

JULIUS OTTO KAISER AND HIS METHOD OF SYSTEMATIC INDEXING:
AN EARLY INDEXING SYSTEM IN ITS HISTORICAL CONTEXT

BY

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DISSERTATION

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Library and Information Science
in the Graduate College of the
University of Illinois at Urbana-Champaign, 2013

Urbana, Illinois

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Abstract

Julius Otto Kaiser (1868–1927) was a special librarian and indexer who developed, in last years of the 19th, and the first years of the 20th, centuries, an innovative method of subject indexing known as systematic indexing (SI). Although Kaiser has long been recognized as a pioneer in the field of knowledge organization (KO) and SI has been considered to be a theoretically significant knowledge organization system (KOS), little has been known about his life and, to date, discussion of his system has, with rare exceptions, tended to focus on two features of his system: (1) its use of a limited set of categories to partition an index vocabulary into classes of terms and (2) its stipulation of syntactic rules for combining terms into complex index terms. The aim of the present investigation is to provide a more detailed and historically informed account of SI and its creator than has hitherto been attempted so as to contribute to a better understanding of the design features of the system and the rationale underwriting them. To this end, the study addresses three questions: What was Kaiser's background and what was the character of the milieu in which he created and developed his indexing system? What were the main methodological and theoretical features of SI as he conceptualized them? And how did the milieu in which he worked shape the design of his system and his conceptualization thereof?

A biographical framing of Kaiser and SI shows that, after receiving a trades-oriented elementary and secondary education in the German city of Stuttgart and working as a freelance teacher of language and music and, later, a private school teacher in Queensland and Chile, Kaiser entered into library and indexing work at the Bureau of Information of the Philadelphia Commercial Museum (PCM) in 1896, where he conceived of, and began to develop, his indexing system. Subsequently, in 1899, he moved to London where he worked successively for the Commercial Intelligence Bureau, Ltd.; the British Westinghouse Company, Ltd.; and the Tariff Commission, a private research organization associated with the Joseph Chamberlain's Tariff Reform movement, all the while refining his system of indexing. During his tenure at the Commission, he published his two major works, *The Card System at the Office* (1908) and *Systematic Indexing* (1911), both of them directed to a business-managerial readership. Having gained a reputation as an indexing expert in the wake of these publications, Kaiser subsequently was engaged to reorganize the correspondence department of the munitions firm Vickers et al. and the works library at the Ardeer factory of Nobel's Explosives Company, Ltd. The systematic card index that he created at the latter institution was well received there and his collaborators in

implementing it publicized SI among their colleagues in the chemical industry and in the realm of special librarianship: as a result, it was adopted by several British industrial libraries in the late 1910s and early-to-mid 1920s. In 1914, after the outbreak of the First World War, Kaiser returned to the United States, where he eventually found work as a bibliographic researcher at the Engineering Societies Library (ESL) in New York and as an editor, reviewer of foreign journals, and indexer with the American Society of Mechanical Engineers (ASME). In 1926, apparently at the behest of colleagues in Great Britain, he wrote a summary exposition of SI for the third conference of the Association of Special Libraries and Information Bureaux (ASLIB), which brought his system into the public eye once more. Shortly after undertaking work to reorganize the library at the Experimental Station of the Hercules Powder Company in Kenvil, Delaware, in 1927, Kaiser died in an automobile accident; after his death, interest in SI was largely restricted to British industrial librarians until the 1950s, when it became known to the broader communities of general librarians and information scientists. The foregoing conspectus of Kaiser's professional life shows that, over the course of his career, he shifted from working in organizations with a focus on commercial and economic information to ones oriented toward applied-scientific and technical information. The study gives detailed descriptions of the informational and knowledge-organizational practices of each of the foregoing institutions.

A close reading of Kaiser's works in light of contemporary literature on knowledge organization reveals that SI represented a distinctive vision of knowledge organization. He intended his indexing system to be used in an intelligence department or business library—i.e., a specialized department within a business organization dedicated to the collection, organization, and distribution of (diverse sources of) information. Within such a setting, he endorsed the use of a system of document classification based upon the type, or form(at), of documentary material, thus entirely dissociating the organization of documents from the indication of their informational contents: SI fulfilled the latter function, which resulted in the creation of a systematic card index. Kaiser endorsed a form of highly analytical indexing, or informational analysis, the goal of which was not to characterize the subjects of documents as wholes but to indicate the subjects of individual pieces of information within documents; such items of information were to be selected for indexing on the basis of their congruence with the particular sphere of interests of the organization for which an index was being created. Espousing an empiricist approach to knowledge and language alike, Kaiser advocated deriving an index vocabulary directly from the (pieces of) texts being

indexed: in his view, terms, or verbal units naming things and their attributes, were the basic building blocks of the index. The relationships among terms were articulated in accordance to two orthogonal classificatory structures embodying a category semantics and a relational semantics. The category semantics of SI stipulated that each term in an index vocabulary was to be assigned to one, and only one, of three term categories: terms of concretes, terms of countries, and terms of processes, whereas relational semantics mandated that terms belonging to the same category—in particular, terms of concretes or terms of countries—could be set into hierarchical relationships whereby relatively more general, or collective terms, stood in superordinate relationships to relatively more specific terms and relatively more specific terms stood in subordinate relationships to relatively more general or collective terms. Kaiser advocated that one select index terms that were as specific as possible on the grounds that specific information, or information on specific subject, was more useful in business contexts than general information.

The category-semantic distinction between terms of concretes, terms of countries, and terms of processes was foundational to SI. These categories formed the basis for the construction of complex index terms, or statements, in which no fewer than terms from different categories were combined into a single string of no fewer than two and no more than three terms in accordance with strict syntactic rules which determined the position of each component term on the basis of its membership within a category: a statement, then, consisted of first, or main filing term, which was invariably a term for a concrete or a term for a country, and one or two terms functioning as subdivisions. Conceptualized as unified expressions of informational content, statements served as the nuclei around which index items—i.e., structured representations of individual pieces of information that indicated both their content and their bibliographical *loci*—were formed: indeed, they served as a means for identifying, and isolating, these pieces of information within texts in the first place. Furthermore, statements (or, rather, the component terms thereof) also provided the basis for the organization of index items within a card file, which were arrayed in alphabetical order, beginning with the first, or main filing term, and extending to the subdivision(s) thereof. The internal structure of statements also was mapped onto a sophisticated system of five-position guide cards, the function of which was to visually mark the position of individual main terms and (some of their) subdivisions within a file for the benefit of index users. Overlaying this alphabetical file structure was a system of cross-references indicating semantic relationships between the first, or main terms, of statements. Understood by Kaiser

to server as substitutes for “logical classifications”, cross-references took the form of lists of “related terms” inscribed upon the guide cards for main terms, by means of which persons consulting an index could navigate the index to find information on subjects collateral to those for which they were searching: based primarily on hierarchical relationships between terms, the syndetic structure of SI is remarkable for its admission of polyhierarchy. All in all, Kaiser’s method of indexing was marked by two central qualities: systematicity and a concern with catering to the individual informational requirements of particular business organizations. In negotiating the tension between the two, SI reflected a fluid interplay between theoretical principle and the pragmatic imperatives of indexing.

With regard to the foregoing, the present study offers detailed and analytic descriptions of Kaiser’s views on information analysis, the epistemological and linguistic assumptions informing his work, his (not entirely unproblematic) definitions of the categories and the rationale underlying the syntax of statements, his method of formulating both statements and index items, his views on alphabetization and cross-reference structure, and the techniques he used to implement these within the technological medium of the card index: throughout, an effort is made to show how Kaiser’s theoretical views found expression in the methodological protocols of SI.

Finally, this study demonstrates that some of the central features of SI were strongly conditioned by the discursive and institutional milieu in which Kaiser worked, particularly the Bureau of Information at the PCM where he first developed his system, as well as by his personal temperament and epistemological views. His conception of the function of the intelligence department and his views on analytical indexing, or information analysis, seem to have derived from the informational régime of PCM’s Bureau, while his system of term categories was based, at least in part, on categories used at the Bureau to structure its system of index files and, more broadly, at the PCM to organize its museal exhibits. Interestingly, over time, as Kaiser moved from working for organizations interested primarily in commercial information to ones dealing mainly with technical information, he altered his characterizations of the categories of concretes and processes: definitions that had originally been framed in terms of commercial, trade-related interests took on a slightly more industrial-technical coloring. Kaiser’s emphasis upon systematicity, a quality towards which he seems to have had a natural inclination, was largely shaped by the contemporary discourse of business and office organization, within which he situated his own books, while his valorization of individuality in indexing was tributary not only to this discourse but also

to his own personal proclivities and strongly individualist epistemology. Kaiser, then, was very much a child of the times and socio-professional circumstances in which he lived and in which he developed SI: nevertheless, certain features of his indexing system, such as its principled use of categories; incorporation of polyhierarchical classificatory structures into its cross-referential structure; and generally domain-analytical approach to knowledge organization still make it highly relevant to ongoing theoretical and methodological discussions within the field of KO.

S láskou a vděčností věnuji tuto práci

- památce milovaného otce Tomáše Patrika
- milované matce Miloslavě Kamile
- drahým bratrům Patrikovi a Dominikovi

I dedicate this work with love and gratitude

- to the memory of my beloved father, Thomas Patrick
- to my beloved mother, Miloslava Kamila
- to my dear brothers, Patrik and Dominic

Acknowledgements

A dissertation is generally understood to embody the creative scholarly work of a single individual and so, by convention, is credited to a single author. Given the academic practices and norms that define the doctoral thesis as a textual genre, this is entirely appropriate: after all, it is the student-author who undertakes the collection, coordination, and interpretation of the information contained in a thesis and gives form to the textual (re)presentation of this information. Yet, it is never the case that the author of a dissertation excogitates, researches and writes it in a vacuum. Rather, he or she draws upon intellectual, spiritual, affective, and logistical assistance from a constellation of persons and/or institutions, who (or, in the case of institutions, which), in virtue of the support that they provide to the author, can justly be said to participate in the creation of his or her work. The process of researching and writing the present dissertation has been no exception to this general truth and, accordingly, it is my great pleasure and privilege here to acknowledge those persons and institutions who have helped me, in various ways, to bring my dissertation project to a successful conclusion.

First of all, I should like to thank, *de profundis cordis*, the members of my Dissertation Committee, who took upon themselves the task of overseeing my work and examining me on it. Dino Buzzetti, whose own meticulous studies of 19th-century British logic served as one source of methodological inspiration for my own attempt to undertake a joint systemic and historical approach to the study of Kaiser's method of Systematic Indexing, served as external reader and I benefited greatly from his probing questions and comments at my examination. Alistair Black, whose numerous and groundbreaking studies on the history of librarianship and of information management were, for me, an invaluable resource for understanding the kinds of social, professional-cultural, and institutional frameworks within which Kaiser operated and developed his system, served as internal reader. In the earliest stages of the project, he advised me to include archival sources in my research and plied me with suggestions about which ones to visit: in its latter stages, he generously shared bibliographical references and prepublication copies of articles of his pertaining to the theme of my research. His exhortations to hit the archives led me to explore the historical background of Kaiser and SI in much greater detail than I had originally anticipated and, in this way, they decisively enriched the scope and depth of this study. Allen Renear, who served as chair of my committee at a time when he had been called to the demanding duties of acting as Interim Dean of the Graduate School of Library and Information Science (GSLIS) at the University of Illinois, Urbana-Champaign (UIUC), provided benevolent and patient

oversight over the sometimes glacial-seeming progress of the project and found time in his very busy schedule to discuss my work with me and encourage me whenever the need arose. No less important, the example of analytical rigor in approaching questions of knowledge organization that he sets in his own work and teaching and his genially expressed, yet firmly held, conviction that, in order truly to understand the meaning of words and utterances, one must pay close attention both to the logical structures underlying (a) language and the ways in which (that) language is used to express these structures were general methodological lodestars with which I oriented my mode of reading, and interpreting, Kaiser's written expositions of the method of Systematic Indexing.

I owe an especial debt of gratitude to Kathryn La Barre, my director of research. It was under her tutelage that I first began seriously exploring Kaiser's indexing system in the first years of my doctoral program and it was with her strong encouragement and support that I continued to extend, develop, and refine my analysis thereof. In her capacity as director of research, Kathryn bore the brunt of superintending a student not blessed with a strong sense of logistical practicalities and a writer whose writing process is nearly as plodding as his prose. Over the course of my thesis work, I profited greatly from her deep knowledge of the history of KO and its literature, her wise advice to distinguish carefully between what Kaiser said about his system and what later commentators have said about it, and her sound, constructive counsel regarding issues of discursive presentation, imparted to me in the course of conversations regarding earlier drafts, which she read and marked with attentive care. Kathryn also proved to be a superb manager for an advisee stamped with incorrigible over-scrupulosity in matters of documentation and a seemingly limitless capacity to miss the forest for the trees therein. She gave me freedom to pursue the numerous themes that emerged from my reading of Kaiser's works and consideration of his historical context but also reined me in with unerring skill and unfailing tact when my explorations started to lead towards unfruitful byways and stasis threatened. As my drafting of the thesis slowly, all too slowly, inched its way towards completion, Kathryn made sure that I stayed reasonably on track and gave me every facility to work on the difficult task of formulating my thoughts in passable prose. In the latter regard, she gave me support even to the point of self-sacrifice: in the Fall Semester of 2012, when I served as a teaching assistant for her in three sections of a heavily registered introductory course on the organization of information, she arranged my duties in such a way that I had additional time to write, even though this required that she shoulder additional burdens in the administration of the course. In sum, it is no exaggeration

to say that, without Kathryn's skillful, selfless, and patient guidance, this thesis would probably never have finally seen the light of day: I am immensely grateful to her for all the pains that she took in directing my work and seeing it through to the end.

The scope of the dissertation required that I consult a wide range of documentary materials, both published and unpublished, pertaining to Kaiser's life, times, and indexing system. Many persons representing a number of different institutions helped me to locate and gain access to these sources (or, in some cases, to recognize limits in the known historical record) and I am happy to thank them for their help. Steven Conn, Professor of History at the Ohio State University, Matt Herbison, erstwhile curator and librarian at the Independence Seaport Museum in Philadelphia, and Marge McNinch, former archivist at the Hagley Museum in Wilmington, Delaware, all provided me with information about the fate of the Philadelphia Commercial Museum's administrative papers and the current lay of the land regarding unpublished sources pertaining to the museum, while Christopher Olson of the Linda Hall Library in Kansas City, Missouri, and one of his assistants, whom I know only by the name of Cindy, searched its collections on my behalf to ascertain that the Engineering Society Library's minute books and other administrative documents were not housed there. Linda Gross of the Hagley Museum provided me with a copy of one of Kaiser's obituaries—a most valuable document for my purposes, while Jeffrey Rickertt and Cathy Leutenegger of the Fryer Library of the University of Queensland answered my inquiries about archival materials pertaining to Kaiser's family there: Cathy, in particular, examined those materials on my behalf and provided me with copies of a list of Kaiser's siblings and of an article about one of his brothers previously unknown to me. I should also like to record my gratitude to the National Archives of the United Kingdom, which supplied me with copies of documents pertaining both to Kaiser and to the Commercial Intelligence Bureau, Ltd.; the National Archives of Australia and Queensland State Archives, which made available to me copies of various official documents relating to Kaiser's family; the Family Research Center of the Champaign Illinois Stake of the Church of Jesus Christ of Latter-Day Saints, which gave me access to copies of immigration documents of the Kaeser family; and Ancestry.com, through which I was able to obtain copies of documents from the United States National Archives: all these sources proved most useful in my research. During a study trip to England that I undertook in April of 2011, a number of institutions opened their doors to me. I thank the Archives at the British Library of Political and Economic Science at the London School of Economics (LSE), the British Library's Newspaper Reading Rooms at Colindale, and the

Department of Special Collections at the Bodleian Library of Oxford University for granting me access to rare or unique materials in their collections and allowing me to consult them for this study: it is also with fond memories and great gratitude that I thank all the librarians and archivists who patiently answered my questions and offered assistance to me before, during, and after my visits to their institutions. Closer to home, I should like to thank warmly the staff of the ILL division of the University Library at UIUC, who procured for me, with exemplary efficiency, speed, and care, those books and articles that had not made their way into the impressively extensive collections of the library, which is one of the university's greatest resources and treasures. Finally, I would be remiss if I did not mention some of the digital collections that currently offer free access—copyright permitting—to electronic versions of books and newspapers that were useful to me in the course of research. In particular, I should like to acknowledge Trove at the National Library of Australia, the Internet Archive, and Google Books, all of which proved to be veritable treasure troves of primary source materials. It is my fervent hope that these and similar sites—especially those associated with vested commercial interests—will continue to contribute to the public good by maintaining a policy of open access in perpetuity.

I also owe a debt of gratitude to the various organizations and institutions that have given me permission to quote or reproduce copyrighted materials. This dissertation has required a close reading of, and hence abundant quotation from, Kaiser's writings. I should like to thank Aslib and Emerald Publishing for their liberality in permitting me to quote extensively from Kaiser 1926: all other works of Kaiser from which I quoted copiously—Kaiser 1908; 1911; 1918—are in the public domain. I have also had to quote directly from unpublished archival materials: in this regard, I should especially like to express my gratitude to the Bodleian Library, Oxford University, for kind permission to quote from the British Westinghouse papers in the Marconi Archive and to the Queensland State Archives and the Department of Justice and Attorney General of the State of Queensland for permission to quote from legal documents pertaining to Johann Jacob Kaeser. I have also made use of a number of images in this dissertation. I am very grateful to the Hagley Library and Museum for permission to reproduce the portrait of Kaiser in the Frontispiece; to the British Library for permission to reproduce the image in Figure 1b; to the University of Illinois Press for permission to adapt Figure 17 from Shannon & Weaver 1949 [1998], 7 & 34; and to Aslib and Emerald Publishing for permission to reproduce the images for Figures 48b and 50 from Kaiser 1926, 24 & 39. All other images used in this dissertation are either

taken from works in the public domain—namely, Barbour 1921; Betts 1900; Hudders 1916; Kaiser 1908; 1911; Tariff Commission 1909; and Wigent, Housel, & Gilman 1916—or were created by me. I have left no stone unturned in seeking to identify and contact copyright holders for unpublished archival documents and images alike. If, in making use of these kinds of materials, I have, through lack of knowledge on my part, inadvertently infringed upon anyone’s copyright, I sincerely apologize.

It is a great pleasure to express my gratitude to the institution at which this dissertation was conceived, researched, and written: GSLIS at UIUC. GSLIS has a noble tradition of fostering research on the historical dimensions of library and information science (LIS) and is one of the few iSchools—perhaps the only iSchool in an increasingly technically-oriented age—in North America where historically-inflected doctoral projects such as mine can find strong support: needless to say, I count myself extremely fortunate to have had the opportunity to pursue my studies in such an intellectually congenial and vibrant environment. I am also grateful for the financial support that I received from GSLIS and the Graduate College at UIUC over the years of my doctoral studies. A Distinguished Illini Fellowship from the Graduate College enabled me to concentrate fully on my coursework in the early years of my program, while the Lucile Huntington Wilkinson Memorial Endowment Fund, the Josie B. Houchens Fellowship, and the Rayward Doctoral Fellowship, all administered through GSLIS, provided much-needed financial assistance at various points in the process of researching and writing up my dissertation: I should like to thank the persons who endowed the latter three fellowships for their far-sighted generosity. I also want to express my grateful appreciation to all the people in the front office and the administrative side of GSLIS, especially Kathy Painter, Valerie Youngen, Penny Ames, and Associate Dean Linda C. Smith, who cheerfully and effectively helped smooth my path through the bureaucratic thickets of studentdom whenever the need arose: their work, not always as visible as it should be in the eyes of the wider world, contributed greatly to creating and maintaining the infrastructural conditions of possibility within which I could carry out my work.

A number of persons at GSLIS helped me as I researched Kaiser and his indexing system and I would like to thank them here. W. Boyd Rayward, whose studies of Paul Otlet and his world are justly regarded as exemplary works of historical scholarship within LIS, was my primary adviser at GSLIS prior to his retirement, introduced me to the historical landscape of library and information science, and encouraged my interests in this domain: he kindly

served as a “shadow adviser” in the earliest stages of my dissertation work and his insistence that any examination of Kaiser’s system should take the historical context into account helped set the tone for the dissertation. I gratefully thank him for his advice and strong support of my scholarly endeavors. A doctoral seminar taught by Dan Schiller that explored, in a historical vein, the social, cultural, and economic aspects of information in society provided me with the occasion to begin developing my biographical framing of Kaiser and Systematic Indexing: I thank Dan for inviting me to participate in this seminar, which enlarged my vision of information history and, ultimately, Kaiser’s place in it. John Unsworth, erstwhile dean of GSLIS, helped me make initial contact with Dino Buzzetti: I thank him for this aid in networking. The Research Writing Group (RWG), run by Dave Dubin, a true *Allgemeinlehrter*, provided a genial forum for presenting the results of my first, sometimes painful, attempts at setting down the parameters of my research project on paper: I am deeply grateful to Dave and other participants in the group, especially Jeff Ginger and Karen Medina, for their patient reading of my manuscripts and their constructive and encouraging comments thereon. Karen Wickett, who until recently presided over the Conceptual Foundations Group (CFG), graciously allowed me to give a series of talks to the group, in the summer of 2011, on Kaiser’s theory of classification, despite the fact that this theme lay on the periphery of the CFG’s interests: I thank Karen and other members of the group, especially Alan Bilansky, Dave Dubin, Aaron Fleischer, Katrina Fenlon, and Allen Renear for their participation at these presentations, the substance of which was later rearticulated into Chapter 6, Sections 3.1 and 3.2.2.2, below. Finally, and more informally, a number of fellow students, former students, and members of the GSLIS staff offered, over the course of countless conversations, intellectual stimulation, encouragement, support, and, when the occasion called for it, commiseration: in particular, I would like to thank Chris D’Arpa, Sharon Johnson, Lucy Moynihan, Caroline Nappo, Ellen Rubenstein, Ingbert Schmidt, Julie Smith, Mikki Smith, and Richard Urban, all of whom were willing patiently to listen to the latest reports from the dissertation front and to offer words of good cheer whenever I seemed to be floundering in a slough of writing-induced despond. Their intellectual and affective support helped keep me going.

I was also fortunate to be favored with support of various kinds from quarters outside of GSLIS, which it is fitting to acknowledge here. First I wish to thank Fran Miksa, author of several magisterial studies on Charles A. Cutter and on the history of modern library classifications. Although I have never had the pleasure of meeting Fran in person, his works

have had a profound influence on my own scholarly outlook. Both his biography of Charles A. Cutter (Miksa 1974) and his historically-informed systemic analysis of Cutter's rules for constructing subject headings (Miksa 1983a) served as models for the methodological approach that I adopted for this project and, at a critical juncture in writing, the former of these works provided a template for the final structure of the dissertation. In addition, Fran took the trouble to comment on my dissertation proposal and sent me, by private communication, bibliographic suggestions with regard to themes broached in Chapter 7, Section 3.1.1, below. For all this, I am most grateful. I should also like to thank David Muddiman, who shared with me the results of his research on the Imperial Institute and the Commercial Intelligence Branch of the Board of Trade prior to its publication (see now Muddiman 2011): his responses to my queries had the salutary effect of disabusing me of my early erroneous assumption that the Commercial Intelligence Branch was the same institution as the Commercial Intelligence Bureau, Ltd. (on which, see Chapter 4, Section 1, below). I am also grateful to Fidelia Ibekwe-SanJuan, who invited me to take part in the Colloque sur l'épistémologie comparée des concepts d'information et de communication (EPICIC) held at her home institution, the Université Lyon 3, on 8 April, 2011: there, I had the opportunity to present a paper (Dousa 2014) preliminarily addressing topics that would receive fuller development at various points in Chapter 7, Sections 1, 2.1, 3, 3.1.2, and 4.3, below, and I thank the participants at the conference for their comments. I likewise benefited from the opportunity to deliver, at the 3rd North American Symposium on Knowledge Organization (NASKO 2011), held at Ryerson University in Toronto on 18–19 June, 2011, a paper (Dousa 2011) setting forth, *in nuce*, the results of research that has now received full expression in Chapter 7, Sections 3–3.4, below: I thank members of the audience for their feedback. Finally, in the course of various private communications regarding other themes and theoretical issues relating to knowledge organization, Fidelia, Claudio Gnoli, Rick Szostak, Richard Smiraglia, and Charles van den Heuvel sent collegial messages of encouragement: in their own unassuming way, these messages helped me to persevere when energy was flagging and I am grateful for them.

Outside of the groves of LIS-related academe, I benefited greatly from the kindnesses shown me by various persons in the Urbana-Champaign area and in Chicago. In Urbana-Champaign, Lu Pillar and her husband Jim, Shirley Kolb, and my neighbor (and veteran GSLIS alumna) Clara Castelo provided spiritual and affective support by inviting me to dinner (Lu & Jim), indulging in conversations on everyday matters (Clara, Lu, & Shirley), and praying for

me (Lu, Jim, & Shirley): I am grateful for their gifts of friendship and fellowship. I should also like to record my gratitude to the members of the parish community of St. Patrick Catholic Church in Urbana for keeping me grounded in the things that really matter. Furthermore, I wish to acknowledge my profound indebtedness to Dr. Sherfield Dawson III, surgeon at the Carle Foundation Hospital in Urbana, who, four-and-a-half years ago, saved my life during a medical emergency: without the decisive intervention of his gifted hands, I would never have had the opportunity to undertake my dissertation work in the first place. In Chicago, my former teacher at the University of Chicago and erstwhile racquetball partner, John A. Brinkman, always found time to meet with me during my visits to that fair city and talk about life in general: I thank him for all those conversations (and the lunches accompanying them, for which he always generously picked up the tab).

I especially wish to express my deep gratitude to the members of two families for the love, inspiration, and many kindnesses that they continuously bestowed upon me over the course of my dissertation work. First, my dear friends, Ken Sawyer, his wife Patty Cloud, and their three lovely daughters Elisabeth, Jane, and Anna—the latter two of whom, twins, are my goddaughters—welcomed me into their home during my visits to Chicago or took the time to drive down to Urbana to visit me. Their vibrant family circle always provided a warm and affectionate haven offering some respite from the cares of dissertation-making, while Ken and Patty, both of them alumni of the Graduate Library School at the University of Chicago, were always ready to turn a sympathetic ear to me whenever I needed it. I am truly blessed to be able to count the Sawyers as my second family.

Second, I thank, *de profundissimis cordis*, the members of my own family, who have been an unfailing source of love, encouragement, and support in so many things. I wish to thank my uncles—Ivo Rybář, Jan Švehla, and Václav Švehla—and my cousins—Stanislav Švehla and Jan Rybar—for procuring for me Czech-language books relating to my research that were not available on this side of the Atlantic. Closer to home, I am deeply grateful to my brother Patrik Michal Douša, who, in the late spring and early summer of 2012, undertook to read and comment on early drafts of what would eventually become chapters 1–5 and 8–10—all while he was busy drafting his own M.A. thesis in Science, Technology, and Environmental Policy and working on various IT projects. His enthusiastic reaction to what I had written did much to renew my resolve at a point when my work seemed to be languishing in the doldrums, while, later in the writing process, the encouragement offered by him and his then fiancée, now wife, Kaji Spellman Douša helped to spur me toward the finish. I also wish to

thank my other brother, Dominic Matthew Dousa, and his wife, Nayeli López Romo Dousa, themselves no strangers to the rigors of writing doctoral theses, for their patient willingness to hear me out whenever I needed to talk about the writing process and their unremitting encouragement to “get the thing done”. Furthermore, I should like to give a special shout-out to their son Diego Alberto Dousa, who was born in June 2012, when approximately one-third of this dissertation had been written: his presence, which has brought great joy to both sides of his family, and his unfolding acquaintance with the world around him, which I have been able to follow from afar via Skype, have been delightful distractions from the work-a-day world of research and writing.

My sentiments of gratitude reach their highest pitch of intensity when my thoughts turn to my parents, Thomas Patrick and Miloslava Kamila Dousa. Sadly, my father, who was a medical research scientist, passed away long before I entered upon my doctoral studies at GSLIS and I never had the opportunity to introduce him to, or discuss with him, the subject of my research, so different from his own. Yet, many of the values and ideals that he modeled for me through his own example—above all, a profound respect for, and love of, the life of the mind and a faithful dedication to one’s calling as a researcher—have become part and parcel of my character and have continuously informed my approach to my own work: I would like to think that this work reflects, in some small way, his great and noble spirit. My mother, who, in addition to her maternal vocation, has had experience as an attending physician, a lab researcher, a pathologist, and an interpreter, is a remarkable woman who has been a constant beacon of love, a source of wisdom, and all-around purveyor of encouragement to me from the very beginning. Sharing in full my father’s values and ideals, she has also been a truly inspiring model of lifelong learning, whose example, again, has left an indelible imprint on her son. She followed the progress of my work with avid interest throughout its gestation and development, read portions of the thesis to comment on its readability, and was willing to discuss just about any matter pertaining to the dissertation in particular and life in general: probably no “layperson” outside of LIS alive today knows as much about Kaiser and his indexing system as she now does. More generally, she has been generously unstinting in her support of me and my work in every way imaginable; my thankfulness to, and for, her knows no bounds. The dedication of this dissertation to my parents and my brothers is but a poor and imperfect token of the filial and fraternal love and devotion that binds me to them.

Finally, mindful of the truth that “every good gift and every perfect gift is from above” (James 1: 17), I wish to render my thanks to the Author of All. In this I can do no better than to quote the words with which the *poverello* of Assisi opens the Cantic of the Sun: “Altissimu, onnipotente, bon Signore, / Tue so’ le laude, la gloria e l’honore et onne benedictione” (St. Francis of Assisi, *Laudes Creaturarum*, ll. 1–2, in Dionisotti & Grayson 1949, 35).
Deo gratias!

Table of Contents

Table of Figures.....	xxi
List of Commonly Used Abbreviations	xxiv
Frontispiece.....	xxvi
Chapter 1. Prolegomena to a Study of Julius O. Kaiser's Theory and Method of Systematic Indexing.....	1
1.1 Introduction: Julius O. Kaiser and Systematic Indexing (SI)	1
1.2. SI in the Disciplinary Consciousness of Knowledge Organization (KO): Limitations and Possibilities	3
1.3. Research Questions and General Methodological Orientation	11
1.4. A Systemic Approach to SI: Method and Sources.....	12
1.5. A Historical Approach to SI: Methods and Sources.....	24
1.5.1. Biographical Framing.....	25
1.5.2. Historically Contextualized Comparison: Contexts of Professional Discourse	30
1.5.2.1. Office Organization.....	31
1.5.2.2. Special Libraries and Information Bureaux	37
1.5.2.3. Early European Documentation.....	42
1.5.2.4. Classification and Cataloging in General Librarianship	47
1.5.2.5. Literary Indexing	49
1.5.2.6. The British Logic Textbook Tradition.....	55
1.5.2.7. Other Contexts	57
1.6. Outline of the Dissertation.....	58
Chapter 2. From Kaeser to Kaiser: Early Years, 1868–1896.....	64
2.1. German Origins: Stuttgart and Environs, 1868–1886	64
2.2. Coming of Age Down Under: Brisbane and Toowoomba, 1886–1892.....	72
2.3. Chilean Interlude: Viña del Mar, 1892–1896.....	79
Chapter 3. At the Philadelphia Commercial Museum, 1896–1899	
The Origins of Systematic Indexing.....	84
3.1. Career Climacteric: from Chile to Philadelphia, 1896	84
3.2. The Philadelphia Commercial Museum: Its Mission and Work	85
3.3. Knowledge Organization at the Philadelphia Commercial Museum	97
3.3.1. Knowledge Organization in the Museum Exhibits	99
3.3.2. Knowledge Organization at the Bureau of Information	102
3.3.3. The Origins of Systematic Indexing.....	108
Chapter 4. First Years in London, 1899–1903: At the Commercial Intelligence Bureau, Ltd., and British Westinghouse	122
4.1. The Commercial Intelligence Bureau, Ltd.	122
4.2. In Library Service to the British Westinghouse Corporation	131
Chapter 5. At the Tariff Commission, 1904–1911: The Elaboration of Systematic Indexing.....	139
5.1. The Tariff Commission: Historical Background and Origins	139
5.2. The Tariff Commission and Its Investigative Activities	152

5.3. Information Work at the Tariff Commission and the Elaboration of Systematic Indexing.....	163
5.4. The Appearance of Systematic Indexing in Print, 1908 and 1911	181
Chapter 6. Systematic Indexing (I): Institutional and Knowledge-Organizational Context.....	189
6.1. Systematic Indexing and its Context: General Considerations	189
6.2. The Institutional Context for Systematic Indexing: The Intelligence Department and Business Library.....	195
6.2.1. Historical Background: The Concept of an Intelligence Department	195
6.2.2. Kaiser's Conception of the Intelligence Department.....	198
6.2.3. Kaiser's Conception of the Business Library	203
6.2.4. The Unity of the Intelligence Department and Business Library in Kaiser's Thought: Some Conceptual Issues.....	211
6.2.5. The Intelligence Department and Business Library: A Summary View	216
6.3. Kaiser and The Organization and Retrieval of Documentary Materials	217
6.3.1. Kaiser's Classificatory Template for the Physical Organization of Documentary Materials	219
6.3.2. Kaiser and the Dissociation of Shelf Classification from Subject Indication: Practical and Theoretical Perspectives	228
6.3.2.1. Practical Considerations	229
6.3.2.2. Theoretical Considerations	231
6.3.3. Kaiser's Dissociation of Subject Indication from Document Classification: Concluding Comments	249
6.3.4. Card Registers: Kaiser's Mechanism for Document Retrieval.....	252
Chapter 7. Systematic Indexing (II): Theory and Method.....	273
7.1. Systematic Indexing as Information Analysis and Control	273
7.2. The Theoretical Foundations of Systematic Indexing: Epistemological and Linguistic Aspects.....	297
7.2.1. The Epistemological Background to Systematic Indexing	299
7.2.2. The Linguistic Assumptions Underlying Systematic Indexing.....	321
7.2.2.1. Written Language and its Semantic Discontents.....	323
7.2.2.2. Kaiser's Model of Written Communication	336
7.2.2.3. Terms: The Elementary Units of Systematic Indexing	343
7.2.2.4. Two Semantic Classifications of Terms in Systematic Indexing.	349
7.2.2.5. Specificity in Systematic Indexing.....	364
7.3. Categories, Statements, and the Categorial System of Systematic Indexing	373
7.3.1. The Category of "Concrete"	380
7.3.1.1. Lexicographical and Conceptual Background to the Category of "Concrete"	381
7.3.1.2. Kaiser's Category of "Concrete".....	402
7.3.2. The Category of "Country"	413
7.3.3. The Category of "Process"	420
7.3.3.1. Lexicographical and Conceptual Background to the Category of "Process"	421
7.3.3.2. Kaiser's Category of Process	426
7.3.4. Kaiser's Category Scheme: Dyadic in Theory and Triadic in Practice	448
7.3.5. Categories and the Syntax of the Statement	477
7.3.6. Semantic and Syntactic Limitations of Categories and Statements: Problems and Solutions.....	489

7.4. The Technique of Systematic Indexing.....	507
7.4.1. The Selection and Preparation of Documents for Indexing.....	508
7.4.2. The Derivation and Formulation of Statements	509
7.4.3. The Formulation of the Amplification.....	520
7.4.4. The Index Item as Unit Record.....	538
7.5. The Organization of Index Files in Systematic Indexing: Alphabetical Order and Cross-References.....	551
7.5.1. The Alphabetical Classification of Terms and Arrangement of Index Items.....	556
7.5.2. Guide Cards, File Structure, and Cross-Reference Structure	583
7.5.2.1. Guide Cards and the Structuring of Alphabetical Card Files	584
7.5.2.2. Guide Cards and the Cross-Reference Structure of Systematic Indexing.....	602
7.5.2.2.1. Cross-references and Guide Cards for Terms of Countries	606
7.5.2.2.2. Cross-references and Guides for Terms of Concretes.....	610
7.5.3. Guide Cards and Cross-References: Concluding Comments.....	651
7.6. Concluding Remarks on Systematic indexing: System and Individuality	658
7.6.1. The Systematicity of Systematic Indexing.....	663
7.6.2. Systematic Indexing and Individuality.....	675
Chapter 8. Indexing Work in Great Britain, 1911–1914: The Implementation and Diffusion of SI.....	695
8.1. Kaiser, the Indexing Expert, and an Interlude at Vickers, Ltd.	695
8.2. At Nobel’s Explosives Company, Ltd., 1912–1914.....	704
8.2.1. Knowledge Organization at Ardeer.....	708
8.3. Afterglow: Ardeer and the Diffusion of Systematic Indexing in British Industrial Libraries, 1914–1926	738
Chapter 9. Return to America, Death, and Aftermath	744
9.1. Dislocation: The Outbreak of War and Return to America, 1914.....	744
9.2. At The Engineering Societies Library, 1916–1923	747
9.3. At the American Society of Mechanical Engineers, 1917–1926	760
9.4. Systematic Indexing Revisited: Kaiser’s Paper for the ASLIB Conference of 1926.....	773
9.4.1. Systematic Indexing: Continuity and Change.....	779
9.5. Hercules Powder Company and Death, 1927	824
9.6. Systematic Indexing after Kaiser: From Practical System to Canonical Profile in KO	830
Chapter 10. By Way of Conclusion	854
10.1. Conclusions about Kaiser, his Background, and his Career	856
10.2. Conclusions about the Methodological and Theoretical Features of Systematic Indexing.....	868
10.3. Conclusions about Contextually Conditioned Features of Systematic Indexing	884
10.4. Perspectives for Future Research.....	895
Appendix 1. A Glossary of Miscellaneous Technical Terms	910
References Cited	916

Table of Figures

Frontispiece: Portrait of Julius Otto Kaiser (1868–1927)	xxvi
Figure 1a: Example of a card from the domestic directory of the PCM	128
Figure 1b: Example of a card from a reference cabinet of the CIB, Ltd.	128
Figure 2: A mimeographed “daily record”, or current awareness bulletin most likely issued by the British Westinghouse Publishing Department.....	135
Figure 3: Vertical files at the offices of the Tariff Commission, London.....	169
Figure 4: Card index files at the offices of the Tariff Commission, London	173
Figure 5a: Simple entries from “Rebate to counteract preference” to “Retaliation” in the back-of-the-book index to the Tariff Commission Report on the Engineering Industries	177
Figure 5b: Complex entry for “Australia” in the back-of-the-book index to the Tariff Commission Report on the Engineering Industries	177
Figure 6: Kaiser’s classification of business literature.....	225
Figure 7: The universe of classifiable entities according to Kaiser 1911, § 107.....	233
Figure 8: Kaiser’s nomenclature of the English coins of Edward VII.....	237
Figure 9: Kaiser’s subject-based classification for books containing information about the English coins of Edward VII.....	242
Figure 10: The biune nature of books according to Kaiser 1911, §§ 115, 185	244
Figure 11: Sample cards from an alphabetical register for correspondence.....	258
Figure 12: Sample cards from trades, territorial, and numerical registers for correspondence.....	260
Figure 13: Sample set of various register cards for the periodical <i>Engineer</i>	266
Figure 14: The relation of knowledge, literature, and information according to Kaiser 1911, § 53...	298
Figure 15: Overlapping and underlapping visualized according to Kaiser 1911, § 663, s.v. “Overlapping and underlapping”.....	329
Figure 16: Kaiser’s model of the process of written communication	337
Figure 17: The Shannon-Weaver model of communication	338
Figure 18: The Shannon-Weaver model of communication augmented by Weaver’s semantic components	340

Figure 19: An example of information analysis, showing original information, statement, and extension.....	518
Figure 20: The statement and amplification fields on a unit card.....	541
Figure 21: The positions of elements of index items on a unit card	541
Figure 22: Example of a unit card with bipartite statement, an extension taking the form of descriptive annotation, and an indication of length in words at the end of the extension.....	547
Figure 23: Example of a unit card with tripartite statement, an extension taking the form of a descriptive annotation, and bibliographical information including author and indirect author.....	547
Figure 24: Example of a unit card with tripartite statement, an extension taking the form of an informative condense, and no bibliographical information.....	548
Figure 25: Example of a unit card with tripartite statement, an extension taking the form of an informative condense, and bibliographical information for an anonymous author.....	549
Figure 26: Alphabetization as a form of classification	565
Figure 27: Absolute alphabeting vs. alphabetico-classed arrangement	569
Figure 28: An example of an alphabetical filing sequence in SI.....	582
Figure 29: Different cuts of guide cards	585
Figure 30: Card drawer with guide cards	587
Figure 31: The mapping of the component terms of statements onto fifth-cut guides	590
Figure 32: The five-position system of guides applied to a drawer from the Index for Evidence for the Tariff Commission’s Report on Iron and Steel.....	595
Figure 33: Guide card for the term for country SOUTH AMERICA.....	607
Figure 34: Guide card for the term for country CHILE	608
Figure 35: Guide card for the term for country BRITISH WEST INDIES.....	610
Figure 36: Guide card for the term of concrete HARDWARE	629
Figure 37a: Guide card for the term for country IRON.....	631
Figure 37b: Guide card for the term for country BAR IRON.....	634
Figure 38: Guide card for the term of concrete ARTIFICIAL	635
Figure 39: Guide card for the term of concrete SILK.....	636

Figure 40: The structure of cross-references between ARTIFICIAL SILK and SILK	637
Figure 41: Two orthogonal generic hierarchical relationships involving the term of concrete ARTIFICIAL SILK	638
Figure 42: Two forms of entering multiword terms upon guide cards, after Kaiser 1911, §§ 410 & 429	640
Figure 43: The structure of cross-references between ARTIFICIAL SILK and SILK in a specialized index	641
Figure 44: Guide card for the term of concrete COTTON	642
Figure 45: The structure of cross-references between COTTON BLANKET and BLANKET	648
Figure 46: An index card from the files of the Index Proper of the Central Index at Ardeer	715
Figure 47: A main guide card from the files of the Index Proper of the Central Index at Ardeer	726
Figure 48a: A process section card from the files of the Index Proper of the Central Index at Ardeer	732
Figure 48b: Portion of a process section card from the files of the Index Proper of the Central Index at Ardeer	732
Figure 49: The five “ultimate scientific ideas” and two orders of relation in Herbert Spencer’s <i>First Principles</i>	787
Figure 50: Sample “Central Index Unit” with guide card for BOILER	795

List of Commonly Used Abbreviations

I. Abbreviations for Archival Sources

Auswanderungen = Koenigreich Wuerttemberg, *Auswanderungen, Kreisregierung Ludwigsburg 2*, vol. E174, 4422, 1884–1886.

MS. Marconi = Marconi Archives, Bodleian Library, University of Oxford.

NAA = National Archives of Australia

QSA = Queensland State Archives

TCP = Tariff Commission Papers, British Library of Political and Economic Science, The London School of Economics

UKNA = National Archives, United Kingdom

USNA = National Archives, United States

II. Other Abbreviations Used

AIEE = American Institute of Electrical Engineers

AIME = American Institute of Electrical Engineers

ASCE = American Society of Civil Engineers

ASLIB = Association of Special Libraries and Information Bureaux

ASME = American Society of Mechanical Engineers

CIB, Ltd. = Commercial Intelligence Bureau, Ltd.

DDC = Dewey Decimal Classification

EC = Expansive Classification

ESL = Engineering Societies Library

KO = Knowledge organization (*qua* field of study)

KOS = Knowledge organization system

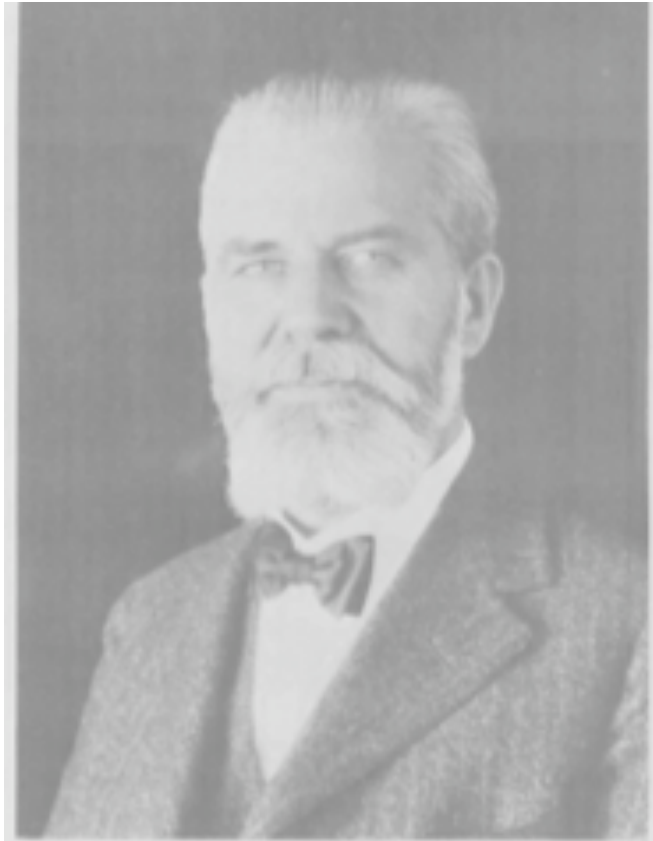
PCM = Philadelphia Commercial Museum

SC = Subject Classification

SI = Systematic Indexing

UDC = Universal Decimal Classification

UES = United Engineering Societies



Frontispiece: Portrait of Julius Otto Kaiser (1868–1927)
Source: Hercules Powder Company 1927,
Reproduction courtesy of the Hagley Library and Museum

Chapter 1.

Prolegomena to a Study of Julius O. Kaiser's Theory and Method of Systematic Indexing

1.1 Introduction: Julius O. Kaiser and Systematic Indexing (SI)

Julius Otto Kaiser (1868–1927) was a special librarian and indexing expert whose career spanned the last years of the 19th, and the first two-and-a-half decades of the 20th, century. He lived and worked during a time of considerable ferment in the field of endeavor known today as knowledge organization (KO) (see Glossary), as a number of librarians and documentalists made pioneering contributions to the theory and practice of bibliographical classification and subject indexing. In 1876, eight years after Kaiser's birth, Melvil Dewey (1851–1931) unveiled the initial public version of his Decimal Classification (DDC), while Charles A. Cutter (1837–1903) put forth the first edition of his *Rules for a Dictionary Catalog (RDC)*: published and publicized at a time when American librarianship was beginning to professionalize, these seminal works served as catalysts for, and emblems of, the coalescence of a professional tradition of knowledge organization in libraries. In 1895, the year before Kaiser entered upon library work, the Belgian Paul Otlet (1868–1944), together with his collaborator Henri La Fontaine (1854–1943), began to adapt the DDC for the purposes of indexing a universal bibliography in card format: the resultant Universal Decimal Classification (UDC), which introduced significant new structural features to those of the DDC's original design, would come to be one of the cornerstones of the documentation movement founded by Otlet and La Fontaine (Rayward 1975, 40–45, 87–97). In the first two decades of the 20th century, as Kaiser's career unfolded at a number of commercial and technical libraries, the first treatises devoted to the exposition of theoretical principles underlying library classification, written by Ernest C. Richardson (1860–1939) and W. C. Berwick Sayers (1881–1960), began to appear (Richardson 1901; Sayers 1912, 1915); these works not only sought to articulate the theoretical foundations for classification for librarians, but also formulated general methodological guidelines for classification practice. Alongside such efforts at theoretical consolidation, these years also witnessed considerable innovation in theory and practice alike. For example, James Duff Brown (1862–1914), one of the leading lights behind the open access movement in British public librarianship, devised the Subject Classification (SC) a highly original, if ultimately unsuccessful, attempt to reconfigure the treatment of subjects in bibliographical classification (Brown 1906; Beghtol 2004a, 2004b); Henry E. Bliss (1870–1955) unveiled the first outline plan of his Bibliographical Classification (BC) and laid the philosophical

groundwork for what would become seminal theoretical works on classification as the organization of knowledge (Bliss 1910; 1915, 1917; 1929; 1938 [1933]); while E. Wyndham Hulme (1859–1954), longtime librarian at the British Patent Office, propounded a theory of cataloging and classification, based on the notion of literary warrant (see Glossary), that directly challenged many of the basic assumptions of his contemporaries (Hulme 1902; 1950 [1911–1912]). Last, but by no means least, in 1924, three years before Kaiser’s death, an Indian pupil of Sayers, Shiyali R. Ranganathan (1892–1972) began to develop a new approach to library classification that sought to overcome the structural limitations that he perceived to hedge traditional classification systems (Ranganathan 1961, 84–85): in the fullness of time, these efforts led to the elaboration of a theory of facet analysis that would exercise a profound influence on subsequent work in classification and indexing (La Barre 2010, 243–244; 253–267).

As the preceding conspectus—brief and selective though it be—indicates, Kaiser’s life and career overlapped with those of the founding fathers of KO, whose work on the design of bibliographic classifications and indexing schemes helped to establish the theoretical foundations of the field. However, Kaiser was more than a contemporary of these pioneers; he was their peer, for he too created a knowledge organization system (KOS) (see Glossary)—or rather, a template for the creation of a particular kind of KOS—of considerable note. This took the form of an innovative method of alphabetical subject indexing that he styled Systematic Indexing (hereafter, SI) (Kaiser 1911, 1926). Formulated within the specialized setting of commercial and technical information bureaux, Kaiser’s technique of SI initially had only a limited vogue, finding use primarily in British industrial libraries, where it came to be known as the “Kaiser system” (e.g., Barbour in Kaiser 1927, 36; Holmstrom 1940, 199–200; Roskill 1946, 17–19; Vickery 1950b, 221; Wright 1946, 40–41) and the indexes produced in accordance to it, as “Kaiser indexes” (e.g., Batten 1947, 37; Jolley 1955, 71; Stolk & Holloway 1974, 17; Vickery 1950a, 144–145). In the latter half of the 20th century, as knowledge of SI became more widely diffused among students of KO, it acquired a reputation as a “sophisticated method of indexing” (Svenonius 1978, 141), the theoretical tenets of which had applicability well beyond the specific contexts for which it had originally been designed (Coates 1960, 39; Metcalfe 1957, 236; Olding 1966, 143–144; Rodríguez 1984, 163). Commentators increasingly recognized Kaiser’s formulation of SI as an important milestone in the development of indexing techniques (Coates 1960, 41; Svenonius 1978, 134; 2000a, 174; Vinayak & Taneja 1986, 344–345); it and its creator were

incorporated into general historical surveys of KO (e.g., Batty 1976, 5–6; Maltby 1975, 132–133; Metcalfe 1976, 175–183); and his writings were taken up into sourcebooks of key texts on subject indexing (Chan, Richmond, & Svenonius 1985, 52–70; Olding 1966, 141–161). In short, Kaiser and his indexing system came to occupy a definite place within the disciplinary consciousness of KO that they continue to hold today. Perceptions of SI, however, have tended to focus on a few of its technical features, which have typically been considered in isolation from their original theoretical and historical context. The potential interest of SI for both the history and theory of KO exceeds its current, somewhat circumscribed image: accordingly, this study will undertake to examine Kaiser’s indexing method in light of its original historical and theoretical context.

1.2. SI in the Disciplinary Consciousness of Knowledge Organization (KO): Limitations and Possibilities

Over the years, KO researchers have noted a number of features in SI worthy of interest, such as the epistemological assumptions on which it is based (Dousa 2008; 2014, 304–307; Sales 2012, 113–115; Svenonius 1978), Kaiser’s conceptualization of it as a method of analytical indexing (e.g., Dousa 2009–2010; 2014, 307–316 ; Metcalfe 1957, 223, 225–226; Sales 2012, 65–67, 118–119), and the nature of its relational structures (Dousa 2007; Vickery 1950a). However, the latter-day valorization of SI is almost entirely due to two of its methodological precepts—namely, that:

- (1). All index terms used to provide subject access in an index are to be assigned to one of a small set of general categories, encompassing terms for *concretes*, terms for *countries*, and terms for *processes* (Kaiser 1911, § 73).

- (2). Once sorted into categories, terms should be combined, by means of stringent syntactic rules, into compound index terms formulated in such a way that a term for a concrete or a country always precedes a term for a process (Kaiser 1908, § 114; 1911, § 302).

The first of these precepts—that all index terms used in an index are to be reduced to a limited set of general categories—mirrors one of the core tenets of the facet-analytic approach to classification and indexing (Gnoli 2004, 12–13; La Barre 2010, 250–251; Maltese 2012, 87; Mills 2004, 551–552; Vickery 1960a, 23–25): accordingly, a number of scholars in KO (e.g., Aitchison, Gilchrist, & Bawden 2000, 70; Broughton 2004, 259; 2006a, 49, with n. 1; 2006b, 108; Chan, Richmond, & Svenonius 1985, 53; Devadason, Intaraksa, Patamawongjariya, & Desai 2002, 67; Frické 2010, 56; 2011, 496–497; Fujita 2003, 74–75;

Riaz 1989, 131–132; Straioto & Guimarães 2004, 111–114; Svenonius 1978; 1979; 1990, 92–93; 2000a, 173–174; Vlasák 1967, 152–156) have come to consider it as prefiguring the idea of fundamental categories later enunciated by Ranganathan (1944, 429–436; 1962, 82–83). The second precept—that composite index terms should be constructed according to a fixed syntax, in which the sequence of the component terms is to be determined by the category to which they belong—has been considered by many observers to mark a notable advance over Cutter’s elaborate, but somewhat open-ended, rules for dealing with compound subject headings (Coates 1960, 41; Foskett 1976, 78–84; Lancaster 2003, 59–60; Metcalfe 1959, 164; cf. Svenonius 1978, 138): indeed, in this regard, commentators have frequently lauded SI as the first alphabetical subject indexing system to set out a fully articulated and explicit “grammar and logic” for the treatment of compound index terms (Olding 1966, 141; cf. Metcalfe 1957, 25, 76; Rodríguez 1981, 329–330; Svenonius 2000a, 6; 2000b, 18). Not only do these two precepts constitute the emblematic features of SI in the eyes of many KO researchers, but they have also helped to define Kaiser’s place within the general narrative framework of KO history, for writers in the field routinely portray him, implicitly or explicitly, as a successor of Cutter, a predecessor of Ranganathan, or both (e.g., Bhattacharyya 1979a, 26–29, 32; 1979b, 97–98; Cervantes 2004, 44–46; Ciekowa 1988, 69–70; Coates 1960, 31–45; Cesarino & Pinto 1978, 286; Iyer 1995, 128–131; Neto 2008, 37–38; Sadowska 2003, 57; Sales 2012; Sales & Guimarães 2010).

The *renommée* of Kaiser and his method of SI within the disciplinary consciousness of KO, then, is a fairly circumscribed one, based primarily upon his use of general categories to synthesize composite index terms (cf. Sales 2012, 15, with n. 4). It is not surprising that this should be the case. As Kaiser (1911, § 645; cf. Chapter 7, Sections 3 & 6.1, below) himself pointed out, the categories constitute the structural lynchpin of his indexing method: thus, it is only to be expected that readers of his work should consider them to be especially salient features of SI. However, there is another factor in play. As Buckland (2002) reminds us, the heritage of a discipline—“what we have in the present, from th[e] past” (Buckland 2004, 171)—is not something that is received *in toto* or *en bloc*: rather, researchers in a field select out, and foreground, those aspects of the theoretical notions and practical techniques created, developed, discussed, and recorded by their predecessors that they believe to be useful or significant in light of current interests. One can readily apply this insight to explaining KO researchers’ perceptions of SI and its place in the history of the field. Some scholars have viewed Kaiser’s prescriptions for the construction of index terms as a useful

resource for thinking about ways to regularize the form and content of subject headings (e.g., Metcalfe 1957, 29–30, 32, 237; 1965, 45, 98–99; Olding 1966, 141–144; Sharp 1967, 161–162): accordingly, his use of categories to provide both a semantic basis and structural form for subject index terms became a natural focus for their attention and his work was brought into relation with that of Cutter. Others have approached Kaiser’s work through the analytical prism of facet analysis (e.g., Straioto & Guimarães 2004; Svenonius 1978; 1979), a research tradition in which, as noted earlier, the idea of fundamental categories plays a prominent role in the design of KOSs: little wonder, then, that these scholars have tended to take a particular interest in those features of SI conforming to their own methodological predilections regarding knowledge organization and to have cast Kaiser in the role of precursor to Ranganathan.

The tendency among KO researchers to focus their attention on those aspects of Kaiser’s method of indexing that seem most relevant to prevailing interests in the field is thus explicable as part and parcel of a natural process of appropriating a heritage. The outcome of this process is that SI has acquired a more-or-less canonical profile—namely, as a category-based template for alphabetical subject indexing—within the disciplinary consciousness of KO. Insofar as this profile has led KO scholars to regard Kaiser’s indexing system as historically significant and so to weave it into key narratives within the history of the field, it has helped to ensure SI’s continued survival within the collective memory of KO. However, this has not come without interpretative cost. As the concentrated focus of a spotlight on a certain spot of a theatrical stage leaves the rest of the stage’s expanse cloaked in darkness and obscurity, so emphasis on a few select attributes of SI has typically meant withdrawal of attention from its other features. As a result, the canonical profile of Kaiser’s method of indexing presents a partial and simplified image thereof.

Simplification has its uses and it would be wrong to deprecate the existence of a canonical profile of SI within KO: after all, a streamlined image of Kaiser’s indexing system has the virtue of enabling researchers to grasp its defining features easily and so to get a ready purchase on its place within the cosmography of their field. However, neither should it be assumed that the canonical profile of SI has captured all that is of potential interest or significance in Kaiser’s KOS. Rather, like all summary representations, it is circumscribed by certain limitations, particularly if one wants to understand the theoretical *Wesen* and historical *Werden* of Kaiser’s thought. One significant limitation lies in the fact that the canonical profile presents the core methodological features of Kaiser’s system in isolation

from their original theoretical context. This becomes readily apparent if one considers the treatment of SI in the literature of KO. Let us take, for example, the attribute of Kaiser's KOS that has most captured the imagination of KO researchers—its use of categories. Latter-day discussions of SI invariably mention Kaiser's partitioning of index terms within his system into terms for concretes, countries, and processes; however, only one writer (Svenonius 1978) has undertaken an in-depth study of Kaiser's rationale for defining those categories as he did. By the same token, although writers on KO routinely discuss Kaiser's stipulation that, in a complex subject heading, terms for concretes and countries should precede those for processes, only a handful (e.g., Coates 1960, 40; Metcalfe 1976, 180–181; Mills in *Mr. Metcalfe and Classification Systems* 1954, 89) have addressed his reasons for adopting this sequence. The consequence of this focus on method has been that the student of KO has at his or her disposal a number of reasonably good expository accounts of what the main features of SI are and how they are to function in practice (e.g., Coates 1960, 39–43; Holmstrom 1940, 199–205; Mills 1968, 183–185; Rodríguez 1984a; Vickery 1950, 144–145), but will be hard pressed to find detailed studies of how Kaiser conceptualized them.¹ Such a state of affairs may well suffice for researchers content with a summary description of the technical aspects of SI, but it is clearly insufficient if one wants to attain a fuller understanding of its theoretical foundations in their historical context.

Another, no less significant, limitation of the canonical profile of SI in KO concerns the historical approach that it underwrites. Writers discussing the place of Kaiser and his method within the development of KO have typically considered it from a particular historiographical perspective—namely, the intellectual history of KO. Within this perspective, key structural and functional characteristics of SI are considered in light of analogous elements of other historically prominent KOSs, Kaiser's contribution to the development of indexing principles and techniques is assessed in light of such comparisons, and he and his method are inserted into chronologically arranged narratives of the development of indexing and classification techniques within LIS (e.g., Batty 1976, 5–6;

¹ Three authors have made significant steps in this direction. Metcalfe (1973, 307–314; 1976, 175–83) touches upon several important elements of Kaiser's theoretical views but does not discuss them in detail, whereas Svenonius (1978) develops a fine-grained analysis of the definition of categories in SI, albeit within an interpretative framework somewhat different from that of Kaiser. Most recently, Sales (2012) has provided a good and, to date, the fullest overview of several theoretical features of Kaiser's system in a dissertation devoted to “the presence of Kaiser in the theoretical framework of the subject treatment of information”. Although Sales's study overlaps with the present one in some of the themes of which it treats, it does so from a somewhat different theoretical perspective and a more constrained historical approach: as such, it nicely complements the research presented here.

Coates 1960, 39–49; Foskett 1982, 123–149; Iyer 1995, 127–131; Rodríguez 1981, 329–330; Roy 1981, 7–8; Svenonius 2000a, 174–177). A cardinal feature of this approach is that it interprets the historical constitution of SI and other KOSs in light of a developmental dynamic largely confined to the conceptual universe of KO: in the language of the historiography of science, it is strongly *internalist* in its orientation (Schuster 2000).

Such an approach has much to commend it, for it seeks to explain the historical significance of SI within the intellectual horizons of KO and so relates it directly to the methodological and theoretical concerns of researchers in the field. However, it is, in a significant sense, incomplete, for it runs the risk of overlooking factors external to the intellectual universe of KO that may have shaped Kaiser's conceptualization of his indexing system, such as the social, cultural, and technological contexts within which he worked and the broader currents of thought that characterized these contexts. To revert to the parlance of the historiography of science yet again, the consideration of such factors would constitute an *externalist* approach to the historical analysis of SI (Schuster 2000). To be sure, past commentators have not been blind to the existence of external factors or to their potential significance for illuminating the intellectual background of SI. Some have called attention to the fact that Kaiser developed his indexing method within milieux that catered to the information needs of businessmen (e.g., Dousa 2009–2010, 19, 23, 25; Foskett 1982, 126; Metcalfe 1976, 176–177, 182), while others have suggested that his choice of categories and their articulation within composite index terms was conditioned by his professional experience in commercial and technical libraries (Foskett 1976, 83; Metcalfe 1959, 298; Mills 1968, 184; Mills in Mr. Metcalfe and Classification 1954, 89; Rodríguez 1981, 329; Svenonius 1978, 134). Suggestive and valuable as such externalist observations are, they have tended to occur as *obiter dicta* enunciated at the margins of what have otherwise been largely internalist discussions of Kaiser's system. To date, no writer has made a sustained attempt to examine SI in light of the social, technological, and cultural context within which it was formulated. This is unfortunate, for a historically informed analysis of Kaiser's system combining an internalist account with externalist considerations has the potential to lead to a deeper appreciation for, and understanding of, the rationale underlying SI than one based on the purely internalist considerations operative within the framework of the canonical profile.

As the foregoing discussion suggests, Julius Otto Kaiser and his method of SI can be said to occupy a paradoxical position within the disciplinary consciousness of KO. On one hand,

Kaiser has attained a certain visibility within the collective memory of the field: he is regarded as an important figure in the history of subject indexing; his elaboration of a method for using categories as structural elements in the construction of composite index terms is generally considered a major contribution to KO; and, *mutatis mutandis*, the basic principles of this method are deemed to be “still valid and useful in many cases” (Foskett 1982, 126) and to “have value” to this day (Milstead 1984, 142).² On the other, it is no less clear that the reputation of Kaiser and his method of indexing rests upon a very circumscribed basis—namely, a canonical profile of SI that focuses almost exclusively upon its utilization of categories in the construction of composite index terms. The emergence of this canonical profile has, to a large extent, assured Kaiser’s position within the pantheon of KO pioneers. However, by concentrating KO researchers’ attention on a few selected aspects of SI considered apart from their broader theoretical context, it has also arguably inhibited a full understanding of how Kaiser conceptualized his system and why he designed it in the way that he did. Furthermore, it has gone hand in hand with an internalist approach to the historical interpretation of SI that, for the most part, has left unexamined important features of the historical context within which Kaiser created and developed his system. There are, then, significant lacunae in current knowledge, and perceptions of, the historical and theoretical background to Kaiser’s method of indexing.

The purpose of the present study is to begin filling in some of these lacunae by a mounting a detailed examination of Kaiser’s method and theory of SI in its historical context. Such an undertaking demands that we consider Kaiser’s formulation of his indexing system in greater depth than previous commentators have done and that we take a wider view of SI than that afforded by the canonical profile with its focus on the most basic features of his category system. Now a widening and deepening of perspective does not entail demoting Kaiser’s methodological precepts for the utilization of categories from their central position within SI: indeed, given the fact that, as noted earlier, he regarded the

² In regard to the last point, one may note that, in recent years, KO researchers in Brazil have employed a modified form of SI to carry out subject analyses of different document types, such as legal abstracts (Guimarães 2000, ¶ 7), articles on economic themes in newspapers (Pierini, Guimarães, & Nardi 1997), and e-mail messages (Neto 2008, 105–127). Even more recently, the North American author of a textbook on “logic and the organization of information” has suggested that the distinction between “concretes” and “processes” can be reformulated as prefiguring the distinction between continuants—entities, such as substances, that undergo change over time and occurrents—entities, such as events, that occur within, but do not change over, time—which has found some favor among certain designers of the complex KOSs known as ontologies (Frické 2012, 98–99).

categories of terms and the complex index terms, or statements, formed from them, as being the structural basis of SI, it would be a betrayal of his thought to do so. However, if we are to relate the categories to the rationale that he developed to explain and justify their use and so appreciate in full their significance for his method, we shall need to examine both how he defined them and how he understood them to fit within the broader framework of the method of indexing of which he considered them to be the foundation: in other words, we have to take into account his indexing system as a whole. Moreover, if we are to achieve an adequate understanding of why Kaiser gave SI the form that he did, we shall have to take into consideration the historical setting within which he lived and wherein he developed it: only by situating Kaiser and his indexing system within their *Sitz im Leben* can we reach a full appreciation of the various factors that shaped his conceptualization of indexing and the rationale underlying his method of index-making.

In presenting a detailed account of SI and its creator, this dissertation is intended to make a contribution to both the history and theory of KO. Its contribution to the *history* of KO is self-evident. Although Kaiser is acknowledged as a pioneer of KO and his method of indexing is deemed to have been a theoretically significant one, neither has been the object of an in-depth study replacing them in their specific historical and institutional setting: indeed, as I have noted above, virtually no previous work has been done on this score. Insofar as this study offers its readers the fullest picture to date of SI, the career of its creator, and the contextual forces that shaped it, it sheds new light not only on the indexing system as such but on the particular milieu and circumstances in which Kaiser created, developed, and applied it: it thus augments and deepens our knowledge of a hitherto obscure chapter in the early history of modern KO.

The contribution of this study to the *theory* of KO is more indirect. I have already observed that the formation of a disciplinary heritage involves the selective appropriation of elements from a discipline's past that are viewed as being significant, in some way, for current work in the field, whether as historical precedents that explain the origins and development of present-day theories, practices, and research traditions or as live theoretical options that can be directly harnessed as conceptual tools for ongoing research therein. Selective appropriation, however, goes hand in hand with the forgetting of those elements of the past—be they conceptual, practical, or technological in nature—that are not taken up into the historical or theoretical discourse of a discipline. Such forgetting, which gives rise to canonical profiles such as the one discussed above, is itself a historically conditioned

process, since researchers choose to retain just those concepts or practices from the past that they consider to be useful or relevant to them in their present situation. Given the time-bound nature of the processes of appropriation and forgetting, it may well be the case that elements of past theory not considered sufficiently relevant or interesting to be assimilated into the conceptual armamentarium of a discipline at one point in its development have the potential to become useful resources for historically-minded theoreticians at a later point thereof: this, however, requires that the theoreticians be made aware of the potentially generative aspects of past work that have fallen outside of the current field of vision of the discipline. Accordingly, it is salutary periodically to revisit the primary sources for a historically significant given theory or form of practice, and to consider it as an organic whole rather than as a concatenation of a few selectively appropriated details boiled down into its canonical profile. The detailed description of SI as conceptualized by Kaiser given in this dissertation is intended to provide students of KO with a much more complete account of the method and its underlying theory than that offered by the current canonical profile of his indexing system: it is hoped that the exercise will raise awareness of Kaiser's method of indexing as a potential resource from which to draw lessons and/or inspiration for current and future theoretical work.

Although the present study has been formulated within, and is intended primarily as a contribution to, the field of KO, it also has relevance for another area of information-related theory and practice—namely, information management (IM). Defined broadly as “[t]he application of management principles to the acquisition, organization, control, dissemination and use of information relevant to the effective operation of organizations of all kinds” (Wilson 1997, 187, cited in Black 2004c, 32), IM includes the management of the organization and control of (documentary sources of) information within its remit and, in this way, it intersects, in part, with KO (cf. Lambe 2007). Although IM emerged as a “named”, or formally recognized, field of practice and theory in the 1980s (Black 2004c, 34; Wilson 1997, 188), recent research carried out by information historians has shown that many of the techniques and principles animating the field can be traced back to the mid-to-late 19th century and early 20th centuries, a period when the intensified bureaucratic expansion of the nation-state and the rise of large-scale business corporations triggered the development of new technologies and techniques for dealing systematically with large volumes of documentary records (Black 2004c, 36–37; 2006a, 452; Black & Brunt 1999, 362). Among the various manifestations of IM *avant la lettre* was the formation of a

discourse on office management and the “systems”—above all, schemes for the operation of vertical files and card indexes (See Section 5.2.1 of the current chapter)—by means of which the organization and control of (sources of) information kept in an office might be expeditiously effected (Black 2007a, 112–115). Commentators on the history of IM have not failed to note that, in elaborating SI, Kaiser contributed to this discourse on filing and indexing as a means of managing information within an organization (Black 2007a, 113; Black & Brunt 1999, 371; Wilson 2011). To this extent, then, Kaiser can be viewed as a pioneer of IM as well as KO and the following study of him and his indexing system in their historical context can be understood as making a KO-inflected contribution to the history of IM.

1.3. Research Questions and General Methodological Orientation

Orienting the present study are three research questions that arise from the considerations outlined in the previous section:

[RQ 1]. What was Kaiser’s background and what were the milieux, institutional and discursive, within which he conceived of, and developed, SI?

[RQ 2]. What were the key theoretical and methodological features of SI and how did Kaiser conceptualize them?

[RQ 3]. How did Kaiser’s conceptualization of the theory and method of SI reflect the the milieux, institutional and discursive, within which he conceived of, and developed, SI?

These questions not only set forth the program to be pursued in the following pages but also reflect the methodological axiom upon which this program rests—namely, that if one wants to achieve a full understanding of the underlying rationale of SI, one must examine Kaiser’s method of indexing from a perspective that takes into account both the systemic features that he built into its design (RQ 2) and the historical setting within which he created and developed it (RQ 1). In other words, the present inquiry makes use of two complementary approaches to study SI: a *systemic* approach that treats it as a particular (kind of) KOS possessing certain structural properties and a *historical* approach that regards it as an historical artifact, the particular form of which was contingent upon, and so becomes fully intelligible only in light of, the institutional, technological, and professional-cultural background within which its creator operated. To be sure, these two approaches are, in practice, interwoven over the course of the study, which is premised on the assumption that the historical background in which Kaiser developed SI helps explain some

of its most salient systemic features (RQ 3). Nevertheless, it is analytically useful to distinguish them for the purpose of outlining the methods and sources used here to examine Kaiser's method of indexing in its historical setting, to a consideration of which we now turn.

1.4. A Systemic Approach to SI: Method and Sources

In most general terms, a system can be defined as “an ensemble of elements interrelated among themselves [and] forming a unified whole” (Benítez-Read 2000, 27). On such a definition, a system possesses some sort of *structure* into which its components are articulated by means of the relationships that obtain between them (Bunge 2003, 277, cited in Tennis & Jacob 2008, 263). The relationships, direct or indirect, that each element of a system contracts with other elements are correlated with its *function* within the system as a whole. Moreover, the elements of the system are interrelated in such a way that, conjointly, their functional interactions enable the system as a whole to attain a certain *end* or *objective* to which it has been ordained (Svenonius 2000a, 3–4). To the extent that a system consists of a structure interrelating its component elements in a way that coordinates their respective functions so that they mutually reinforce each other and eventuate in a certain outcome, it possesses *coherence* and, hence, *unity*. Insofar as a system is a structurally and functionally unified whole, it constitutes a complex entity and can become, in its turn, a component element of a set of interacting systems that, taken together, form a larger “super-“ or “meta-system”; conversely, it is possible to segment a given system into smaller component systems or subsystems (Benítez-Read 2000, 27–28).

In light of the foregoing considerations, a systemic approach to the analysis of a given entity can be understood as one that interprets the entity in question as a system and endeavors to lay bare the structural and functional elements of which it is composed and through the coordinated interaction of which it fulfills the end(s) toward which it is directed. A systemic account of SI, then, seeks to identify its constituent structural elements, consider their respective functions, and examine how these elements were designed to work together to form a unified whole, or system, oriented toward the general goal of offering “ready access” (Kaiser 1911, § 643) to information. Here, however, a word of clarification is in order. SI constituted a method for constructing and implementing a particular, structurally distinct kind of card index that Kaiser (1911, §§ 629, 664, s.v. “Research Work”; 1918, 285) called a “systematic index” and later authors termed a “Kaiser

index” (See Section 1 of the present chapter).³ This means that, in truth, any systemically oriented study of SI must take into account two closely interrelated systems: (1) the set of rules and/or guidelines codifying the process by means of which a systematic card index, in Kaiser’s sense of the term, was created and maintained and (2) the structural-functional form of the systematic card index produced through the application of these rules (For fuller discussion, see Chapter 7, Section 6.1 below). Although these two systems were, in theory, distinct, they were based on a single set of principles of design ultimately embodied in the structural features of the model for systematic card indexes that Kaiser (1911, §§ 306, 314; 645; cf. Chapter 7, Sections 3 & 6.1, below) set forth in his writings: that is to say, the rules for making an index were governed by the kind of card index that they were intended to produce or, to put this in somewhat different terms, the model of the systematic card index functioned as the final, and, to a certain extent, as the formal, cause of SI *qua* method.⁴

Insofar as the form and function of the systematic card index provided the *raison d’être* for SI as a method of indexing, it is reasonable to take the features of the former as the point of departure for an exposition of the latter: this was, in fact, the strategy that Kaiser (1911, Chapters V–VI) himself adopted in his fullest account of his indexing system. The discussion of SI in this dissertation follows him in this, taking the various structural elements of a systematic card index—index terms classified into a limited set of term categories; complex index terms, or statements, formulated from simpler terms on the basis of syntactic rules for combining terms from different categories; index items, or unit pieces of information, formed on the basis of statements; card files formed from the collocation and arrangement of index items on the basis of the formal characteristics of the terms composing their

³ One should note that Kaiser (1911, §§ 591–618) also applied his indexing method, with necessary adjustments, to the construction of book indexes (cf. Section 5.2.5 of this chapter & Chapter 5, Section 3, below), including those to his own books (Kaiser 1908, § 367; 1911, § 664). Since a full examination of the application of SI to back-of-the-book indexing would unduly complicate the presentation of the system as such, which Kaiser originally developed for the purpose of making card indexes and applied secondarily to the preparation of book indexes (cf. 1911, § 579), I shall prescind from doing so in this dissertation; rather, I propose to reserve it for a separate, future study.

⁴ As is well known, Aristotle identified four causes (*aitiai*) for things in the world: (1) the material cause, or that from which something is made; (2) the formal cause, or “form” (*eidos*) or “model” (*paradeigma*) that makes something the kind of thing that it is; (3) the efficient cause, or the agent that acts to make something what it is; and (4) the final cause, or end (*telos*) toward which something is ordained and that provides its underlying rationale (Aristotle, *Metaphysics*, 1013a, 24–1013b, 3, in Aristotelés 2008, 120–121). Insofar as SI *qua* method was oriented toward the creation of a systematic card index, the latter provided the final cause for the set of rules constituting the method; to the extent that the intended structure of the systematic card index determined, to a large extent, the form that the rules took, it can be considered as a formal cause thereof, at least in an attenuated sense of the term.

statements; and the system of cross references, or syndetic, structure designed to bring semantically related index terms into relation with one another—as a basis for describing the method used to formulate them (See Chapter 7, Sections 2.2.2.3–3; 3.5–5.3, below). In doing so, it takes note not only of Kaiser’s methodological protocols for formulating each component element of an index but also the theoretical rationale that he adduced to justify the presence of these elements and the form that they took (See Chapter 7, Sections 2–2.2.5, 3.1.1–3.4; 5.1). While the emphasis is largely on how the method generated particular index structures, Kaiser’s general understanding of the process of indexing and its aims receives attention as well (See Chapter 7, Section 1). Furthermore, Kaiser considered the systematic card indexes created through the application of SI to form part of a broader régime, or “super-system”, of knowledge organization that included a specific method of classifying and physically organizing the documents the textual contents of which were the objects of SI and the use of retrieval aids, called registers, as mechanisms for locating documents within a collection; because these collateral KOSs provided the immediate systemic context for SI and so contributed to the rationale for its design, they also are discussed here (See Chapter 6, Sections 3–3.4 below). Finally, this régime of knowledge organization was, in turn, designed for use in a specific kind of milieu, which Kaiser (1911, Chapter II) designated as an “intelligence department”. Inasmuch as he expected that the intelligence department would be the *locus* in which SI was used to create systematic card indexes and that these indexes fulfilled a determinate function to support informational activities carried out by the department, his conceptualization of this institutional context for the deployment of SI is briefly examined as well (See Chapter 6, Sections 2–2.5, below). In short, the systemic approach to SI presented in this study seeks to give an account of the principles of design underlying the structural and functional features of the systematic card indexes for which Kaiser developed a template; the methodological protocols by means of which these principles were put into practice; the theoretical rationale justifying both the structural features of the indexes and the rules for creating them; and the broader systemic and institutional context within which Kaiser situated both his method of indexing and the indexes resulting therefrom.

Students of KO interested in considering SI from a systemic point of view are fortunate in the primary sources that they have at their disposal. Over the course of his career, Kaiser set forth the tenets of his indexing system in three publications. The first of these, a book entitled *The Card System at the Office* (Kaiser 1908), presents only a brief adumbration of SI,

although it gives valuable information about the broader régime of knowledge organization in which Kaiser envisioned that his method of indexing would be used.⁵ The second, a tome bearing the title *Systematic Indexing* (Kaiser 1911), contains a full account of Kaiser's indexing system. Comprehensive in its scope and detailed in its treatment, this book has been aptly described as a "code of practice" for the construction of Kaiser indexes (Brunt 2006, 582; cf. Metcalfe 1959, 263–264). Undoubtedly correct as far as it goes, this lapidary characterization should not be taken to mean that the book's contents are confined to a bare exposition of a set of procedures with examples of how to implement them. To be sure, its pages give extensive guidance on the mechanics of how to construct an index and the book is, as one contemporary reviewer stated, "intensely practical" in its orientation (Reviews 1911; cf. Filing Systems and Indexing 1912, 464). However, Kaiser also sought to provide reasoned explanations for the design of the indexes that would result from application of his method and, in doing so, laid out a theoretical rationale for SI: as another reviewer approvingly put it, "he not only shows what should be done, but why it should be done" (Liverpool Journal of Commerce, quoted in Isaac Pitman & Sons 1914, 15). In short, *Systematic Indexing* is the textual source *par excellence* for reconstructing Kaiser's conceptualization of SI. His third and final publication pertaining to SI, an article likewise entitled "Systematic Indexing" (Kaiser 1926), gives a summary, high-level restatement of themes that had been more fully explored some fifteen years earlier, while incorporating subtle alterations in theory as well as minor refinements in method: a witness to both constancy and change in Kaiser's thinking about SI, it constitutes a useful complement to his earlier formulations of the system. Taken together, these three works provide a solid foundation for examining Kaiser's conceptualization of SI *qua* system: furthermore, the considerable temporal distance separating the two books from the article allows us to catch a glimpse of how his understanding thereof shifted over time.

While Kaiser's published expositions of his indexing system naturally occupy pride of place as sources for reconstructing his conceptualization of SI *qua* system, there are collateral contemporary sources that can serve as useful complements thereto. As Kaiser (1911, § 20) himself noted in the introduction to *Systematic Indexing*, by the beginning of 1911, he had applied his method to at least four different systematic indexes; by the time of his death sixteen years later, he had designed at least two more indexes and had just

⁵ A French translation with the title *Le Système de la Carte au Bureau* (Kaiser 1914) was published in Paris in 1914.

commenced work on establishing a third (American Society of Mechanical Engineers 1928). Of these seven card index systems, only two seem to have left unequivocal traces in the historical record.⁶ One of them is the series of card indexes that Kaiser designed for the Tariff Commission in London, for which he worked as a librarian from 1904 to 1911 (See Chapter 5, below). Created in the years immediately preceding the publication of his books, these indexes furnished many of the examples that Kaiser (1908, 1911) used in his first two books to illustrate his methods of indexing and filing. Furthermore, a small remnant of the actual card files is still extant, forming part of the collection of Tariff Commission's papers held at the British Library of Political and Economic Science at the London School of Economics (Bennett 1981, 95–110). These card files offer an abundance of additional examples of how Kaiser (and his collaborators at the Tariff Commission) put SI into practice and so provide a valuable *comparandum* to the illustrations given in his published works.

The second exemplar comes from the Nobel's Explosives Company's plant at Ardeer, Scotland, where, between 1912 and 1914, Kaiser oversaw both the reorganization of filing arrangements and the establishment of a systematic index for a technical library (See Chapter 8 Section 2, below). It is unclear whether any parts of the actual index files from this index have survived to this day. Fortunately, members of the library and research staff who had collaborated with Kaiser in creating the index published a number of reasonably detailed descriptions of it and the indexing routines used to maintain it (Barbour 1919,

⁶ It is possible—even probable, perhaps—that vestiges from three other indexes are to be found in a section of *Systematic Indexing*, in which Kaiser (1911, §§ 462–533) gave a series of index items inscribed upon “sample cards” drawn from “various indexes” (§ 461) as illustrations of individual index items (On “index items”, see Chapter 7, Sections 3 & 4.4, below). These sample index items, which appear to be derived primarily from materials published in periodicals, include the date of the information—not to be confused with the date of publication of the information (See Chapter 7, Section 4.3, below)—to which they refer. Given the nature of the sources from which the information was taken—periodicals that sought to provide current awareness about recent developments in the world relating to commerce—and Kaiser's (1908, § 342) belief that documents should be indexed as soon as possible after they were received in an office or business library, there is some reason to believe that these index items were originally prepared at a time close to the date of information that they indicate. If this hypothesis is correct, then the dates assigned to the information would indicate that the sample cards include exemplars taken from the indexes of the Philadelphia Commercial Museum, where Kaiser worked from 1896–1899; the Commercial Intelligence Bureau, where he was employed from 1899 to about 1903, and British Westinghouse, Ltd., where he worked over the course of 1903—a supposition strengthened by certain variations in the amplifications (on which, see Chapter 7, Section 4.3 below) of the index items, which seem to correlate with these date ranges. However, inasmuch as Kaiser did not specify the sources for his examples and, by his own admission, made some slight modifications to the items in question (Kaiser 1911, § 462), it is not possible to state with metaphysical certainty that the examples were directly taken from the indexes in question, though it seems likely that they were, at the very least, based on materials therefrom. For further discussion, see pp. 119, n. 109; 131, n. 128, & 137, n. 135, below.

1921; Barbour in Kaiser 1926, 36–39; Rintoul 1918; 1925). To be sure, the Nobel library staff introduced some slight alterations to both indexing procedures and index after Kaiser’s departure from Ardeer (Barbour, in Kaiser 1926, 36–37; Rintoul 1925, 170). Nevertheless, it was he who “designed and set down the essentials of the scheme” (Rintoul 1925, 166) and so the index can be considered as an example of his handiwork. The published descriptions of the indexing system and the broader régime of knowledge organization of which it formed part indicate that the members of the Nobel’s library staff responsible for the maintenance of the index had assimilated the underlying rationale of SI from Kaiser: moreover, at certain points, they prefigure some of the modifications or refinements to the method that would appear in Kaiser’s (1926) final account of his indexing system. For these reasons, they are a valuable supplement to Kaiser’s own writings on filing and indexing, one that offers testimony to the ways in which a concrete implementation of SI stood in continuity with, and yet also introduced modifications to, the methods outlined in Kaiser’s protocols as set forth in *The Card Index at the Office* and *Systematic Indexing*.

Having briefly outlined the kind of analysis that a systemic approach to SI involves and noted the primary sources at our disposal for undertaking such an analysis, let us consider briefly the concrete method to be used in pursuing it. As RQ 2 indicates, one of the primary aims of this study is to give an account of the key features of SI in light of Kaiser’s conceptualization thereof. This requires that we undertake a close reading of the texts in which he discussed it in order to identify what he took to be the primary structural elements of a systematic index, to examine his methodological precepts for formulating these elements, to consider his justifications, theoretical and practical, for both the form of the index and the method used to generate it, and to delineate the more general system of knowledge organization within which such an index was to find its use. Our reading of Kaiser’s exposition of SI in his own writings can be enriched by taking into account examples drawn from the indexes that he created at the Tariff Commission, which allow us to see how certain crucial aspects of SI were treated in practice, and descriptions of the index that he designed for Nobel’s Explosive Company, which allow us to see how his precepts were understood by those persons who collaborated with him in implementing it. Furthermore, our reading of Kaiser’s writings on SI can benefit from a consideration of secondary discussions of his indexing system by latter-day theorists of KO, even if these have tended, for the most part, to confine their attention to a few select aspects thereof (See Section 2 of the current chapter).

As a rule, close reading requires that one carefully attend to what the author of a given text says and to how he or she says it. Although both of these principles may appear to be so elementary and self-evident as not to require comment, three considerations justify underscoring the importance of observing them in undertaking a close reading of Kaiser's writings on SI. First, there is the matter of the terminology that he used to describe his system of indexing. Although conversant with several different traditions of discourse and practice relating to knowledge organization emanating from the realms of office organization, special librarianship, general librarianship, and fields cognate to these (See Sections 5.2.1–5.2.6 of the current chapter), Kaiser did not align his technical vocabulary to that used in any one of these fields. Rather, as past readers of his works did not fail to notice (e.g., Brooks 1913, 371; Metcalfe 1957, 235; 1965, 45), he employed a distinct terminology for describing the structural features of systematic card indexes, the processes of indexing used to create them, and the methods of classification associated with them. This technical vocabulary was compounded of a few terms drawn from the discourse of librarianship (e.g., "alphabetico-classed", "call number", "catchword", "dictionary catalogue"), a number of expressions derived from various other discourses and given specialized meanings within the framework of SI (e.g., "concretes", "processes", "statements", "amplification", "condenses", "collective term", "duplication", "overlapping", "underlapping", "fixed points"), and locutions that Kaiser seems to have coined on his own (e.g., "index item"; "first term", "second term", "third term", "related terms", "common description", "higher collective" and "lower specific"; "terminable index" and "interminable index").

Kaiser's development and use of a specialized terminology—or, if one will, a technical idiolect—can perhaps be explained by reference to his general attitude toward language, the terminological state of the discursive tradition within which he was writing, and the relative novelty of some of the structural features of SI. Keenly aware of the semantic vagaries of natural language, he took it as axiomatic that different individuals were likely to assign different meanings—however slight those differences might be—to the same term (See Chapter 7, Sections 2.2–2.2.1, below): in other words, he believed that, with the exception of certain fields using fixed nomenclatures (such as, e.g., chemistry), the understanding of terminology among a given set of readers was subject to the centrifugal forces of individual interpretation. Addressing his books primarily to persons working within the fields of office organization and commercial indexing at a time when these were still emergent fields of discourse in which the terminology of subject indexing was fairly

fluid (See Section 5.2.1 of this chapter), he deplored what he considered to be loose usage of the vocabulary relating to filing, indexing, and classification and accordingly placed a high premium on terminological precision and the definition of terms (e.g., Kaiser 1908, § 77; 1911, §§ 98–104, 306, n. *; 1926, 30, § 33). At the same time, many of the structural features of indexes that he conceptualized within the framework of his indexing system were original to it and so there was no terminological precedent upon which he could draw in naming them. Given Kaiser’s concerns about fixing the meaning of terms with precision, one cannot discount the possibility that, in developing a special vocabulary for writing about both traditional and novel features of his indexing system, he sought to ensure that the technical terms at his disposal were largely free of inherited meanings that might, so to speak, contaminate readers’ understandings of them and so lead to imprecision of interpretation. However this may have been, he considered terminological issues important enough to include short, if somewhat idiosyncratic, glossaries under the heading “Terminology” at the end of his two books (1908, § 366; 1911, § 663).

A close reading of Kaiser’s writings, then, is necessary at a most basic level of intellectual access: if we are to come to terms with his conceptualization of SI, then we need to understand the terms that he deployed in speaking about it and this can only be done by giving due regard to both the formal definitions that he assigned to them and to the ways in which he used them in the course of his textual explications of his system. A second reason for paying heed to the manner in which Kaiser said what he said lies in the variable clarity with which he formulated his accounts of SI. “Precision, directness, [and] unambiguity” were the qualities that he most prized in writing on the grounds that they allowed readers to “secure the best understanding” of the message that an author wished to convey (Kaiser 1911, § 63; see Chapter 7, Section 2.2.1, below). To a certain degree, Kaiser seems to have achieved this goal in his own writing, for a number of contemporary reviewers of his two books found the exposition to be clearly presented: indeed, one even complimented him on his style (See Chapter 8, Section 1, below). With regard to many passages in his works, the modern-day reader can only concur with this judgment. Yet, not with regard to all, for, at a number of places in his writings, Kaiser exhibited a propensity toward couching his exposition in a highly compressed style that only hinted at the premises from which he was operating, left significant gaps in the argumentation, or did not explain in full the import of

the terms he was using.⁷ Needless to say, the passages in which this trait manifests itself are quite opaque in their expression and pose an interpretative challenge to readers: as one of Kaiser's most ardent latter-day admirers flatteringly put it, "because he reasons so sparsely with little explanation for minds less acute than his own, he is not easy to follow" (Metcalf 1959, 297). This feature of Kaiser's works cannot but impel those persons intent on reconstructing his conceptualization of SI *qua* system to a close reading of his texts, for only by serious engagement with the *ipsissima verba* in which he formulated his explanations and arguments can one hope to reach some understanding of what he was trying to say. Accordingly, the present study makes extensive use of quotations from Kaiser's texts throughout its discussion of his system of indexing and the broader régime of knowledge organization in which he embedded it: in doing so, it seeks to give the reader a means of controlling the interpretation of Kaiser's thought offered here.

The third reason for adopting close reading as a method becomes clear when one considers Kaiser's general mode of presenting his indexing system in his writings, above all in *Systematic Indexing*, which, as we have already seen, was his most detailed statement regarding it. In that work, he developed a well-ordered sequence of themes, or heads, with which to articulate the general structure his exposition of the theory and method of SI (Kaiser 1911, "Contents"). However, his presentation did not unfold, *more geometrico*, in a single, tightly structured series of arguments, in which each modulated seamlessly into another in an unbroken chain. Whereas Kaiser certainly respected the general progression of thematic heads that he had chosen to structure his work, he tended to take up a particular element of his system, discuss it at some length, drop it and move on to a cognate subject, and then return to it later within the text in relation to a different theme and viewing it from a different perspective:⁸ in a somewhat similar vein, he sometimes applied a

⁷ Especially egregious examples of such passages are Kaiser's description and critique of the catalog and index at the library of the Bureau of Information at the Philadelphia Commercial Institute (Kaiser 1926, 20, §§ 1–3, discussed in Chapter 3, Section 3.3 below); his use of a grammatical analogy to describe the conditions in which a virtual subclass of terms of processes was to be used (Kaiser 1911, § 663, s.v. "Concrete and Process", discussed in Chapter 7, Section 3.2.2, below); his counterargument to objections against the condensation of information in abstracts (Kaiser 1911, §§ 657–658, discussed in Chapter 7, Section 4.3 below); and his discussion of "degrees of collectivity" in the hierarchical relationships between terms in a classification (Kaiser 1911, §§ 113–114, Section 5.1, below). In these, the compression of the exposition is such that it compromises ready comprehensibility of the text; less problematic cases could easily be multiplied.

⁸ Examples of such dispersed discussions of subjects include those pertaining to: (1) the underlying rationale for the inclusion of *concretes* and *processes* within the categorial schema of SI, explained in "epistemologico-ontological" terms within a discussion of literary composition at Kaiser 1911, §§ 52 ff. and discussed in "logico-linguistic" terms at § 298 (See Chapter 7, Section 3.4, below); (2) the

single form of argument in quite different thematic contexts, giving it a distinct twist in each.⁹ As a consequence, his statements on specific aspects of SI tend to be scattered across different, sometimes widely separated, passages within the text of *Systematic Indexing*. To be sure, Kaiser was aware of this dispersive tendency in his treatment of SI and sought to remedy it by inserting in-text cross-references to collateral discussions (1911, § 22; cf. 1908, § 5) and by collocating references under particular headings in the book's index (1911, § 664). Nevertheless, such references serve primarily as indicators of the different textual *loci* in which a given subject relating to SI is discussed: it is only through close reading that one can assess precisely how these scattered passages relate to one another.¹⁰

polytopicality of books and its implications for shelf classification, discussed at Kaiser 1911, §§ 115 & 255–256 (See Chapter 6, Section 3.2.2, below); (3) the distinction between documentary materials and information, and the need to dissociate the latter from the former in a business context at Kaiser 1911, §§ 83–84 & 248, Points 3–5 (see Chapter 6, Section 2.3 & Chapter 7, Section 1, below); and (4) the notational treatment of “0”, or “nought” and its abuses, treated within a general discussion on notation at Kaiser 1911, § 126 and invoked in critiques of the notation of the DDC at §§ 262–263 and that of James Duff Brown's SC at § 281 (cf. Chapter 7, Section 6.2, p. 684, n. 535, below).

⁹ One example of such “repurposing” of arguments will suffice here. In *Systematic Indexing*, Kaiser deployed the argument that different individuals will agree in general on a given object of discussion but differ in their understanding of its details both (1) to make a point about the semantic indeterminacy of names (more precisely, common nouns and noun phrases) and (2) to argue for the need for centralized information departments within business organizations. The disparity of two thematic contexts is best appreciated by juxtaposing the two passages in question. Here is the version given in the discussion of names: “[I]t would be rash to say that there is agreement as to what is covered by a particular name ... There is a general acceptance as to what is meant by a name *on the surface*, but when we go deeper to trace its exact limits, divergence generally makes its appearance” (Kaiser 1911, § 112 [emphases his]). And here is the version applied to centralized information departments: “In a large office or factory exactly the same divergent views prevail among partners or principal officials as to the management and accessibility of their materials [sci., their documents—TMD], their organisation generally etc. ... Obviously there must be some common basis on which all work, although they may not agree; some may agree on some points, but no two will ever agree on all points. Even if they *think* they agree, they will very soon convince themselves of the contrary as soon as they go into details. ... The best way is ... to recognise *organisation* as a separate department and arm it with adequate authority for its purpose” (§ 280 [emphases his]). The similarity in formulation and difference in thematic context speak for themselves.

¹⁰ Again, a single example may serve as an illustration. Kaiser (1911) used the argument that “you cannot standardise the human intellect” for two different purposes—namely, (1) to argue for the proposition that all knowledge is stamped by the individuality of the knower (§ 57) and (2) to argue against universal standardized systems such as universalist ideologies and artificial languages (§ 245): the first argument occurred within a statement of his epistemological position (See Chapter 7, Section 2.1, below), while the second formed part of a critique of what he took to be the increasingly universal spread of the DDC (See Chapter 7, Section 6.2, below). There is no in-text cross-reference connecting the two passages in question, while the index enters the paragraph numbers for both under two different headings: “Intellect” and “Standardisation” (Kaiser 1911, § 664, s.v. “Intellect” and “Standardisation”). Whereas each of these headings indicates that the paragraphs in which the argument is made are thematically related in some way, neither provides any specific information as to how the subjects of “intellect” or “standardization” are treated in the passages in question: it is

This argument gains even greater force when one moves beyond *Systematic Indexing* alone and considers Kaiser's writings as forming a unitary corpus of works—that is to say, an *oeuvre*: establishing intertextual connections between them and identifying the points at which, for example, his later account of SI in “Systematic Indexing” exhibits shifts in terminology or conceptualization *vis-à-vis* that given in the earlier books can only be achieved through a process of close and patient reading that, again, attends both to what Kaiser said and the manner in which he said it.

Close reading is a hermeneutic activity and so, by definition, results in an interpretation of the text(s) read. As noted earlier, the interpretation of Kaiser's writings undertaken within the framework of this study is primarily reconstructive in intent: that is to say, its goal is to give a reasonably accurate account of Kaiser's conceptualization of SI as an indexing system possessing a particular structural design, which was to be implemented in accordance with a certain set of methodological protocols and the justification for which was embodied in certain theoretical and practical arguments.¹¹ Now it is important to be clear as to what the scope and limitations of reconstructive interpretation are. Obviously, there can be no question of replicating Kaiser's conceptualization of SI, for no interpreter situated in a different historical moment and operating within a different horizon of social, cultural, and technological expectations than that of the writer whose texts he or she is interpreting is in a position to do so: there is a hermeneutic distance between the interpreter and that which is interpreted that cannot fully be bridged. Yet, if we cannot attain a conceptualization of SI identical to that which Kaiser had when he wrote about his indexing system, we can strive to achieve an understanding of it that is as consistent as possible with what he wrote about it. This entails, *inter alia*, divesting ourselves, as much as we can, of our own theoretical prepossessions when reading his writings; paying heed to the formulations of his written statements about SI and taking these as the basis of our own statements about his indexing system; clarifying opaque statements or passages in his

only through close reading that one comes to appreciate both the similarity of their arguments in the two passages—and the difference between the thematic contexts in which they are deployed.

¹¹ I use the term “reconstructive” here to signal an affinity between the idea of “reconstructive interpretation” outlined here with the more general approach of “reconstructive hermeneutics”, which, in simplest terms, stresses the primacy of the hermeneutical object (i.e., the text that is being interpreted) *vis-à-vis* the hermeneutical subject (i.e., the person who is undertaking the task of interpretation) and so places a premium on uncovering the author's meaning of the text. For an introduction to this hermeneutic approach, which is especially suitable for historically oriented investigations, see Sousedík 2008, with Cajthaml 2010; for discussion of its application within the context of library and information science (LIS), see Stodola 2011.

works by reference to other statements or passages in his *oeuvre*, whenever this is possible, and/or to other relevant contemporary sources, whenever appropriate to do so; and reading his texts with a close eye to their historical background (cf. Sections 5.1–5.2 of the current chapter). In other words, in accepting Kaiser’s own statements about SI as the rule and norm for our own explication of it; construing these statements, as best we can, in light of his historical horizon; and endeavoring, whenever we can, to understand Kaiser through Kaiser, we can build up an account of his indexing system that conforms sufficiently to the perspective expressed in his writings to count as an adequate reconstruction, if not exact reproduction, of his conceptualization thereof (cf. Sousedík 2008, 35–36).

Although the account of SI presented in this study is committed to reconstructing Kaiser’s conceptualization of his indexing system, it departs, on occasion, from the methodological norms of reconstructive interpretation. There are two circumstances in which it does so. First, one sometimes encounters places in Kaiser’s texts where he did not draw out the full implications for SI of a given structural feature forming part of its design: that is to say, he did not notice properties of the feature that may seem obvious to readers conversant with current KO theory but that the conceptual framework within which he was operating did not equip him to see.¹² In such cases, where Kaiser’s conceptualization of the feature in question does not match latter-day theoretical norms and leaving the properties that he overlooked unmentioned would prove a stumbling block to readers, it has seemed best to pursue a *via media* between maintaining strict fidelity to his thought and accommodating present-day expectations by discussing the properties in question with reference to current theoretical notions but also noting that Kaiser did not recognize them within the horizon of his conceptual framework. Second, a careful reader of Kaiser’s writings sometimes comes upon theoretical or practical justifications for a given feature of SI, the formulation of which

¹² A parade example of this can be seen with regard to hierarchical relationships between semantically related terms. In his texts, Kaiser (1911, § 73) restricted himself to speaking of “collective”, or “general”, and “specific” terms, with the former being superordinate to the latter. However, an analysis of the distribution of hierarchical relationships across the different categories of terms that he recognized reveals that the kinds of hierarchical relationships between terms varied from category to category: terms for concretes tended to stand primarily in generic, or quasi-generic, relationships to one another, while terms for countries tended to stand primarily in partitive relationships to one another. Although Kaiser seems to have intuited that there was some sort of difference between the relationships among terms of concretes and those among terms of countries, he could not articulate this because he did not make an explicit distinction between generic and partitive hierarchical relationships. For full discussion, see Chapter 7, Sections 2.2.4 & 5.2.2.1–5.2.2.2, below.

seems problematic.¹³ Now, insofar as the goal of reconstructive interpretation is to achieve a sympathetic understanding of Kaiser's conceptualization of his indexing system, one should be prepared to exercise interpretative charity wherever appropriate. Such considerations, however, do not absolve the interpreter from the responsibility of judging the relative strength or weakness of the arguments that Kaiser set forth to explain and justify the design of his system. It is thus legitimate to mount critiques of those points of Kaiser's conceptualization of his system that strike one as weak, provided that the latter do not constitute captious attempts to advance one's own theoretical prepossessions at the expense of Kaiser's, but are based on impartial assessments of the quality of the arguments that he made. Although both of the deviations from the norms of reconstructive interpretation noted here increase the hermeneutic distance between the interpreter and Kaiser and so run counter to the general spirit of the approach adopted here, they find their justification in the fact that they allow us to form a deeper and more truly nuanced understanding of the systemic features of SI than a purely reconstructive interpretation would afford.

1.5. A Historical Approach to SI: Methods and Sources

A systemic approach to the study of SI affords students of KO the opportunity to examine the inner economy of Kaiser's indexing system and to consider the principles of design that animated his method in theory and practice: it thus encourages the treatment of SI as a unit unto itself, whether in isolation or as a detachable part of a broader knowledge organization régime, or "super-system", involving not only the preparation of systematic card indexes but the classification of documents and the compilation of card registers as well. However, if one accepts the premise that the environment in which a system exists can exert a significant influence upon the configuration of its features (Benítez-Read 2000, 32), then one will readily concede that an analysis of SI oriented solely towards anatomizing it *qua* system is not likely to yield, on its own, a full understanding of how Kaiser conceptualized it. One must also consider the social, cultural, and technological contexts in which Kaiser developed and applied his indexing method, for it is likely that these left their imprint upon his thought about the design of his method of indexing, as well as the other elements of the ideal régime of knowledge organization within which he envisioned that it

¹³ An especially important example of this is Kaiser's argument for deriving the category of countries from that of concretes, for a full discussion of which, see Chapter 7, Section 3.2, below.

would have a place. Accordingly, the systemic approach to SI must be complemented by a historical approach that firmly anchors Kaiser and his indexing system in their historical context. In concrete terms, such an approach calls for two complementary methods—*biographical framing* and *historically contextualized comparison*.

1.5.1. Biographical Framing

Every human being is endowed with a particular physical constitution, a personal temperament, a given style of thought, and a manner of acting that conjointly differentiate him or her from all other human beings, past, present, and future: that is to say, he or she is an irreducibly unique individual. Inasmuch as any given KOS is a human creation, brought into being either by an individual or, as is often the case, two or more individuals acting in concert, it will reflect, to some degree at least, the knowledge, thought, and, perhaps, even the temperament(s), of its creator(s). Yet, it is no less true that “no man is an island, entire of itself” (Donne 1999/1624, 103). Human beings are eminently social beings and, over the course of his or her life, a person participates in a number of social worlds, each of which carries with it traditions of discourse and practice that serve as organizing matrices within which individual thought and action can unfold. Such traditions can be viewed as collectively filtered sedimentations of past experience that provide the social conditions of possibility through which individuals come to conceptualize their own experience of the world: in other words, they constitute the conceptual and institutional frameworks that condition the thought, values, and actions of the persons who participate in them. Thus, knowledge of the milieu in which a person moves over his or her lifetime can help one better understand the contours of his or her thought. Mapping out the main coordinates of a given historical figure’s trajectory through life as a way to get a purchase on the social, cultural, and technological contexts that helped to form his or her attitudes toward, and thinking about, a given subject of interest constitutes what I call biographical framing.

For students of KO, biographical framing can serve as a potent means of illuminating the intellectual background to the design of a KOS. Indeed, there is good precedent for use of the technique in the historiography of KO. Miksa (1977, 1983a) has convincingly argued that the underlying theoretical rationale for a number of otherwise puzzling features of Charles A. Cutter’s protocols for subject cataloging becomes explicable only if one reads the relevant passages of *RDC* in light of the epistemological tenets of Scottish Common Sense Philosophy, the doctrines of which saturated the philosophical atmosphere at Harvard

College for much of Cutter's tenure there, first as a student and then as a librarian, in 1850s and 1860s. Wiegand (1996, 10–11, 14–33; 1998) has shown that the structure and content of the DDC owed much not only to Dewey's own personal predilections for decimalism, but also to the intellectual climate of Amherst College, where he studied and worked as a librarian in the early-to-mid 1870s: the ordering of a number of classes in the first edition of the scheme published in 1876 appears to reflect the worldview of textbooks used at the school as well as that of its faculty, some of whose members helped Dewey to develop the scheme. Paul Otlet's insistent claims for the encyclopedic scope of the UDC and his persistent efforts to promote it as a universal classificatory substructure for the purpose of supporting international cooperation in documentation become more intelligible in light of his early adhesion, as a student and young lawyer, to the universalist philosophical systems of Auguste Comte (1798–1857), Herbert Spencer (1820–1903), and Alfred Fouillée (1838–1912): Rayward's (1975, 18, 21, 25–35) biographical study of Otlet has shown that the eclectically derived, but positivistically inflected convictions of the father of documentation, which were in large part a product of his own reading and self-avowed taste for large-scale generalization, received strong reinforcement from like-minded friends and colleagues with whom he was associated during his legal and bibliographical apprenticeship in Brussels in the early 1890s. In each of these cases, knowledge of the socio-cultural milieu within which a pioneer of KO developed his worldview yields an enhanced understanding of how he came to make certain decisions about KOS design. The efficacy of the method of biographical framing in other cases renders it likely, *prima facie*, that, by considering the historical contexts in which Kaiser lived and worked, we can attain greater insight into how he came to conceptualize his indexing system. Accordingly, a first step towards an historically informed understanding of SI is to examine the life and career of its creator.

Any study that seeks to integrate a biographical framing of Kaiser and his system into its program enters upon a terrain that is largely *terra incognita*, for, to date, his life has drawn only the scantiest of attention from scholars in KO. Among latter-day writers, only one—John Metcalfe, the historically-minded doyen of classification theory in Australia from the 1950s to the 1970s and an ardent, though hardly uncritical, admirer of Kaiser—sought to uncover new information about his works and days. Drawing primarily upon a single obituary notice and internal references in Kaiser's own works, Metcalfe (1957, 75–76, 234–235; 1959, 297–298; 1965, 44–45, 48; 1976, 175–177) produced several short summaries of Kaiser's life embedded within larger systemic and historical studies of classification and

indexing. Venturing little beyond establishing a basic chronological framework for Kaiser and enumerating the places where he lived and worked, these pioneering biographical sketches have served, directly or indirectly, as the source for the few subsequent accounts of Kaiser's life and career to be found in the literature of KO (Svenonius 1978, 134; Dousa 2007, 2–3; Sales 2012, 49–56). From the vantage point of biographical research, Kaiser surely ranks among the most neglected of the early pioneers of KO.¹⁴

Given the lack of any substantial secondary studies of Kaiser's life, it is necessary to take recourse to primary sources for the purposes of biographical framing. Thus, we will do well to consider what evidence is available for constructing a biographical frame for Kaiser's life and work. At first blush, the documentary base regarding Kaiser's person may appear discouragingly sparse. Metcalfe's accounts of Kaiser's life were based almost exclusively upon a single obituary notice (Hercules Powder Company 1927) that he had managed to locate: since then, another, slightly more detailed, necrology has come to light (American Society of Mechanical Engineers 1928). These two notices give a chronological framework for Kaiser's life and an overview of his professional *cursus*, as well as a few items of information about his person: accordingly, they provide an obvious starting point for structuring a biographical narrative. Additional, albeit limited, information may be gleaned from Kaiser's corpus of published writings, in particular the monograph on *Systematic Indexing* from 1911 and the similarly titled paper from 1926, as well as a brief article that he published on bibliographical searching in 1918 (K[aiser] 1918): not only do these include passages that recount the circumstances surrounding the origins of SI (Kaiser 1911, § 20; 1926, §§ 1–3), but an attentive reader will also catch glimpses, here and there, of revealing details about Kaiser's personal and professional values. There is evidence that Kaiser kept personal papers, including manuscripts of unpublished works, among his effects (Kaiser 1911, § 20; Hercules Powder Company 1927): would-be biographers must count it a great misfortune that these do not appear to have been preserved. On a happier note, in an age when a plethora of finding aids has become available on the World Wide Web, one can uncover, scattered across different collections, documents pertaining to Kaiser, including

¹⁴ Of the other major pioneers of KO active during the eventful half-century between 1876 and 1926, only E. Wyndham Hulme has suffered comparable neglect on the biographical front. Apart from a short entry in Munford's (1987, 38) *Who was Who in British Librarianship* and two brief summaries of his career in articles devoted to an examination of his theory of literary warrant (Olding 1968, 1; Lee 1976, 101), there have not been any biographical treatments of a figure who made fundamental contributions not only to KO but to the field of "statistical bibliography" or bibliometrics (Pritchard 1969).

immigration and naturalization papers, census records, passenger manifests, and even the occasional newspaper item.¹⁵ Study of these documents allows us to confirm, supplement, or, in some cases, even correct information given by Metcalfe and the anonymous compilers of the obituary notices. However, the information that they contain is rather disjoint and atomized in its nature, clustering around a few events scattered over the course of Kaiser's lifetime. There is thus considerable unevenness in the distribution of information about Kaiser's biographical trajectory: indeed, the fact that certain, isolated details of his life come into sharp focus serves as a bitter reminder of just how much else about it remains unknown. If one aspired to compose a full-fledged biography of Kaiser, one would have to concede that there is insufficient material with which to work.

The extant sources, then, allow us to tell only the sketchiest of stories about Kaiser's life as a whole. However, one of the obituary notices (American Society of Mechanical Engineers 1928) furnishes information that is crucial for the enterprise of biographical framing, for it enumerates the organizations for which he worked as a librarian or indexer (cf. Sales 2012, 52–53, Quadro 1), namely:

- The Bureau of Information at the Philadelphia Commercial Museum (1896–1899)
- The Commercial Intelligence Bureau, Ltd., in London (1899–1902)
- The head offices of the British Westinghouse Electric and Manufacturing Company, Ltd., in London (1903)
- The Tariff Commission in London (1904–1911)
- The head offices of Vickers, Ltd., in London (1911–1912)
- The technical library of the Ardeer Plant of the Nobel Explosives Company, Ltd. (1912–1914)
- The Engineering Societies Library in New York (1916–1923)

¹⁵ Online sources that I have used to find documents in the course of my research include: (1) the genealogy Website Ancestry.com (<http://www.ancestry.com>), whose aggregated collections have allowed me to locate emigration papers, census records (1901 & 1911 UK; 1920 USA), and passenger manifests pertaining to Kaiser and other members of his family; (2) the catalog of the National Archives of the United Kingdom (<http://www.nationalarchives.gov.uk/>), which led me to Kaiser's naturalization papers (1906); (3) the catalog of the Queensland State Archives (<http://www.archives.qld.gov.au/>), which turned up a passenger manifest documenting the arrival of Kaiser's family in Australia as well as family members' naturalization papers and associated documents, and (4) The Trove, an online portal maintained by the National Library of Australia (<http://trove.nla.gov.au/newspaper>), which gave me access to digitized copies of newspapers containing evidence for Kaiser's early career. Without these online sources, I most likely would not have become aware of the existence of the documents in question nor, once I did learn about them, would I have had ready access to them. Such experiences leave me only all the more appreciative of the challenges that faced earlier historians of KO, such as Metcalfe.

- American Society of Mechanical Engineers (ASME) in New York (1917–1926)
- The Experimental Station (Kenvil, NJ) of the Hercules Powder Company (1927).

The significance of this list should not be minimized. These organizations provided the immediate professional contexts wherein Kaiser formulated the method of SI, conceptualized its theoretical underpinnings, implemented it in practice, and reflected on it in the endeavor to refine it. Thus, it is reasonable to infer that their information régimes—especially those of the institutions at which he was employed prior to his first major published exposition of his system in 1911—played a part in shaping his thinking about indexing and so left their impress upon the design of SI. By considering the informational missions of, and knowledge organization practices at, these organizations at the epoch when Kaiser was associated with them, we can place ourselves in a better position to understand how he came to conceptualize his indexing system in the manner that he did.

To be sure, here too one must contend with the vagaries of historical preservation. The information régimes of some of the institutions, such as the Philadelphia Commercial Museum; the Commercial Intelligence Bureau, Ltd.; the Tariff Commission; the Nobel Explosive Company’s Ardeer plant; and the Engineering Societies’ Library are relatively well documented by various configurations of sources, whereas documentary evidence for others, such as those of the British Westinghouse Company and Vickers, Ltd., is comparatively meager. Despite the inevitable unevenness of the available evidence, we can build up, in most cases, at least a basic profile of the information cultures of these organizations. Furthermore, in some cases, it is even possible to find traces of Kaiser’s activity within an institution—a welcome circumstance, since any access of information on this score can enrich our understanding of the forces that shaped his work. All in all, by taking into account sources pertaining to the organizations for which Kaiser worked, we extend considerably the documentary basis for understanding the historical context for the development of SI.¹⁶

¹⁶ For this study, I have drawn upon contemporary published sources pertaining to the Philadelphia Commercial Museum; the Commercial Intelligence Bureau, Ltd.; the British Westinghouse Electric and Manufacturing Company; The Tariff Commission; The Ardeer plant of the Nobel Explosives Company; the Engineering Societies Library; the ASME; and the Experimental Station of the Hercules Powder Company. I have also benefited from secondary studies that discuss the information régimes of the Philadelphia Commercial Museum (Conn 1998a, 1998b, 114–150; Heskin 1952), the Tariff Commission (Marrison 1996, 117–135), the Nobel Company’s Ardeer plant (Miles 1955, 66–71), and the Engineering Societies Library (Mount 1979, 1982). As for unpublished sources, I have made use of archival materials pertaining to the Commercial Intelligence Bureau, Ltd., which are held at the

In light of the foregoing considerations, the scope and method of biographical framing adopted here can be summarized as follows. The biographical component of this study takes the form of a narrative, the aim of which is not to give an exhaustive account of Kaiser's life and person, but rather to chart the main coordinates of his *Lebenslauf* and to update and deepen, wherever appropriate, the pioneering research carried out by Metcalfe. The narrative is primarily articulated around the trajectory of Kaiser's career as a librarian and indexer and makes use of an episodic structure featuring descriptive overviews, within the limits of the available documentary evidence, of the informational régimes and knowledge organization practices of the institutions at which he worked. It thus brings together background information about the specific contexts in which Kaiser developed SI and so addresses RQ 1. In doing so, it paves the way for exploring how these contexts informed Kaiser's formulation of his indexing system.

1.5.2. Historically Contextualized Comparison: Contexts of Professional Discourse

Biographical framing provides one avenue to attaining a historically informed understanding of how Kaiser conceptualized his indexing system. Its frame of reference, however, is narrowly bound to the Kaiser's occupational *cursus* and, accordingly, to the specific institutional contexts within which he developed and implemented SI. Another, complementary approach seeks to adopt a wider frame of reference within which to examine his methodological precepts and theoretical pronouncements—namely, the various streams of professional discourse and practice regarding knowledge organization (see Glossary, s.v. “KO”) that were emerging in the late 19th and early 20th centuries. In concrete terms, this approach builds upon a method that has already come up for discussion. Earlier, I proposed that a close reading of Kaiser's published writings is to serve as the foundation for reconstructing his conceptualization of SI from a systemic perspective (see Section 4 of the current chapter). *Mutatis mutandis*, techniques of close reading also provide the basis for considering his indexing system in a broader historical context. We have seen that, in the systemic approach, close reading is oriented towards laying bare the

National Archives of the UK at Kew; the British Westinghouse Corporation, which form part of the Marconi Archive held at the Bodleian Library of Oxford University; and the Tariff Commission, the papers of which are housed in the special collections of the British Library of Political and Economic Science at the London School of Economics. I have, however, been unable to consult the Vickers archive held at Cambridge University Library nor have I come across any discussion of its information régime in primary or secondary published sources: this constitutes a limitation on the biographical framing offered here.

inner logic of SI and so the reader focuses on interpretation of Kaiser's formulation of his indexing system as given in his writings. In the historical approach, the reader seeks to relate the ideas set forth in Kaiser's writings to those expressed in contemporaneous literature pertaining to knowledge organization. Such a mode of reading involves comparing and contrasting elements of Kaiser's views about indexing and classification with those of contemporaries working within the various traditions of discourse and practice that dealt with these subjects. By adducing parallels and noting contrasts between Kaiser's system and those of other writers wherever it is appropriate to do so, the reader can situate SI within the general landscape of knowledge organization of its time and so places him- or herself in a better position to assess what was traditional and what was innovative in Kaiser's theory and method. This method, then, is best characterized as one of historically contextualized comparison.

If we are to make use of historically contextualized comparison, we must first identify the domains of discourse and practice that form the primary backgrounds against which Kaiser's writings on SI are to be read. These domains, which can be deduced from various hints in his writings and from the brief *cursus vitae* set out in Section 5.1 of the current chapter, include (1) the discourse and practice of office organization, (2) the realm of special libraries and information bureaux; (3) European documentation; (4) the discourse of classification within general librarianship; (5) the discourse of literary indexing associated with librarianship; and (6) discourse on classification within British manuals of traditional logic. Let us briefly consider each of these in turn.

1.5.2.1. Office Organization

An apt point of entry is to consider the professional discourses to which Kaiser's own writings were intended to contribute. Let us begin with his books. As noted in Section 4 of the present chapter, his first book was entitled *The Card System at the Office*. Published in London in 1908, it was the initial volume of what he intended to be a trilogy of works, the second installment of which was to expound on "systematic indexing and condensing", while the third was to treat of "the card system at the factory" (Kaiser 1908, §§ 3, 116, n. *). Taken as a whole, his three-volume set was to form what Kaiser dubbed "The Card System Series" (Kaiser 1908, front cover & t.p.; 1911, front cover & t.p.). This plan was not to be fully realized. In 1911, the second volume, with the contracted title *Systematic Indexing*, came forth from the press, again in London; however, its projected successor never saw the

light of day. The architectonic structure of the Card System Series thus shifted from that of a triad to a dyad, the first element of which, in the estimation of its author, “serves to some extent as an introduction” to the second (Kaiser 1911, § 20).¹⁷

As the name of the series indicates, its overall theme was the use of a particular type of technology—the card index system—in commercial settings. Today, in an age dominated by digital information systems, the card index will doubtless seem to many to be a quaint and, in large measure, superannuated piece of informatic apparatus. However, at the time and place where Kaiser wrote his books, it still very much had the savor of novelty. Originally developed within the realm of library economy for the construction of library catalogs,¹⁸ card index systems were introduced into commercial use in the United States in the late 1880s and 1890s as a medium of record-keeping more flexible and efficient than the traditional account book (Flanzraich 1993; Krajewski 2002, 109–119).¹⁹ Uptake of the new technology within the American business community was brisk—so much so that, by the middle of the first decade of the 20th century, a writer in the popular press could assert, albeit not without some exaggeration, that “to-day every business has some kind of card system” (“The manifold uses” 1906, 7908).

¹⁷ It is noteworthy that Kaiser does not mention the projected third volume anywhere in *Systematic Indexing*—an eloquent silence suggesting that he had rethought his original plan in the years intervening between the publication of this book and that of its predecessor.

¹⁸ The history of the card catalog in library work is complex and has not yet received definitive treatment. The deployment of slips or cards for the use of librarians and bibliographers in cataloging or bibliographic work can be traced to a few isolated contexts in continental Europe in the late 18th century (Hopkins 1992; Krajewski 2002, 35–64): however, the card catalog *for public use* in libraries first took root in the United States. The earliest certain example of such a catalog is the one initiated by Ezra Abbott for the Harvard College Library in the 1861, which was soon followed by a number of other American libraries (Krajewski 2002, 92–96; cf. Heiss 1938, 16–18, 75–76): by the mid-1890s, a commentator on the American public library scene could write that the “card catalogue plan ... is now so nearly universal that it may almost be said to be the only method in general use” (Fletcher 1894, 58) and, another could consider “[t]he necessity of a comprehensive and detailed card catalog” to be a settled point among public librarians (Lane 1896, 836). As regards the United Kingdom, there are reports of the use of slip catalogs in Irish libraries in the early 19th century (James 1902a, 186) and the idea of publicly accessible card catalogs was again mooted in the latter half of the 1870s (Clarke 1905, 167–168): the use of the card catalogue, however, does not seem to have come into its own on English soil, at least in public libraries, until the turn of the new century (Bowman 2006, 88–89).

¹⁹ The growth of use in the late 1880s coincides with the first sustained efforts at marketing card systems for business purposes, pioneered in large measure by Library Bureau. However, there is some evidence that cards were being used earlier, albeit in isolated contexts. According to a number of authorities, the earliest attested use of cards for commercial indexing took place on English soil, at the Bank of England in 1852 (Brown 1903, 299; Flanzraich 1993, 406; James 1902a, 186; Krajewski 2002, 111), while, in America, there are claims for the utilization of cards in banks as early as 1865 (cf. Poole, cited in Library Bureau 1890, 36).

During the same period, card systems also began to make their way to the British isles. In the 1890s, several firms, American (“An Orderly Office” 1897; Library Bureau 1896; 1909, 20–21) and English (“The Ceres Card index” 1891; Wm. Dawson & Sons 1892, 1894) alike, marketed card index equipment for commercial use in England (cf. Burton 1899, 35). It is difficult to gauge how rapidly this new mode of recordkeeping was adopted in the British business world. late-Victorian and Edwardian businessmen had a reputation for dilatoriness in taking up new business methods and technologies—a trait routinely, if somewhat facetiously, ascribed by the contemporary press to the innate conservatism of John Bull (Botticelli 1997, 262–265)—and commentators on the British business scene frequently counted the card system among the many innovations neglected or underutilized in English business establishments (Brown 1907, 48; Collins 1907, esp. pp. 420–421; Fayant 1904a, 12; Jenkinson, cited in Barker 1904, 316; “The Remington at Home”, 104). Nevertheless, over the course of the first decade of the new century, the new technology began to make inroads. “Card systems are being used more and more every day”, reported a British businessman seeking to vindicate the ways of his compatriots to the readers of an American business journal (Casey 1904, 1002), while a columnist writing for a prominent English journal of commercial education claimed that the use of such systems “is spreading enormously in business houses, large and small” (Our Commercial Correspondent 1905a). Impressionistic statements such as these may find some substantiation in the fact that, by 1909, Library Bureau, one of the American firms that had pioneered the use of card indexes for commercial use, could boast not only of an office in London, where the Boston-based company had maintained a filial branch since 1893, but also of salesrooms in Manchester, Birmingham, Newcastle-on-Tyne, and Leicester, as well as of a card factory situated in the City (Library Bureau 1909, 20–21, 32): such expansion, one may assume, not only betokened entrepreneurial initiative, but also reflected increased demand. At any rate, Kaiser’s series appeared at a time of growing interest in the use of card systems on the English business scene, when the rising generation of clerks was increasingly expected to have some familiarity with them (Our Commercial Correspondent 1905b; Fieldhouse 1906, 180–181).

The advent of the card system in commercial settings must be seen in a broader perspective, for it was but one symptom of a deep-seated transformation in the world of clerical work that extended from roughly the late 1870s through the First World War. The early years of this period witnessed the rise of large-scale industrial companies in the

United States whose scope of activities rang major structural changes in the organization of commercial and manufacturing enterprise. Vertically integrated corporations with geographically dispersed branches, specialized divisions, and proliferating bureaucracies required that the activities of their different units be coordinated so as to achieve maximal efficiencies of production and distribution (Chandler 1977). In response to the managerial imperatives of assuring coordination among units of increasingly complex organizational structures, there emerged an approach to management that latter-day writers have dubbed “systematic management” (e.g., Litterer 1961, 1986 [1959]; Yates 1989, 1, 9–15). Central principles of this approach included the tenets that (1) “system”, or the use of standardized procedures, should govern routine work, be it managerial or manual; (2) work procedures, rules, and job responsibilities should be clearly specified and documented; (3) all relevant information about the operations of (the various divisions of) a firm should be recorded; and (4) systematic collection and analysis of this information should guide top managerial decisions about the coordination of the activities of the different departments within the firm (Litterer 1961, 472–476; 1986 [1959], 113–114, 123–137, 263–266, 271–274; Yates 1990; 2000, 110). Systematic management thus required efficient and extensive record-keeping as well as well-defined procedures for collecting, collating, and communicating information within a firm: in other words, it constituted a document-intensive and information-rich mode of managerial control over the conduct of business.

This new industrial dispensation impinged upon that *locus* of a firm where managerial control was exercised and the information necessary for supporting such control was received, analyzed, arranged, stored, and distributed—the office (Delgado 1979, 11; Page 1906, 7572; Stephenson 1919, 2–3). As the size of firms increased, so did the volume of their correspondence, and, as their organizational structure grew in complexity, so did the amount of internal documentation required to achieve coordination and control (Yates 1982, 9–11). In order to deal efficiently with this rising documentary tide, a number of new technologies and associated techniques for recording, storing, analyzing, and communicating information were harnessed for use in the business office in the final quarter of the 19th, and first two decades of the 20th, century, including, *inter multa alia*, the fountain pen, the typewriter, carbon paper and duplicating machines, the vertical file, the loose-leaf ledger, and tabulating machines (Yates 1982; 1989, 39–63; 2000, 113–121). In tandem with large-scale increases in the numbers of clerical workers and greater specialization in office work roles (Yates 1989, 43–44; 2000, 112–113), the adoption of

these new technologies and the methods of work associated with them lay at the heart of what commentators have variously termed “an administrative revolution” (Gardey 2008, 16) and “an office management revolution” (Black 2007a, 111) that instantiated many of the rationalizing impulses manifest in systematic management. Occupying a central position in the panoply of new tools for office management were card systems, which, in tandem with filing systems utilizing the recently invented vertical file (Krajewski 2002, 117; Yates 1982, 16; 1989, 57–58), served as the mechanism of choice for the storage and retrieval of documents and information within the realm of the business office (Black 2007a, 112–113).

The original impetus for innovations in office management within the business world had come, in large measure, from the experiences and needs of large-scale manufacturing industries: the proponents of systemic management typically had backgrounds in engineering and were primarily concerned with the management of factory operations (Litterer 1986 [1959], 74–77, 243–251; Yates 1989, 9). However, in the first decades of the early 20th century, “the managerial philosophy of system, with its emphasis on collecting and using information”, extended its reach to smaller manufacturers and non-manufacturers as well (Yates 2000, 112, with n. 21). Its diffusion was due in part to the activity of “systematizers” or “business engineers”, itinerant consultants claiming expertise in the new arts of organization (e.g., Griffith 1910, 11–12; Longacre 1906; Perry 1910). No less important, however, was the emergence of what might be termed a discourse of systematization, articulated not only in specialized treatises on management but also in periodicals catering to the business community, such as *The Business Man’s Magazine* and the aptly named *System*, and even those directed to a general readership, such as *The World’s Work* (e.g., Smith 1902; Brownell 1904). In these latter sources, office technologies, such as the card index, were frequently accorded a leading rôle (e.g., Page 1906a; 1906b; “The Manifold Uses” 1906).

The journal *System* offers a particularly instructive example of how the discourse of systematization was imbricated with the technology of the office management revolution. Founded in 1900 by Arch W. Shaw, a partner in the Shaw-Walker Company, which specialized in the production of office equipment and card systems, this monthly magazine originally served as a “house organ” for the Muskegon, Michigan-based firm (Gardey 2008, 160; Sumner 2009 [1952], 24–25). In 1903, Shaw established the System Company, based in Chicago, to publish *System* as an independent magazine. The venture prospered and *System* attained, in fairly short order, a high profile among readers in the American business

community (Sumner 2009 [1952], 24–25). From its inception, it contained articles expounding on the utility of card systems for a spectrum of occupational contexts ranging from the work of ice dealers (Wilkinson 1903) and garage managers (Greene 1908) to that of physicians (Hewetson 1906) and clergymen (Gorter 1902), as well as explicating their use in various phases of business activity. In this, it followed the tradition of catalogues, prospectuses, and brochures put out by manufacturers of card and filing systems (e.g., Leneer 1904; Library Bureau 1896, 6–8; Shaw-Walker 1905, 7–20) from which it had originally emerged. Following the relocation to Chicago, *System*, now subtitled *The Magazine of Business*, rapidly came to intersperse its discussions of card systems with briskly written pieces on more general managerial topics, such as the organization of manufacture and retailing businesses, and, in time, expanded its coverage to yet wider themes such as foreign trade (Gardey 2008, 161). Furthermore, it sought to extend its reach beyond American shores. Copies were shipped abroad to Great Britain, and, by the end of 1907, Shaw had opened a publishing branch in London, which put out an edition combining material from the North American version with articles tailored to British interests (Shaw 1907). Throughout this expansion of its discursive space and geographical reach, however, the magazine did not abandon the two central planks of its initial thematic program: promoting the use of “system” in all spheres of commercial endeavor and extolling card systems as a core component of the infrastructure of systematization (Gardey 2008, 161–162). In its pages, the technology of the card system became inextricably linked with the business ideology of system *tout court*.

The treatment of card systems in *System* epitomizes a wider trend in the literature, for on both sides of the Atlantic, writers on business organization considered the use of card systems for the filing and indexing of records as a key element in the systematic prosecution of office work (e.g., Dicksee & Blain 1906, 20–21; Sparling 1906, 27) as did those authors whose primary focus lay in the mechanics of filing and indexing techniques (e.g., Byles [1911]; Cope [1913], Hudders 1916; Mares 1909). It is within this stream of discourse that Kaiser positioned his Card Index Series. In the introduction to his first book, he stated that:

Office Organisation, of which the work here discussed forms part, has been considerably modified within recent years, and what is called the “card system” has now come very much into vogue. ... The most important branches of office work are discussed in the following pages so far as the compass of this volume allows, and it is hoped that it may contribute its share to stimulate still further the general adoption of a system which is itself the outcome of modern business methods and has stood the test of time (Kaiser 1908, § 2).

This declaration of affiliation with the literature of office organization was no mere lip service. Not only did the volume discuss, at length, the techniques of filing and indexing in a general office setting, but it concluded with a series of trenchant paragraphs on the “effective working of a system” (§§ 351–365), in which Kaiser dispensed general advice on system management. Significantly enough, this section of the work was intended to “apply ... to *systems generally*, and to the card system particularly” (§351, n. * [emphasis his]): in other words, the operation of card systems was presented as but one aspect of a more encompassing systematic approach to the conduct of office management. Kaiser’s invocation of the ideals of system did not abate in his second book, the very title of which situated the act of indexing within the realm of system and the tenor of which, as we shall see in Chapters 6 and 7, was suffused with the same methodical spirit. It is unsurprising, then, that contemporary writers on bibliographical matters assigned his books to the literature of “office methods” (Shelp 1918, 12), “office routine” (Jevons 1916, 335), and, more broadly, to the realm of “business books” (Ball 1916, 34 & 86; Morley & Kight 1920, 193 & 227), while a prominent latter-day commentator has characterized their author as “a business systems man or analyst” (Metcalf 1976, 183). One discursive context against which various points of Kaiser’s indexing method must be considered is that of office organization, filing, and card indexing.

1.5.2.2. Special Libraries and Information Bureaux

Whereas Kaiser (1908, § 1) had directed his first book to “office principals”—that is to say, office managers—charged with the task of mobilizing card systems for the purpose of organizing documents within an office, his final article was addressed to a somewhat different audience, the attendees of the third annual conference of the Association of Special Libraries and Information Bureaux (ASLIB) held at Balliol College, Oxford in 1926 (Kaiser 1926; See Chapter 9, Section 4, below). The shift from the discursive realm of office organization to that of the special library and information bureau was not a difficult one for him to make. For one thing, within the business world, there were certain functional analogies between the informational activities of a filing department in an office and those of a special library: as workers in the former collected, registered, indexed, and stored the records of a business’s transactions (its correspondence, accounting records, and so on) (Library Bureau 1919, 1–2), so the staff of the latter collected, classified, indexed, and stored documentary materials of various sorts (periodicals, books, technical reports, press cuttings, and so on)

containing information deemed directly relevant to the work of a business enterprise (Lapp 1915, 58). The office and the special library both provided, each in its own way, “organized information” (Lapp 1915) upon which businessmen could draw in charting the course of their activities: indeed, contemporary commentators occasionally drew direct parallels between the two (Foster 1918, 159; Johnson 1915, 160;). More importantly, Kaiser’s own professional experience was intimately bound up with special libraries in the United States and Great Britain alike. Even a cursory glance at the list of institutions with which he was associated (see Section 5.1 of the current chapter) reveals that he spent much of his career working in special libraries of various types, ranging from commercial information bureaux catering to the needs of businessmen to company libraries dealing largely with technical information: indeed, as we shall see, it was largely in response to the informational environment of such institutions that he developed and implemented his method of indexing. It was, then, only natural that he should have elected to present an exposition of SI to an audience of persons interested in the constitution and management of special libraries.

The realm of American and British commercial and technical libraries within which Kaiser worked over the course of his career was a relatively new one. To be sure, examples of libraries established to support the work needs of the staff of a particular institution or to serve specific professional communities can be traced at least as far back as the 18th century.²⁰ However, it was not until the late 19th, and early 20th, centuries—a period marked not only by the growth of large-scale manufacturing and commercial enterprises (as we have already seen) but also by the intensified application of scientific research to the elaboration of industrial processes and products—that specialized commercial and technical libraries oriented towards efficient provision of up-to-date information to the “modern man of affairs” (Dana 1910a, 4) started coming into their own. In the United States, company libraries began to proliferate in the late 1880s, entering upon two decades of exponential growth from 1900 (Christianson 1976, 404–405; Kruzas 1965, 49–50, 80), while the years on either side of the turn of the century witnessed the appearance of

²⁰ For example, in England, the East India Company had established a library of documents pertaining to the geography, economy, and culture of its geographical target of interest as early as 1801 (Black 2004a, 422; 2007b, 154), while in the United States, the New England Life Insurance Company had created a law library for the use of its staff by 1843 and the New York Chamber of Commerce formed a library before 1850 (Kruzas 1965, 42 & 50). If one moves beyond the commercial realm to consider legal libraries for governmental departments or medical libraries for hospitals, one can push the antecedents to the special library well back into the 18th century (See Christianson 1976, 399–400; Johns 1968, 65–67).

dedicated commercial and technical departments in public libraries (Christianson 1976, 402–403; Kruzas 1965, 33–41), libraries maintained by professional or trade associations (Kruzas 1965, 42–47), and libraries-*cum*-information bureaux belonging to organizations, both independent and governmental, serving as clearinghouses for information on foreign commerce (Philadelphia Commercial Museum [1896], [3]; Barrett 1908, 293–294).

In Great Britain, the tempo of development was somewhat different. Libraries associated with government offices providing information on commercial matters were in operation from the first years of the 19th century onward (Black 2004a, 422; 2007b, 154; Marshall 1972, 112), while those connected with independent institutions devoted to the provision of commercial intelligence were in existence by the early 1890s (e.g., Muddiman 2011, 113–114): however, company libraries, sporadic examples of which can be traced back to the 1870s, only began to augment their numbers after the outbreak of World War I (Black 2004a, 422; 2004b, 281–283; 2007b, 153–158; Marshall 1972, 108–109), while specialized commercial and technical departments in public libraries, mooted since the turn of the century (e.g., Jast 1903), first became a reality during the same conflict (Black 2007c; Johns 1968, 48; Muddiman 2007a, 62). By the 1920s, then, the specialized commercial and/or technical library had become a feature of the information landscape in Great Britain as well as the United States (Pearce 1923).

Following upon the advent of special libraries was the development of a professional discourse of special librarianship. In the United States, this was closely bound up with the creation, in 1909, of the Special Libraries Association (SLA), a professional association for special librarians, in 1909 (Williams & Zachert 1983, 370–371). Formed in order to foster cooperation among institutions that, because of their specialized and diverse nature, had previously tended to work largely in isolation, SLA was conceived by its founders as a forum for the “interchange of ideas” and the sharing of bibliographical resources (Brigham 1910; Lee 1910; “The Special Libraries Association” 1910, 1). Such interchange was carried out not only in the work of the organization’s local chapters and national-level divisions based on subject fields,²¹ but also in general meetings and in the pages of its journal, *Special Libraries*, which published the fruits of shared bibliographic projects, communicated news about developments in the field and purveyed articles that sought to define what the scope

²¹ The divisions emerged from an original set of seven subject committees pertaining to agricultural, insurance, commercial-association, public-utility, sociological, technology, and legislative and municipal libraries (Christianson 1976, 407): by 1925, these included “Commercial, Financial, Insurance, Newspaper, Civic and Technology groups” (Rankin 1926, 53).

and essence of special librarianship and its practices (Rankin 1926, 51–53; Williams & Zachert 1983, 371–373). In this way, there emerged a robust American discourse of special librarianship.

The British analogue to SLA was ASLIB, which convened its first meeting in 1924 and formally incorporated as an association in 1927 (Muddiman 2007b, 80–82 with n. 5). Brought into being by a cadre of research managers in science and industry, whose experience during World War I and its aftermath had convinced them of the importance of a well-coordinated informational apparatus for communicating scientific and technical information, this organization took as its goal

to examine, foster and co-ordinate the activities of special libraries, information bureaux and similar services; to act as a clearing house for these services; to develop the usefulness and efficiency of special libraries and information bureaux under whatever titles they may function; and generally to promote, whether by conferences, meetings or other means, the wider dissemination of and systematic use of published information.²²

Like its American counterpart, ASLIB sought to provide a forum for the exchange of ideas about the management of specialized libraries, as well as to serve as a “clearing-house” (Pearce 1927, 18) of information about the informational resources held in specialized repositories. The mechanisms for doing so, developed during the latter half of the 1920s, included publishing directories of special libraries and information bureaux, putting out a quarterly magazine (*ASLIB Information*), and convoking yearly conferences, the proceedings of which became an important venue for the discussion of issues of both theoretical and practical import for the organization of specialized collections (Muddiman 2007b, 83). Such activities helped to continue, canalize, and consolidate a discourse about special libraries that had already emerged in British library and industrial literature during the war and its immediate aftermath (Johns 1968, 43–46, 58–59).

The North American and British traditions of special librarianship arose in different national contexts and, accordingly, each had a distinct ethos rooted in the particular nexus of social, cultural, and economic milieux within which it took shape. Despite these regional differences, they shared fundamental assumptions about the nature of special library work that subtended the discourse relating to it. In both traditions, the special library had a strictly utilitarian function: it was designed to serve “people who are doing things” (W. P. Cutter, in “What is a Special Library” 1912, 147) and so its collection of documents was

²² Aslib Archives, Box 51: “Memorandum of Association of the Association of Special Libraries and Information Bureaux”, March 29, 1926, quoted in Muddiman 2007b, 82.

regarded as “an efficient tool in the daily work of those for whose use it is designed” (Whitten 1909, 546; cf. Stubbs 1925, 42). The task of the special librarian consisted in maximizing the efficacy of this tool in several ways. The collection was to be selected so as to contain only materials on subjects pertinent to the work of the particular clientele served by the library: these materials were to be reasonably complete and as up-to-date as possible (Matthews 1920, 142–143; Whitten 1909, 546). It was to be organized in such a way that the informational content of the documents deemed relevant to the occupational needs of the library’s intended users would be made readily accessible to them: this entailed the provision of abundant bibliographical aids, as well as the practice of detailed classification and intensive indexing (Josephson, in “What is a Special Library?” 1912, 146; Matthews 1920, 150 & 157). Focus was squarely on the expeditious provision of information and so the ideal special librarian was to be active in reference work, assiduous in analyzing the information content of documents, proactive in disseminating information to members of his or her clientele, and ever ready to package the information (s)he was communicating to fit the particular needs of clients (Black 2006b, 497; 2007b, 182; Rothstein 1972 [1955], 42). In this way, especially in the eyes of its British proponents, the special library was to constitute a veritable “intelligence service”, “intelligence department”, or “information bureau” serving as a central node within a given organization for the collection, analysis, organization, and dissemination of information (Matthews 1926b; Pearce 1917, 162 & 165; 1921, 365).

Kaiser does not appear to have held formal memberships in either ASLIB or SLA. Nevertheless, as we have seen, the special library and information bureau formed the settings within which his informational career unfolded and he contributed to the discourse of special librarianship an article that, he hoped, would “stimulate original thought leading to progress in the development of effective library service” (Kaiser 1926, 33, § 44). Accordingly, the realm of special librarianship provides an apt backdrop against which to consider the method of SI. In this regard, it is interesting to consider Kaiser’s chronological relationship to the special libraries movement. His presentation of SI to ASLIB appeared in 1926, about a decade after the concept of the specialized commercial and technical library had begun to get a firm purchase within the world of British information work and over a decade and a half after a full-fledged discourse of special librarianship had emerged on American soil. However, already in 1911, two years after the foundation of the SLA and about four years before special librarianship began to be intensively discussed on the

British scene, Kaiser (1911) wrote at some length about the nature, purpose, and functions of the “intelligence department” (§§ 34–51, 622) and “business library” (§§ 247–248, 663, s.v. “Business Library”) in his full-length treatment of SI. True enough, the book in which these discussions were embedded was primarily directed to an audience of office managers and its intended discursive realm was that of office organization. Nevertheless, as we shall see in Chapter 6, Sections 2–2.5, it dealt with themes salient to the then nascent professional discourse of special librarianship, especially in Great Britain where it was published and, indeed, as we shall see in Chapters 8 and 9 below, both it and its predecessor became a point of reference for a number of British special librarians (e.g., Garrett 1921, 370; Rintoul 1925, 166). From this perspective, then, there is good reason to count Kaiser among the pioneering writers on the special library and its relation to the practice of knowledge organization.

1.5.2.3. Early European Documentation

Office organization and special librarianship were professional realms of which Kaiser had direct experience and it was within the discursive fields associated with them that he situated his own writings. There were, however, other areas of discourse and practice relating to information work that impinged upon his horizon of experience, albeit more obliquely and to a considerably lesser degree than the two aforementioned ones. One of these secondary domains was the European documentation movement that had recently been brought into existence by the Belgian lawyer-turned-bibliographer Paul Otlet and his close associate, the lawyer and politician, Henri La Fontaine.

The documentation movement had its origins in the field of bibliography. In the early 1890s, Otlet and La Fontaine were engaged in bibliographical work for the Society for Social and Political Studies in Brussels, within the framework of which they established an International Office for Sociological Bibliography, the remit of which, as its name implied, was to compile an international bibliography of works pertaining to social science and law (Rayward 1997, 290–291; 2010, 8–9). By the middle of the decade, Otlet and La Fontaine had formulated an infinitely more ambitious plan: the compilation of a card catalog of universal scope, the contents of which would be arranged in an author file and in a subject file arranged in a classificatory order (La Fontaine & Otlet 1895–1896; Rayward 2010, 13–14). This catalog they named the Universal Bibliographical Repertory (RBU); the classificatory scheme that they developed, with assistance from a number of international

collaborators, to serve as its conceptual infrastructure was an expanded version of the DDC known as the UDC.²³ In 1895, under the aegis of the Belgian government, Otlet and La Fontaine reconstituted the International Office for Sociological Bibliography as the International Office of Bibliography (OIB), which now formed the nucleus of an International Institute of Bibliography (IIB).²⁴ The IIB provided the institutional *mise en scène* within which Otlet, in particular, conceptualized a distinctive approach to information work that came to be known as Documentation.²⁵

Otlet premised his vision of Documentation on the idea that documents—prototypically, though by no means exclusively, written and pictorial records—were vehicles of informational content analyzable, in principle, into smaller units of “ideas” and “facts” (Otlet 1891–1892, 17, 1903, 134; Rayward 2003, 5–6). In his view, a number of factors militated against researchers’ effective use of extant documents as sources “for the acquisition of knowledge, for scientific study and research” (Institut International de Bibliographie 1907a, 3). Traditional methods of organizing documents, he claimed, were inefficient and incomplete: too many documents, otherwise of potential use to researchers, lay scattered across countless repositories, languishing in oblivion because of gaps of coverage in traditional bibliographical tools and lack of coordination among bibliothecal agencies (pp. 6–7). Furthermore, in an age of ever-increasing bibliographic production marked by what Otlet understood to be unnecessarily duplicative presentations of the same information in various documentary guises, it was no less necessary to isolate and collocate units of information drawn from different sources into dossiers so that researchers could consult them rapidly and with minimal waste of time (pp. 7–8). The goal of Documentation, he proclaimed, was “rapidly and easily to furnish all researchers, whatever their level of

²³ Although the UDC was in development from 1896 on, the first full edition was published only between 1904 and 1907. For a detailed account of the development of the classification from its inception to its bibliographically complex first edition, see Rayward 1975, 85–97 & 110, n. 58.

²⁴ The IIB would have a long and eventful history, to recount the details of which would exceed the boundaries of this study. Suffice it to say that, after a significant reorganization in its governance structure in the mid 1924, it was rebaptized as the International Institute of Documentation (IID) in 1931 and as the International Federation for Documentation in 1937 (Black & Muddiman 2007, 51; Rayward 2010, 12).

²⁵ As Woledge (1983, 270–271) has pointed out, Otlet, who produced a large corpus of writings extending over half a century, used the term “documentation” in a number of different senses in his published works, ranging from “the existing body of documents relating to a particular matter” and “a particular collection of documents” to “a new science” pertaining to bibliographical matters. To preclude any misunderstanding, I shall use the capitalized form *Documentation* to refer to the general approach to information work that emerges from Otlet’s writings and provides the basis for later usage of the term and “documentation” for other, less specialized uses.

knowledge or culture might be, with study materials that present the sum total of universal experience and with detailed information on particular given points” (p. 4). If this ideal of universally effective provision of information were to be realized, it would require the elaboration of new modes of documentary organization.

Otlet’s solutions to the problems of documentary organization were embodied in the informational projects that he instituted at the IIB. Of primary importance for “documentary work” was

the inventory and description of documents, in such a manner as to create an instrument of research thanks to which one could consider all the documents of the past, of the present, and of the future as chapters, sections, paragraphs of a single book expressing the whole of Science and Thought ... (Institut International de Bibliographie 1907a, 8).

The exemplar of this mode of universal bibliography, encompassing card records for books, periodicals, and journal articles (Institut International de Bibliographie 1907b, 15, 17), was, of course, the RBU, which, organized according to the UDC, formed, in Otlet’s eyes, nothing less than “the immense table of contents” to the entire domain of documented human knowledge (Institut International de Bibliographie 1907a, 9). Another core task consisted in “the analysis and the summarization of documents, the coordination and the codification of their contents” (p. 9). This involved the conceptual decomposition of the informational content of documents into individual items of information, which might then be redistributed into new collocations ordered in conformity to a subject classification; in material terms, it entailed assembling subject-based dossiers consisting of pamphlets, transcriptions of textual extracts onto loose-leaf sheets or cards, and cuttings from newspapers and magazines into a series of vertical files arranged in accordance with the UDC (Institut International de Bibliographie 1907b, 20–21; 1907c). For Otlet, the classified series of dossiers resulting from the process of analysis, rearticulation, and synthesis was, again, assimilable to “a sort of Universal Book, the Permanent Encyclopedic Repertory”, ever amenable to updating by the addition of new pieces of information (Institut International de Bibliographie 1907a, 9 [emphases theirs]; Otlet 1903, 143–144). This idea, too, was given concrete expression within the walls of the IIB, which, from 1905, housed, in addition to the already long-established RBU, a Universal Iconographic Repertory (RIU) and, from 1907, a Universal Repertory of Documentation (RUD) established along encyclopedic lines (Institut International de Bibliographie 1907b, 19–23; 1908, 85–86; Rayward 1975, 153–154; 1994, 238–239; 2010, 22).

Coordinated by means of the shared conceptual structure of the UDC, the RBU, RIU, and RUD formed what modern commentators have characterized as a series of correlated “databases” (Rayward 1990, 3–4; 1994, 239; 1997, 291–292), which, in theory, provided a mechanism for efficiently exploring the body of documentary information at either the level of the document (RBU, RIU) or at that of disaggregated and recombined items of information (RUD). The IIB complemented these repertoires-*cum*-databases with a bibliographical search service (Rayward 1975, 125–126; 1994, 239; 1997, 293–294) as well as a library and several affiliated museum collections (Rayward 1997, 292; 2010, 18–23). It thus functioned as the prototypical model of a type of institution that Otlet named “Offices of Documentation” (*offices de documentation*) (e.g., Institut International de Bibliographie 1907c, 7; Otlet 1918, 155). The purpose of an Office of Documentation was to accumulate, analyze, organize, and distribute documentary materials in such a way that any individual consulting it would be supplied forthwith with “information that is sure, precise, perfectly up-to-date, and presented in such an analytic form that he can utilize it immediately” (Otlet 1903, 144). Such institutions could specialize in the domain that they served: for example, Otlet (1905, 1917) proposed the creation of Offices of Documentation for economic and industrial affairs, and, in fact, collaborated in the founding of IIB-affiliated Offices for fields as diverse as Polar Exploration, Hunting, Fisheries, and Aeronautics (Rayward 1975, 155–156; 1994, 243).²⁶ Envisioned by Otlet as operating at a national or international level, Offices of Documentation were to be major nodes in a larger institutional network channeling the flow of documentary information both downwards to local outlets (Otlet 1903, 140–141; 1905, 45) and upwards to the central point of the nexus, the IIB, whose practices would provide the methodological rule and measure for their informational activities (e.g., Otlet 1905, 47–48; 1917, 524, 544–545). Ongoing cooperation within a highly articulated, but centralized, system of documentary centers would ensure the optimal provision of information for all.

The vast organizational apparatus of the IIB, its repertoires, and the projected, though never realized, cooperative network of documentary centers was founded on a set of informational practices—collection of a wide range of documentary materials, detailed classification and analytical indexing; and expeditious distribution of information tailored to the specific needs of inquirers—that aligned it, in significant ways, with the domain of special librarianship. Members of both traditions were aware of this mutual affinity. On the

²⁶ Founded in 1907, these Offices seem not to have survived the onset of the First World War.

documentalist side, Otlet (1903, 145–146; 1905, 6, 12; 1917, 536) regarded certain types of special libraries—for example, information bureaux associated with commercial museums and industrial libraries—as emergent forms of Offices of Documentation: indeed, his discussions of the informational requirements of the users of such institutions are indistinguishable from those found in the literature of special librarianship. In England, the kinship between Documentation and special librarianship was freely acknowledged: for example, J. G. Pearce, one of the founding fathers of ASLIB, spoke of Otlet’s work at the IIB as a significant European development in special librarianship (Pearce 1923, 93); Otlet’s program of international cooperation and using the UDC as a coordinating mechanism found zealous and influential champions within ASLIB in the persons of A. F. C. Pollard and S. C. Bradford;²⁷ and Otlet (1926) himself presented a paper about the work of the IIB at the second ASLIB conference. In the United States, there was far less explicit invocation of Documentation among special librarians (Williams 1997, 775–776): nevertheless, as a number of commentators have noted, the modes of information provision cultivated in special libraries formed the closest American analogue to European Documentation in the first third of the 20th century (La Barre 2006, 14–15; Shera 1952, 191–192; Williams 1997, 776). Although one should not, of course, overlook the considerable differences between Otlet’s highly centralized and universalist, vision of Documentation and the more pluralistic arrangements that tended to obtain in Anglo-American special library practice, it is evident that there were fundamental continuities between these two domains of information work (cf. Meadows 2006, 411–412).

Kaiser’s engagement in special library work in England during the first decade of the 20th century put him in a position to come into contact with at least some aspects of Documentation: he was aware of the ambitious bibliographic project under way at the IIB and had some acquaintance with the UDC, which he viewed with a sharply critical eye (Kaiser 1911, §§ 271–274; 1926, 28–31, §§ 26, 28–30, 32, 34; cf. Chapter 7, Section 6.2, p. 684, n. 535, end). Although Kaiser’s own approach to knowledge organization was, in many ways, the antithesis to Otlet’s universalist vision, there were some points of convergence between the two, in particular in their views on the aims of analytical indexing (Dousa

²⁷ Pollard (1877–1948) was an engineer and professor of Optical Engineering and Instrument Design at the Imperial College of Science in London with a strong and long-standing interest in bibliographic matters, while Bradford (1878–1948) was keeper of the Science Museum library at South Kensington. Both men actively involved themselves in the affairs of the IIB in the late 1920s, founding, in 1927, the British Society for International Bibliography (BSIB) as the British section of the (by then reorganized) institute (Muddiman 2007b, 91–92; 2008, 204).

2009–2010; cf. Chapter 7, Section 1, below). All in all, there is ample warrant for including Documentation as part of the backdrop against which to view Kaiser and SI.

1.5.2.4. Classification and Cataloging in General Librarianship

Another arena of discourse and practice forming a relevant background to Kaiser and his system is that of general librarianship—that is to say, the tradition of librarianship associated with public and academic libraries, the collections of which, in theory, were to range over the entire of what Miksa (1992) has termed “the universe of knowledge” (e.g., Dudgeon 1912, 130; Johnson 1915, 159; Roebuck 1914, 11). The model of the general collection underlay the presuppositions of the majority of pioneering writers on the practice and theory of subject cataloging and/or subject-based classification in the late 19th and early 20th century—Cutter, Dewey, Richardson, and, later, Bliss in the United States; Brown and Sayers in Great Britain—whose own professional experiences as librarians unfolded in the milieu of public and/or academic libraries.²⁸

Although the codes of cataloging and/or classification schemes that these writers set forth were designed primarily for use in libraries with general collections, they came to exert considerable influence upon information work in other settings as well. In most matters, special librarians and devotees of Documentation tended to draw sharp contrasts between their respective modes of information provision and those of general libraries (e.g., Dudgeon 1912, 131–133; Johnson 1915, 158–159; Otlet 1917, 520–521; 1934, 414). However, in regards to classification and cataloging, they drew extensively upon the traditions of general librarianship in formulating their own systems. We have already noted that Otlet and his collaborators developed the UDC directly from the DDC, the great attraction of which, in their eyes, lay in such features as its structural design, the universal comprehensibility of its notation, and its encyclopedic scope (La Fontaine & Otlet 1895, 27–31): in the Anglo-American world, librarians took to referring to Otlet’s classification as the “Expanded Dewey” (Hopwood 1907, 307) or the “Brussels expansion” of the DDC (Sayers 1915, 116; 1926b, 67). The DDC itself or schemes adapting its structure and notation were frequently adopted for the purposes of classification in American special libraries (e.g.,

²⁸ The exception to this general pattern was E. W. Hulme, who worked in a special library—H. M. Patent Office Library—from 1881 through 1919 (Munford 1987, 38) and, indeed, devoted two of his articles explicitly to the construction of subject catalogs in scientific and technical libraries (Hulme 1900, 1901). Yet, the perspective that he took up in formulating his views on cataloging and classification was firmly situated within the conceptual framework of general librarianship.

Lamke 1909; Lee 1907, 69–70; Marion 1910, 402), while, in the British isles, the DDC, the UDC, and homegrown decimal schemes vied for favor among special librarians as well (e.g., Pearce 1921, 368; Turner 1927, 147–150; Twentyman 1926, 88; cf. Sayers 1926b, 67–68). As for the realm of office work, the structural and notational features of the DDC were adapted to filing and indexing practices, as business offices in various industries derived their own versions of decimal classification from Dewey’s model for their correspondence files (e.g., Betz 1908; Buchaca 1914; Hogan 1920; Williams 1911 [1902]; cf. Deutrich 1965, 202–204).²⁹ This was not the only element of library lore that made its way into the business office: magazines such as *System* occasionally published articles on the basic elements of cataloging (Parsons 1903; Gauss 1906) for the benefit of those readers interested in indexing their libraries. In short, general library traditions of knowledge organization, especially those connected with decimal classification, diffused, much like the library technology of the card catalog, into all major spheres of information work in the first decades of the 20th century, where they were alternatively contested and rejected or accepted, and, if need arose, reconfigured to fit better into a new context.

Although Kaiser styled himself as a librarian in publications and official documents,³⁰ he did not belong to the mainstream of general librarianship nor does he seem to have taken much of an interest in the world of public libraries as such (Metcalf 1976, 179). Indeed, he tended to draw a sharp distinction between public (i.e., general) and business (i.e., special) libraries (Kaiser 1911, §§ 247–248; 1926, 40), firmly aligning his own indexing method with the latter. Yet, if he did not feel much kinship with the public librarian, he was not, by any means, immune to the discourse of knowledge organization emanating from the realm of general librarianship. Certainly, Kaiser was aware of the leading general bibliographic classifications of his day. By his own account, he had first-hand experience of working with the DDC early in his career as a librarian (1926, 20, §§ 1–3); in time, he had occasion to study, and comment on, Cutter’s Expansive Classification (EC) and Brown’s SC as well

²⁹ It is telling that, by 1920, bibliographers felt justified in including the schedules of the DDC in a bibliography of “business books” (Morley & Kight 1920, 90 & 131).

³⁰ For Kaiser’s occupational self-designation as librarian in published sources, see, e.g., Hayem & Schloss 1902, 41; Kaiser 1908, t.p.; 1911, t.p.; 1914, t.p.; for official documents, see, e.g., his naturalization certificate in the UK (UK Archives, HO 144/832/143880 C458752) and census returns from 1911 (UK: RG14PN2393 RD25 SD7 ED2 SN9 [available at <http://www.1911census.co.uk/>]) and 1920 (USA: NARA microfilm publication T625, Roll 1203, Page 9a; Enumeration District 760 [available at <http://www.ancestry.com>]). In the published sources, Kaiser always characterizes himself as the librarian of a specific institution, whereas, in the official documents, he simply appears as “librarian” *tout court*.

(1911, §§ 275–284). Despite the fact that he harbored a deep skepticism regarding their efficacy as tools for the organization of books and other documentary materials, they nevertheless served as a point of reference in his discussions of classification: accordingly, one must take the tradition of general library classifications into account in considering Kaiser’s ideas on classification and its relation to SI.

Much less certain is the extent of Kaiser’s familiarity with the contemporary library literature on cataloging. On one hand, he seems to have had some familiarity with the discourse of the field, for he occasionally used its technical terms, such as “dictionary catalogue” (See Chapter 3, Section 3.3) and “alphabetico-classed” arrangement (See Chapter 7, Section 5.1), and some of his comments suggest that he had a basic knowledge of what it involved (Kaiser 1908, §§ 246–248; 1911, § 366). On the other, unlike other contemporary writers on indexing (e.g., Clarke 1905, 19–20; Petherbridge 1904, xiv; Wheeler 1905, 466 & 505), he did not cite, or even mention, Cutter’s *RDC* in his writings: this has led some commentators to question how well—or if—he knew what was at the time a standard reference work on the constructing an alphabetically arranged catalog (Metcalf 1957, 235; Olding 1966, 141; See Chapter 7, Section 3.1.1, end, below). Whatever the degree of his familiarity with the *RDC* may have been, Kaiser had little to say about cataloging, for the subject did not hold much interest for him: to his mind, there was a sharp distinction between it and indexing, and he deemed the latter to be the superior means of access to information (See Chapter 7, Section 1, below). Yet, if Kaiser tended to give cataloging short shrift, the analogies between subject cataloging and subject indexing are sufficiently close that, on certain points, reference to the contemporary cataloging literature can illuminate aspects of his indexing system.

1.5.2.5. Literary Indexing

As we have just noted, library cataloging bore strong affinities to another realm of practice pertaining to knowledge organization—the indexing of books and periodicals or, as some contemporary commentators called it, “literary indexing” (e.g., Clarke 1905, “Contents”; Elliot 1910, 258). Traditionally the preserve of literary men or workers engaged by publishing houses, the two primary modes of literary indexing began, in the late 19th and early 20th centuries, to become the objects of a specialized discourse, as the appearance of a number of treatises and manuals on the subject on both sides of the Atlantic indicates (Clarke 1905; Nichols 1892; Petherbridge 1904; Wheatley 1879, 1902; Wheeler 1905).

Significantly, many of the leading protagonists in the emergent discourse of indexing had close connections with the world of librarianship. In England, Henry B. Wheatley (1838–1917), author of two treatises on indexing and prime mover behind The Index Society, a London-based association that, between its creation in 1877 and absorption into the British Record Society in 1890, promoted the making of literary indexes, was also an early member of the Library Association and had sufficient experience in library work to produce a manual of library cataloging (Bell 2008, 70–74; Lee 2002, 86 & 88; Munford 1987, 83; Piggot 2000; Wheatley 1889). Mary Petherbridge (1870–1940), proprietor of a prominent London-based indexing bureau and author of a manual on *The Technique of Indexing* that appeared in 1904, had begun her career as a librarian and received professional training in librarianship at the State Library School headed by Melvil Dewey in Albany, New York (Anderson 1970, 22–23; Bell 2008, 93–97; Mary Petherbridge, 1870–1940 1988, 115; Petherbridge 1895; 1904, [182]–[183]), while Archibald C. Clarke (18??–19??), author of a *Manual of Practical Indexing* that appeared in serialized form as “essays on indexing” in the pages of *Library World* before being published as a monograph in 1905, was the librarian of the Royal Medical and Chirurgical Society of London (later, the Royal Society of Medicine) and member of the Library Association (Clarke 1905, t.p.; Munford 1987, 14). In the United States, the prominent librarian William Frederick Poole’s (1821–1894) project of reviving, augmenting and reissuing, on a cooperative basis, an index to general periodical literature that he had initiated at mid-century, unleashed a debate on indexing among American librarians in the latter half of the 1870s in which a number of the leading authorities on classification and cataloging, including, among others, Charles Ammi Cutter, took part (e.g., Fletcher 1879; Poole 1878a, 1878b; A Library Symposium 1878; cf. Clarke 1905, 32).³¹ Jonathan Benjamin Nichols (1867–1954), who appears to have been the

³¹ Poole had originally compiled and published the first version of what would become the *Index to Periodical Literature*, or “Poole’s Index”, in 1848, while serving as student librarian for the Society of the Brothers in Unity, a student society at Yale University. Thereupon, he prepared an improved and much expanded edition, which he published in 1853, not long after he had definitively embarked upon a career in librarianship. Although the second edition was very well received and Poole maintained an interest in producing a new edition, it was not until 1876, at the behest of the members of the newly founded American Library Association, that he revived work on a new edition of the index in earnest, organizing it as a major cooperative project wherein librarians from different American and, eventually, some British libraries would contribute entries for periodicals assigned to them, which were collated and edited by Poole and an assistant, the librarian W. I. Fletcher. After several years of labor, the third edition, which indexed articles from 232 periodicals published between 1802 and 1881, appeared in late 1882. Following this monumental work was a series of (more-or-less quinquennial supplements, which appeared between 1888 and 1908. The *Index to Periodical Literature* is significant because it was the first major modern periodical index covering

first American to write a general treatise on indexing, published it both as a separate pamphlet with the title *Indexing: A Manual for Librarians, Authors and Publishers* (Nichols 1892a) and as a long article in the *Library Journal* (Nichols 1892b). Martha Thorne Wheeler (ca. 1853–1916), author of an influential handbook on indexing that came out in 1905, was an instructor in the subject at Dewey’s library school and her work was published as an installment of the bulletin of that institution (C. B. 1905, 135; Wheeler 1905). Given these linkages, it is unsurprising that the discourse and practice of indexing stood in close relation to that of cataloging and, indeed, intersected with it at a number of points (cf., e.g., Wheeler 1905, 466–467).³²

Although book and periodical indexing both fell under the rubric of literary indexing and both were based, to a large degree, upon shared structural principles (Nichols 1892a, 1892b; cf. Wellisch 1996, 84), there were also significant differences between them. For our purposes, the most important of these had to do with the units of indexing. “The object of an Index to a book is to show anyone who can read exactly what the book contains, and where each item of information is to be found”, wrote Petherbridge (1904, xix), setting forth the *communis opinio* regarding the function of the book index. Insofar as an index of this sort was intended to give access to the “minute structure of one book or of a series of books” (p. xiii), book indexers took as their units of indexing those passages of a given book embodying pieces of information on subjects that, in their judgment, were likely to be of interest to its readers: in practical terms, this meant that the book index typically made references to the page number(s) at which information on a given subject was entered. Needless to say, such indexes could attain a high level of granularity. Now indexes to individual periodical titles sometimes followed a similar approach, indexing particular passages pertaining to a given subject.³³ However, many periodical indexes—in particular, those that covered a number of different periodical titles—took the magazine, journal, or newspaper article as their unit of indexing: that is to say, they confined themselves to

multiple periodicals, a form of bibliographical tool that would become come into increasing use both within and outside the library world. For detailed discussion of Poole’s index, its genesis, and eventual fate, see Clapp 1954, 510–12; Williamson 1963, 3–13, 17–19; 104–117.

³² In this respect, it is telling that, with regard to the work on his index to periodicals, Poole instructed his collaborators (cf. preceding footnote) that “No person should be assigned to the work of indexing who is not competent to catalogue books on Mr. Cutter’s or the British Museum system. The work of an inexperienced person will be worse than useless” (Poole & Fletcher 1882, vii): in his eyes, knowledge of cataloging rules was necessary for effectiveness as a periodical indexer.

³³ This was especially true for indexes to scholarly journals. See, for instance, the sample from the cumulative index to *Archaeologia*, a journal published the Society of Antiquities in London, given in Clarke 1905, 46, where the location is given by volume number and page alone.

entering references to entire articles under authors and subjects or subjects alone (see, e.g., *Index to the Periodicals of 1900 1901*, *passim*; Poole & Fletcher 1882, *passim*). Such article-based indexing, which became the norm for the numerous general and specialized periodical indexing journals and services that proliferated in the final decades of the 19th, and the opening decades of the 20th, centuries (Clapp 1954, 513–515; Clarke 1933, 15–19, 72–76), characterized the subject content of a given bibliographic unit as a whole rather than identifying specific passages within a bibliographic unit pertaining to a given subject (cf. Clarke 1933, 24, § 29). In this respect, the level of indexing *vis-à-vis* the informational content of the document was coarser than that of book indexing: whereas a book index directed the reader to the location of the particular passage within the book conveying information about a specific subject of interest to him or her, the periodical index indicated to its user the articles treating of a subject but did not analyze the articles down to the level of granularity of the book index.

In taking a fixed kind of bibliographic unit—*in casu*, the article published in a journal or magazine—as its unit of indexing, the tradition of periodical indexing overlapped with that of library cataloging in an important way. Among librarians, the book was regarded as the prototypical unit of cataloging: that is to say, the entries under author, title, or subject in a library catalog would indicate to the users whether it had books by a given author and what they were, whether it had a book bearing a given title, or whether it had books on a given subject and what they were (cf. Cutter 1876a, 527, 1st–5th Questions). Underlying this view was the tacit assumption that a book constituted a distinct, intellectually unitary work created by a given author (cf. Miksa 2012, 22). While such an assumption held true for the many monographic books that populated the shelves of libraries, it worked less well with regard to such genres as anthologies containing works composed by different authors or even collections of essays by a single author, in which a single volume served as the *locus* for multiple works. In such cases, library catalogers had the option of making so-called analytical entries for individual essays or chapters forming part of a book, treating them, in effect, as distinct bibliographic units within the framework of the catalog (e.g. Fletcher 1895, 62; Committees of the American Library Association and the (British) Library Association 1908, xiii, s.v. “Analytical Entry”, 56, § 170, 79–80; Quinn 1899, 101–105).

Analytical entries for essays, chapters, or articles in the library catalog were deemed to be directly analogous to the entries for articles in periodical indexes, for the individual essay or chapter formed part of a book just as the individual journal article formed part of a

journal. This analogy had two consequences. First, it encouraged some librarians to conceptualize catalogues with analytical entries for serial literature as crosses between indexes and catalogs. Perhaps the best-known example of this was the *Index-Catalogue of the Library of the Surgeon-General's Office, United States Army*, created by the medical doctor and bibliographer John Shaw Billings (1834–1913)—a massive undertaking, the first volume of which appeared in 1880, with installments appearing in print in steady, if irregular intervals, until 1961 (Greenberg & Gallagher 2009, 109–110). A printed catalog of the medical literature represented in the holdings of the library of the Surgeon-General's Office (today, the National Library of Medicine), it also included analytical entries for the contents of periodicals and thus also took on the aspect of an index. This latter consideration led to its compound name, for, as Billings explained in his introduction to its inaugural volume,

[t]his Catalogue includes both authors and subjects—the names being arranged in dictionary order in a single alphabet. Under the subject-headings are included the titles of original articles in the medical journals and transactions contained in the Library, for which reason the Catalogue is commonly spoken of by those who are familiar with it as the “Index-Catalogue”, and the name has been adopted as being brief and at the same time distinctive (Index-Catalogue of the Library of the Surgeon-General's Office, United States Army, Series 1, Vol. 1 1880, iii).

Interestingly, entries for a comparable admixture of “bibliographical units”—namely, “books and the principal articles from reviews, bulletins, and collections of learned societies”—formed the contents of the IIB's card-based RBU (Institut International de Bibliographie 1905, 22), although Otlet, operating within a different linguistic tradition and seeking to distinguish his own bibliographical tool from conventional library catalogs (cf. p. 21), preferred to call his hybrid bibliography a “repertory” (See Section 5.2.3 of the present chapter). At any rate, it was but a short step from considering a catalog including separate entries for articles published in periodicals as an “index-catalogue” to regarding a catalog with analytical entries for essays or chapters published in books as a hybrid form as well: as one well-placed American commentator observed in the mid 1890s, “[i]n many library catalogs analytic entries have been so numerous made as to constitute them indexes as well as catalogs” (Fletcher 1896, 1010).

By the same token, the analogy between analytical entries in catalogs and entries in periodical indexes also led to an extension of the concept of indexing in relation to books. If one could prepare indexes of periodicals in which the unit of indexing was the individual article, there was no reason why one couldn't have indexes of non-monographic books in

which the unit of indexing was the individual essay or chapter. Such was the position of Poole's primary collaborator on the *Index to Periodical Literature* and one of the leading proponents of indexing within librarianship, William I. Fletcher (1844–1917), who, in 1893, published, under the aegis of the American Library Association (ALA), just such a work: entitled *An Index to General Literature*, it covered “biographical, historical, and literary essays and sketches” as well as “reports and publications of boards and societies dealing with education, health, labor, charities and corrections, etc., etc.” (Fletcher 1893, t.p.; cf. Bobinski 1978, 119). Thus, when Fletcher (1896, 1010) defined an index as “an arrangement (generally alphabetic, but sometimes classified) of the analyzed contents of one book, or of the books in a certain class, ... intended to show in what books and at what places in those books information is to be found on a certain subject”, the definition was double-edged. On one hand, it could be read as referring to the traditional back-of-the-book index that analyzed a book down to particular passages dealing with a given subject, as, indeed, Wheeler (1905, 467) seems to have done in her treatise on indexing. On the other, it could also refer to the kind of index that Fletcher had compiled, which analyzed a book down to the level of the individual essay or article *qua* bibliographic unit, but no further: this was the meaning that he had in mind (cf. Fletcher 1896, 1012). The fact that Fletcher's definition of indexing could be plausibly understood in both senses points to the underlying unity of literary indexing as an activity directed toward indicating and characterizing the informational contents of a textual unit forming part of a larger bibliographical whole, be this unit a documentarily informal one, such as a individual passage within a monographic book, or a documentarily formal one, such as a chapter or essay within book embodying a collection of works or, for that matter, an article within a journal. To be sure, not all practitioners of indexing shared this view. Petherbridge (1904, xiii, 161), for one, drew a sharp distinction between the indexing of the “minute structure” of a book, magazine, or newspaper and “indexing of a bibliographical nature” at the level of the article: the latter, she contended, “belongs to cataloguing rather than indexing” proper. Yet, if other commentators concurred that back-of-the-book indexing and periodical indexing represented distinct modes of indexing, they nevertheless identified both as legitimately belonging to the sphere of literary indexing (e. g., Clarke 1905): whether one prepared an index for a single book, compiled an index to a set of periodicals, or prepared analytical entries for a catalog, one was engaging in indexing work.

Such, then, were the general contours of the domain of literary indexing as it was constituted in Kaiser's day. Over the course of his career, he had first-hand experience with both branches thereof. As regards the indexing of books, he compiled the indexes to a series of monographic reports published by the Tariff Commission between 1904 and 1910 (See Chapter 5, Section 3, below): this led him to develop a version of SI for book indexing that he used in making the indexes for his own books (Kaiser 1908, § 367, 1911, § 664; cf. §§ 560–620, esp. §§ 604, 606). Discussion of Kaiser's technique for preparing book indexes falls outside of the scope of this dissertation and must await a separate study (cf. p. 13, n. 3, above). Here, it is sufficient to note that he considered his method of book indexing to be a derivation of his method of card indexing (Kaiser 1911, §§ 575–579) and that the latter constituted a form of "literary indexing" (Kaiser 1908, § 116, n. *), though, as we shall see, his definition of literature extended far beyond the books and periodicals that formed the primary objects of literary indexing in the traditional sense (See Chapter 6, Section 2.2, below). By contrast, Kaiser became active in article-level periodical indexing only relatively late in his career, in 1917, when he became reviewer of foreign journals and indexer for the *Engineering Index*, a leading technical periodical index, for which he continued to work until shortly before his death in early 1927 (See Chapter 9, Section 3, below). However, he was well aware of the ways of periodical indexing journals long before then and had formed definite, none-too-favorable opinions about their efficacy as tools for search: in fact, he envisioned SI as an alternative to them (Kaiser 1911, §§ 6–7, 10–15; see Chapter 7, Section 1, below). Given that Kaiser was involved with both phases of literary indexing and that he considered his own method of indexing to form a species thereof, it is obviously appropriate to keep the broader discourse of this area of knowledge organization in mind as an important component of the background against which to compare SI.

1.5.2.6. The British Logic Textbook Tradition

There is one more stream of tradition pertaining to knowledge organization that we must consider. The discourse of classification that arose within general librarianship in the last decades of the 19th, and the beginning of the 20th, centuries did not develop in isolation but took its theoretical orientation from a more fundamental source—the rules for classification elaborated within logic, the leading ideas of which ultimately derive, *mutatis mutandis*, from Aristotelian and Scholastic tradition. The degree to which logical lore was drawn into the discourse of librarianship varied geographically. In the United States,

librarians writing on cataloging and classification tended not to refer explicitly to logical literature, though they did, on occasion, make use of its terminology.³⁴ In Great Britain, on the other hand, at least some writers on these subjects made it a point to invoke logical principles explicitly and cite the handbooks of logic that they used as their sources. For example, in his articles outlining the principles of cataloging and classification, Hulme (1901, 508; 1902, 319 & 323; 1903, 28 & 30; 1950 [1911–1912], 8) repeatedly referred to “logicians”, “logic primers”, or, more explicitly, John Stuart Mill’s *System of Logic* in discussing such topics as the definition of classes, the relation of classes to class names, and the (lack of) natural limits of logical division. More generally, authors of textbooks and didactic articles on library classification (Brown 1898, 28; 1916 [1912], 1–5; Coulson 1911–1912; Sayers 1915, 16–17, 28–29; 1918, 19–56; The Value of a Knowledge of Classification in General Education 1921, 216–217) thematized, with varying degrees of depth and insight, the logical principles underlying classificatory method and commended to their readers perusal of such texts as Mill’s *System*; W. S. Jevons’s *Primer of Logic, Elementary Lessons of Logic*, and *The Principles of Science*; and Thomas Fowler’s *Inductive Logic*. The discourse on library classification in the British Isles thus aligned itself, albeit selectively and not without some theoretical strain, with the logical doctrines of classification mediated by English handbooks on logic and scientific method.

We have already noted that Kaiser did not belong to the mainstream of general librarianship. Nevertheless, one trait that he did share with British classificationists working within that tradition was an awareness of the relevance of logical principles to the methodology of classification and indexing. In the introduction to his second book, he advised his readers that “for a more complete study” of the subjects treated in chapters on

³⁴ For example, Cutter (1876b, 15; 1904, 23) used the technical terms “concrete” and “abstract”, which derive from the logic of terms (See Chapter 7, Section 3.1.1), as well as “differentiae” (1876a, 540), which reflects the traditional logical account of definition *per genus proximum et specificiam differentiam*, while Richardson (1901, 9) invoked the distinction between natural and artificial classification, which occurs regularly in the logical literature of the period (e.g., Fowler 1872, 50–51; Jevons 1958 [1877], 679–681; Ryland 1900, 234–237). In neither of these cases, however, was mention made of the fact that these terms had been taken from the realm of logical discourse. Of course, this reticence regarding the explicit mention of logical tradition does not mean that these, and other American, writers on library classification were unaware of the logical bases of their subject. Quite the contrary appears to have been the case, as is evident from the lapidary definition of logical classification given in a report on classification at an ALA conference: “a logical classification [is] one which follows definite principles, and conforms its succession of divisions to certain inferences according to the laws of thought” (Bliss 1889, 241). Presumably, the general lack of reference to specialist sources about logic was due to the assumption that any educated person would be familiar with the subject and so there was no need to give explanations of matters taken to be common knowledge.

“the structure of *literature* ... from the indexer’s standpoint” and “*classification*”, “students may read also the textbooks on logic” (Kaiser 1911, § 19, n. * [emphases his]). Kaiser did not specify which textbooks he had in mind and so the identity of the sources upon which he drew is unknown. Nor do we know how close a study he made of such textbooks. As we shall see in Chapters 6 and 7 below, his invocation of logical concepts was selective, while his use of technical terms was fairly idiosyncratic and often deviated from the usage of the contemporary texts on traditional logic: whether this indicates lack of deep engagement with the latter or simply reflects an independent-minded tendency on the part of Kaiser to reformulate what he had read in his own vocabulary cannot be determined for lack of collateral evidence. Yet, despite these uncertainties regarding Kaiser’s sources and the degree of his acquaintance with them, his invocation of the logic textbooks indicates that he deemed their lore to be germane to knowledge organization in general and to his indexing system in particular. Furthermore, concepts drawn from traditional logic (and the cognate discipline of grammar) colored his thought to a sufficient degree that the discourse of term logic in contemporary English logic textbooks constitutes a useful ancillary background against which to consider his conceptualization of SI.

1.5.2.7. Other Contexts

We have seen that office organization and special librarianship were the primary occupational contexts within which Kaiser elaborated and discussed SI and that he had a considerable background in literary indexing, while Documentation, classification in general librarianship, and term logic were parallel streams of discourse and/or practice relating to knowledge organization with which he had at least a passing familiarity. It is appropriate, then, that this study should draw upon the literature of these domains for the purpose of carrying out historically contextualized comparisons. One should keep in mind, however, the externalist insight that professional or intellectual domains—or, as the case may be, closely related clusters thereof—do not develop in splendid isolation, but are constantly interacting with, influencing, and conditioned by, the wider socio-cultural milieux within which they are embedded. One must thus be ever open to the possibility that, here and there, sources drawn from other areas of contemporary thought may throw some aspect of Kaiser’s conceptualization of SI into sharper relief than could be done by comparison with materials from the six central fields of discourse identified here alone. Accordingly, this study occasionally steps outside of the limits of the aforementioned fields and mobilizes

contemporary sources from other domains—such as, for example, lexicography, grammar, rhetoric, psychology, and educational philosophy—wherever it is appropriate to do so.

On occasion, the discussion of certain aspects of Kaiser’s thought requires that we extend our historical horizons yet further, either to sketch out the longer-term development of a key concept prior to Kaiser’s time—for example, one cannot understand the full significance of the notion of concretes without considering the ancient philological and philosophical background of the term “concrete” (See Chapter 7, Section 3.1.1, below)—or, conversely, to point out interesting parallels between his thought and those of later writers on similar themes—for example, one’s appreciation of a model of written communication that he developed, in part, to justify his policies regarding the choice of index terms is heightened when one compares it with the model propounded by Claude Shannon and popularized by Warren Weaver in the late 1940s within the framework of the so-called mathematical theory of communication, a theoretical touchstone in the discourse of library and information science (LIS) to this day (See Chapter 7, Section 2.2.2, below). Although discussions of such matters take us well beyond the chronological limits of Kaiser’s life and times, their contribution to an enhanced understanding of his theory of SI justifies their inclusion here.

1.6. Outline of the Dissertation

In this introductory chapter, we have acquainted ourselves with Julius Otto Kaiser and SI on the basis of the canonical profile characterizing them within the disciplinary consciousness of KO. We have considered the limitations of the canonical profile in regards to both the abbreviated manner in which it treats SI *qua* system and the truncated historical framework within which it locates Kaiser and SI, and have indicated the desirability of transcending these limitations so as to gain a better understanding of Kaiser and his KOS. We have set an agenda for examining SI from a perspective that seeks both to (1) trace the systemic structure of SI, as reflected in the form of the systematic card indexes that it created, the methodological protocols that constituted it, and the theoretical arguments used to justify the latter and (2) to consider the contextual forces that shaped his conceptualization of his indexing system. Last but not least, we have discussed, at some length, both the sources used for in the investigation, the methodological approaches on which it is based, and the concrete methods to be used to carry it out. Having established a

foothold on the terrain of our investigation, we are now in a position to chart the course that it takes in the following chapters.

As a whole, the dissertation takes a tripartite structure. The first part, which comprises Chapters 2 through 5, concerns itself primarily with the biographical framing of SI prior to the publication of *Systematic Indexing* in 1911. Chapter 2 discusses Kaiser's early life prior to his entry upon a career in information work. It recounts his birth and his childhood in the German state of Württemberg, accompanies him to Queensland, where he spent his late adolescence and early manhood, and ends in Chile, where he worked as a schoolmaster for several years: particular attention is given to reconstructing the course of his formal education and the development of his early career as a schoolteacher. Kaiser's career trajectory underwent a fundamental shift in 1896, when he entered upon library and indexing work at the recently founded Philadelphia Commercial Museum and, shortly after doing so, began to develop the indexing method that would lead to SI. Chapter 3 gives a detailed account of this singular institution—in particular, its knowledge organization régime—and considers in detail the extant evidence for the origins of SI. After an approximately three-year tenure at the Museum, Kaiser went to the United Kingdom, where he would work as a librarian and indexer for a decade-and-a-half: Chapter 4 sheds light on the two hitherto little-studied organizational settings in which he worked during his early years in London—the Commercial Intelligence Bureau, Ltd., a for-profit provider of commercial information for British businessmen with close ties to the Philadelphia Commercial Museum, and the library service attached to the Publishing Department of the British Westinghouse Corporation. After fairly brief stays at these two posts, Kaiser became librarian at the offices of the Tariff Commission, a research organization associated with Joseph Chamberlain's campaign for Tariff Reform, a position that he held for a number of years. It was while working for the Commission that he formulated the version of SI expounded in his two books. Chapter 5 considers, in some depth, the genesis and nature of the Tariff Commission and its research activities, gives an overview of Kaiser's activities there, and discusses the publication of his works in light of the latter.

The second part of the dissertation consists of Chapters 6 and 7. Here, the focus shifts from a biographical framing of Kaiser and his career to a systemic, yet historically aware, exposition of SI based primarily on a close reading of *The Card System at the Office* and *Systematic Indexing* but also drawing upon evidence from the index files of the Tariff Commission, from the literatures of the various discourses discussed above, and, wherever

appropriate, from the biographical data adduced in the preceding chapters. Chapter 6 sets the stage by giving an account of the broader régime of knowledge organization in which Kaiser envisioned that his indexing system would find use. It opens with a discussion of the ideal institutional setting for SI, which he variously labeled as the intelligence department of a business organization or as the business library, and examines his conceptualization of these virtually identical milieux and their function(s) in its historical context. Then it turns to a consideration of two kinds of KOS that, Kaiser presupposed, would be used in tandem with SI: the form of document classification by means of which the documentary materials collected by an intelligence department or business library were to be physically organized and the kind of bibliographical mechanism by means of which individual documents kept within a collection were to be identified, located, and retrieved, the card register. Kaiser's preference for a classification of documents rooted in documentary form over one based on subject content provides a framework for discussing his ideas about classification, while his understanding of card registers as tools for retrieving documents *qua* bibliographic units serves as a necessary preamble to his understanding of the index as an instrument for finding specific pieces of information within documents.

Chapter 7, by far the most extensive chapter of the work and, indeed, its very heart, gives a detailed analytic account of Kaiser's indexing system. Although presented as a continuous series of sections (so as to stress the unity of the scheme as a whole), it can be divided, roughly, into three parts. The first third begins with a discussion of his conceptualization of SI as a form of highly analytical indexing or information analysis whereby individual pieces of information embedded within documents might be identified, selectively extracted, and rearranged in such a way that items of information from different documentary materials pertaining to the same subject matter could be collocated and so subjected to systematic control. The general aims of SI having been introduced, attention then turns to a consideration of the epistemological and linguistic presuppositions underlying the indexing system. It is shown that Kaiser's view of knowledge (acquisition) had a strong empiricist and perspectivist bent, which also deeply colored his understanding of human language and communication: the result of this, it is argued, was that he focused on *terms*, or meaningful verbal units, rather than concepts, as the elementary building blocks of indexing and that, in principle, though not always in practice, he preferred that index terms be derived directly from texts being indexed. The indexing vocabulary created by means of this early form of derivative indexing was structurally articulated in

accordance with two semantically-based classificatory structures: one according to which each term in the vocabulary was to be assigned to one, and only one, of three categories—terms of concretes, terms of countries, or terms of processes—and one that drew a distinction between relatively general and relatively specific terms. The interactions between these two orthogonal classificatory structures are discussed, as is Kaiser's understanding of specificity, which he considered to be a highly desirable property of both index terms and the information in general.

We have already noted that Kaiser considered the three categories of concretes, countries, and processes to be the central structural feature of his indexing system, as, indeed, have all later commentators upon SI (See Section 2 of the present chapter). He did so because they formed the basis for the construction of more complex index terms, or statements, by means of which pieces of information within a given text could be identified, isolated, and recorded as index items (See Section 4 of the current chapter). Accordingly, the central third of Chapter 7 is given over to a very close analysis of Kaiser's definition of the categories and his syntactic rules for creating statements by combining terms on the basis of their category membership in light of both their historical background and underlying theoretical justification. It is shown that Kaiser, in effect, simultaneously espoused two versions of this categorial system—a dyadic version consisting of concretes and processes alone and a triadic one comprising concretes, countries, and processes—of which the first was largely based on a theoretical model that he developed upon both epistemologico-ontological and logico-linguistic grounds, whereas the second reflected the engrafting of this model upon an antecedent indexing schema that he had taken over from the Bureau of Information at the Philadelphia Commercial Museum, where he first developed his system. After discussion of the origins and systemic features of the categories and the statements formed from them, an account of the technique of SI, from the selection and categorization of terms in a text being indexed through the formulation of index items on the basis of the statement and the recording thereof upon unit cards: in this way, it shows how the method of indexing was correlated with a determinate structure for the records of individual pieces of information that formed the elements of the files of a systematic card index.

The final third of Chapter 7 considers Kaiser's provisions for the constitution of card index files and mechanisms for helping users of a systematic card index navigate them. Kaiser stipulated that the index items in a card file were to be arranged on the basis of the alphabetical order of the terms composing their respective statements: his rationale for, and

conceptualization of, this order, as well as his practical rules for alphabetization are discussed. To aid users of an index to find those index items on subjects of interest to them within the card files, Kaiser devised a highly elaborate form of card-based guiding, mapping the structures of statements upon a five-position system of guide cards that indicated the location of certain subjects within the files. The mechanics of this system are presented and elucidated. Some of these guide cards also served as sites for recording cross-references between main entry terms belonging to the same category, so that relationships might be established between collective and specific terms of concretes, as well as between collective and specific terms of countries. Both the theoretical basis for, and the practical rules for implementation of, a syndetic structure (see Glossary) superimposed upon the alphabetical arrangement of the card files are treated in detail. Finally, having outlined the general contours of SI and examined individual aspects of it at some depth, the chapter concludes with a discussion of what Kaiser took to be two cardinal features of SI: systematicity and customizability to fit the individual informational requirements of different business organizations. It is argued that SI was designed in such a way that its systematicity could accommodate the imperatives of individuality to a large degree, but that there were tensions between these two features, not only at the level of index design but also at that of index management.

The third and final part of the dissertation, which encompasses Chapters 8 to 10, follows the fortunes of both Kaiser and SI after he published his book-length account of SI in 1911. As such, it reverts, in large measure, to the mode of biographical framing, though certain systematic sections trace ulterior developments in Kaiser's conceptualization of his indexing system. Chapter 8 gives an account of Kaiser's final years in Great Britain, the highlight of which was his reorganization of the works library at the Ardeer factory of Nobel's Explosives Company, Ltd., which included a full-scale implementation of SI; it discusses the form that this implementation took and recounts how Kaiser's colleagues at Ardeer, impressed by his scheme, contributed to the early diffusion of knowledge about SI among British special librarians working in the industrial sphere. In 1914, Kaiser returned to America, where he held, for a number of years, a library position at the Engineering Societies Library in New York and worked as an indexer for the American Society of Mechanical Engineers before taking up employment at the Hercules Powder Company shortly before his death. Chapter 9 discusses these institutions and the work that he did for them. It also briefly considers Kaiser's final published account of SI in a article that he

prepared for ASLIB in 1926, focusing especially on the ways in which he reconceptualized certain key aspects of his system. The chapter concludes with a brief account of the reception of SI among special librarians and theorists of KO from Kaiser's death until the early 1960s, the period in which the canonical profile of him and his indexing system took on definitive shape. Chapter 10 brings the dissertation to a close with a summary of the main findings of the earlier chapters, as well as a brief conspectus of avenues for future research.

Chapter 2. From Kaeser to Kaiser: Early Years, 1868–1896

2.1. German Origins: Stuttgart and Environs, 1868–1886

On 12 May 1867, Johann Jakob Käser (henceforth, Kaeser), aged 28, married Karoline Wilhelmine Völker, a little over six years his junior, in Stuttgart, the capital and royal residence city of the southwestern German Kingdom of Württemberg (Voelker 1984). Born in the town of Esslingen am Neckar, some nine miles to the southeast of Stuttgart, but with familial roots in the hamlet of Birkach, about five miles to the south of the capital city, Johann was a *Schreiner*—a joiner or cabinetmaker—by trade.³⁵ Karoline’s family apparently hailed from the village of Roigheim, located some thirty-three miles to the north of Stuttgart, where her father made his living as a stonecutter (Voelker 1984). Both husband and wife, then, came from a modest social background rooted in the milieu of craftsmanship or skilled labor. Otherwise, apart from the fact that, like most of their compatriots, the Kaesers belonged to the Evangelical—i.e., Lutheran—confession,³⁶ little is known of their life within the urban setting where they made their conjugal home.

Less than a year after their marriage, on 10 March 1868, Karoline Kaeser bore Johann a son, whom they named Julius Otto.³⁷ Over the next half-decade, he would be joined by four siblings: three brothers—August Theodor (1869), Hermann Theodor (1870), and Albert Emil Oskar (1873)—and a sister, apparently named Wilhelmine (1872).³⁸ Whatever joy his parents felt at the increase of their brood was tempered by sorrow, for, as was frequently

³⁵ Auswanderungen, Nr. 2018, Doc 1, p. [1] & Doc 2, p. [2], no. 8; QSA, Item 18474, p. 256.

³⁶ Auswanderungen, Nr. 2018, Doc. 2, p. [2], no. 5 & Nr. 2115.

³⁷ Or was the original sequence “Otto Julius”? Such is the order that appears in the Kaeser family’s application for permission to emigrate in 1886 (Auswanderungen, Nr. 2018, Doc 1, p. [1–2]; Doc 2, p. [2], no. 3a), while a passenger list of the ship that transported the Kaesers to Australia in the same year, gives his first name as “Otto” (QSA Item ID 18474, p. 256). These are the two earliest-dated documents mentioning Kaiser that I have found; all subsequent documents give “Julius” as his first name and, if they mention the name “Otto” at all, place it in second position. There are at least two possible ways to account for the inverted sequence. Either the original form of our personage’s name was “Otto Julius Kaeser”, which he altered to “Julius Otto Kaeser” in his eighteenth year or the latter was, from the very beginning, the correct form of the name, which, for some reason, was inverted in the documents from 1886. The answer to this small conundrum, which cannot be resolved here, is to be sought in records of Kaiser’s christening, which are probably to be found in the Lutheran parish registers housed in the Landeskirchliches Archiv in Stuttgart.

³⁸ For the names of the Kaesers’ children, see UQFL17, “The Kaeser Family in Australia”: Wilhelmine’s name is listed there with a question mark. Note also QSA Item 743132, copy of death certificate of Johann Jacob Kaeser, which indicates that he was father to two deceased children, albeit without naming them.

the case in those days, not all of their progeny reached maturity: both August Theodor and Wilhelmine died in their infancy. From 1873 on, the family numbered five members and so young Julius grew up in the company of his parents and two younger brothers. Available documentary evidence does not yield any information about the ambience of the Kaeser household nor does it afford insight into the inner dynamics of its family life. It is likely, though, that music played a prominent rôle therein, for two of the sons would develop into accomplished musicians (see Section 2 of the current chapter).

More can be said about Julius's formal education, for one of the obituary notices chronicling his life enumerates the places where he received his schooling: "the Pfander, Burger, and Continuation Schools at Stuttgart" (American Society of Mechanical Engineers 1928). From this bare list of institutional names, it is possible to reconstruct, albeit in very rough outline, a picture of the course of studies through which he would have passed and so to get a sense of the social expectations for his future that his attendance at these schools represented. The first-named of these, the Pfander School, was evidently a primary school, although it is unclear whether it was a *Volksschule* (a public elementary school) or an *Elementarschule* (a preparatory elementary school for children groomed for higher-level schooling).³⁹ Whatever the case may have been, this school, which Julius most likely entered at the age of six or seven, would have imparted the rudiments of reading, writing, and arithmetic, as well as provided elementary religious instruction.⁴⁰

The next step in young Julius's educational *cursus* was the Burger School—more precisely, the *Bürgerschule* or "Citizens' School". Attended by students between the ages of eight and fourteen, this institution occupied an intermediate position in the highly stratified school system of the Kingdom of Württemberg.⁴¹ Above it stood the lower grades of

³⁹ The nature of the educational institution lurking behind the name "Pfander School" is elusive. I have not found any allusion to the existence of a school of that name in the contemporary literature on education in Stuttgart that I have consulted. One should note, however, that, in the mid 1870s, a certain Herr Pfander served as the "elementary instructor" (*Elementarlehrer*) at the Stuttgarter *Elementarschule* (e.g., Königlich Statistisch-Topographisches Bureau 1877a, 241): it is just possible—though hardly provable—that Kaiser (or his obituarist) used the teacher's name metonymically to refer to the school as a whole. At any rate, the fact that the name "Pfander School" occurs first in what appears to be a chronologically ordered list justifies the inference that it was an elementary school of some sort.

⁴⁰ The age of seven was the lower bound for compulsory education and so the age at which most children entered the *Volksschulen*, while the course of studies in an *Elementarschule* typically began a year earlier at age six (Königlich Statistisch-Topographisches Bureau 1884, 272 & 273; Sarwey 1883, 220; Statistische Nachrichten über den Stand des Realschulwesens in Württemberg, 1880: 101).

⁴¹ More precisely, the *Bürgerschule* included an eight-year program that students entered at the age of six and left at that of fourteen: however, the first two years of this program (for children aged six

Gymnasia, *Realgymnasia*, and *Realschulen*—classically-oriented, mixed-subject, and scientifically-oriented high schools, respectively—, attendance at which served as a stepping stone to further education at a university or polytechnical institute; beneath it were situated the higher grades of the *Volksschulen*, attended by the general mass of the population not destined for higher education (Bird 1884, 9 & 89; Königlich Statistisch-Topographisches Bureau 1877b, IL, § 99; 1884, 274).⁴² The *Bürgerschule*'s course of studies was, in essence, a streamlined and simplified version of that provided in the lower grades of Stuttgart's *Realschule*, including instruction in mathematics, science, German language, geography, history, drawing, and gymnastics, as well as facultative French lessons (Bird 1889, 89; Königlich Statistisch-Topographisches Bureau 1884, 272). The *Bürgerschule* thus offered its students the opportunity to obtain a somewhat more substantial education in elementary science, mathematics, and other "modern" subjects deemed to be appropriate general background for a career in the skilled trades or commerce than they would have received in the *Volksschule* (Bird 1889, 9; Königlich Statistisch-Topographisches Bureau 1884, 272). In later life, Julius would manifest ability in, and a penchant for, mathematics, especially geometry (See Chapter 9, Section 5, below): it may well be that the seeds for his interest were sown during his school days in Stuttgart.

The age of fourteen was a significant one for children in Württemberg, for it marked the upper age limit for compulsory education: upon successfully passing their examinations for that year, they were eligible to leave school and seek employment (Königlich Statistisch-Topographisches Bureau 1884, 273; Sarwey 1883, Vol. 1, 220). For students in the high schools, the prospects of a place at a university or polytechnical institute and the promise of a reduction in obligatory military service provided incentive to prolong their education at these institutions for periods extending from a single year to an additional four years or more (Bird 1889, 32–33, 62–63).⁴³ A different set of options awaited students at the *Volksschulen* and the *Bürgerschule*. It was expected either that they would go on to attend a

to eight) were considered by contemporary educators to be equivalent to an *Elementarschule*, while the final six years (for those aged eight to fourteen) constituted the *Bürgerschule* proper (e.g., Statistische Nachrichten über den Stand des Realschulwesens in Württemberg, 1880: 92 with Anm. 35, & 101). If the Pfander School was indeed an *Elementarschule*, Julius most likely entered into the *Bürgerschule* sometime in or after his eighth year.

⁴² For a good summary description of the distinctions between *Gymnasia*, *Realgymnasia*, and *Realschulen*, as well as a tabular representation of the differences in their respective curricula, see Bird 1884, 29–30, 33–34.

⁴³ An additional year's work garnered the student a reduction in military service, while completion of four years with the successful passing of a leave-taking examination rendered him eligible for higher education.

trade school—such as the *Baugewerkschule*, which provided specialized training in technical subjects appropriate for a career in lower-level construction engineering, mechanical work, or one of the craft trades (Königlich Statistisch-Topographisches Bureau 1877b, XLVI, § 84; 1884, 269; Bird 1884, 84–86)—or that they would enter directly into the workforce as apprentice laborers or tradesmen. Even in the latter case, however, the young worker was not entirely absolved of educational obligations, for he was required to attend, on a part-time basis, evening or Sunday afternoon classes in technical subjects applicable to his chosen occupation until he had reached the age of eighteen (Königlich Statistisch-Topographisches Bureau 1884, 273–274; Sarwey 1883, Vol. 1, 220). Such courses were typically taught at a *Fortbildungsschule*, or continuation school (Königlich Statistisch-Topographisches Bureau 1884, 269).

As the enumeration of schools in his obituary makes clear, Julius took the second route and attended a *Fortbildungsschule*. In the 1870s and 1880s, a male Stuttgarter could study at two schools of this type.⁴⁴ One of them, the *gewerbliche Fortbildungsschule*, or trades continuation school, offered courses in technical drawing, modeling, handwriting, commercial correspondence and business writing, arithmetic, elementary and descriptive geometry, bookkeeping, machine operation, physics, chemistry, geography and history, and French (Gugler 1878, 494–495; Königliche Commission für die Gewerblichen Fortbildungsschulen 1873, 40–41, Tafel 1, no. 1.a-b; Nagel 1877, 129–130); the other, the *kaufmännische Fortbildungsschule*, or commercial continuation school, provided instruction in “[c]ommercial correspondence in German, French, and English; Italian, shorthand, bookkeeping, commercial arithmetic and commercial geography” (Bird 1884, 87; cf. Gugler 1878, 527; Königliche Commission für die Gewerblichen Fortbildungsschulen 1873, 40–41, Tafel 1, no. 1.e). Although the two schools shared the same building and overlapped in some of the subjects taught, they were administratively distinct and differed markedly in their policies regarding curricular matters: the *kaufmännische Fortbildungsschule* prescribed a set course of studies for its students, whereas students at the *gewerbliche Fortbildungsschule* could take as many—or as few—classes as fit their vocational needs (Gugler 1878, 494–495, 524 with n. *, 527; Königlich Statistisch-Topographisches Bureau 1884, 269; Nagel 1877, 128). On the available evidence, it is impossible to determine which of these

⁴⁴ There was also a separate track of *Fortbildungsschulen* for girls that offered courses such as drawing, handwriting, bookkeeping, languages, and home economics; see Gugler 1878, 528–529; Königlich Statistisch-Topographisches Bureau 1884, 270; Königliche Commission für die Gewerblichen Fortbildungsschulen 1873, 32–33; 40–41, Tafel 1, no. 1.d.

schools Julius attended, though one may well suspect that the lower rate of tuition at the *gewerbliche Fortbildungsschule* and its relatively flexible regimen would have made it a more practical choice for a young man of his background.⁴⁵ Whether he feasted on the full course set out in the *kaufmännische Fortbildungsschule* or, more likely, sampled selected offerings from the curricular smorgasbord of the *gewerbliche Fortbildungsschule*, this phase of his formal education would have been oriented almost exclusively towards the acquisition of knowledge for use in the workaday world of the small trades or business. To what extent he supplemented these occupationally focused studies by independent reading or additional instruction is unknown, though, for reasons that shall presently become clear, it seems highly likely that he received musical training of some sort.

Classes at a *Fortbildungsschule* were intended for members of the working population and so it is likely that, in his fourteenth year or shortly thereafter, Julius entered, in some way, into the world of work. What sort of job he would have taken on is not known. He may well have followed in his father's footsteps and begun training as an apprentice joiner. However, sons did not always take up paternal occupations and one cannot exclude the possibility that he intended to pursue some other line of work. In the early 1880s, Stuttgart would have provided a rich environment for making such a choice. Located in a valley surrounded by forested hills and vineyards, it had transformed itself from a relatively small and picturesque royal city with a population of some 61,340 in 1861 into a regionally important industrial center and commercial entrepôt, the inhabitants of which numbered 117,303 in 1880 (Catlin 1884, 412; 1885, 554). Its factories and workshops were renowned for the manufacture of a variety of products as diverse as paints and chemicals; jewelry; tin ware; optical and scientific instruments; carriages; furniture; musical instruments; toys; corsets; silk, linen, cotton, and woolen goods; drugs; sugar; confectionary goods; and chocolate (Andree 1877, 478; *Führer durch Stuttgart und Umgebungen* [1884], 12–13; Stuttgart 1886, 333). Stuttgart also boasted a vibrant commercial life. Home to a stock exchange and several annual market fairs, it was, among other things, a regional center for publishing and a focal point for the book trade in southern Germany (Andree 1877, 478–479; *Führer durch Stuttgart und Umgebungen* [1884], 14–16, 19; Stuttgart 1886, 333–334).

⁴⁵ On tuition rates, see Gugler 1878, 527; Nagel 1877, 129–130. A half-year's study at the *kaufmännische Fortbildungsschule* cost 25 marks and a full year, 45 marks, if paid in full at the beginning of the year. By contrast, attendance at evening courses for any subject except French at the *gewerbliche Fortbildungsschule* cost 10 marks per half-year, with French lessons requiring payment of 6 marks extra, while Sunday afternoon courses in technical drawing, composition, or bookkeeping cost only 4 marks per year.

It also had a number of institutions aimed at fostering interest in manufacture and trade, such as a state-sponsored industrial museum known as the sample-warehouse, or *Musterlager* (later rebaptized as the *Landes-gewerbemuseum*) (Andree 1877, 476–477; Führer durch Stuttgart und Umgebungen [1884], 13; Vischer 1875, 225–244; Wagner 1887), and the similarly named, but distinct, *Export-Musterlager*, a subscription-supported export agency-cum-permanent trade exposition with a filial branch in the northern German city of Hamburg (Murray 1886, 16–17; Renouard 1896, 455–458; Vansittart in Consuls' Reports 1886). Here, then, was no lack of opportunity for young men with a modicum of ambition to find a niche in a trade.

By the mid-1880s, Johann and Karoline Kaeser had relocated their family to Johann's ancestral village of Birkach, a hamlet of approximately 1,000 souls lying a few miles distant from the bustling city.⁴⁶ This move, which placed the Kaesers in a semi-rural community populated primarily by small tradesmen, industrial workers, and day laborers (Dittmann 2007, 55–56), need not have entailed a rupture of Julius's occupational or educational ties with Stuttgart. Throughout the 19th, and even into the early 20th, century, many Birkachers made the daily five-mile trek by foot to the nearby city for the purposes of work (pp. 55–56, 57): it is perfectly possible that he joined their ranks. However, one must also reckon with the possibility that he may have received on-the-job training closer to his village home.

By the middle of the 1880s, the horizon of expectations for Julius's future began to take on a definite shape. His educational background destined him for a career in one or other of the small trades. Such an occupational track portended a constant round of unremitting work, for young, wage-earning tradesmen typically put in ten- or eleven-hour days, six days a week (Barron 1886, 197): through application and thrift, they could aspire, in time, to set up their own business and secure a place within the ranks of the independently-employed master artisans, small shopkeepers, and merchants who then formed the *Mittelstand*, or lower middle class, of German society (Crossick & Haupt 1995, 134–136). The earlier stages of a tradesman's career, however, generally tended not to proceed in a straightforward arc, for impinging upon the imperatives of making a living were the obligations of citizenship. All able-bodied young male citizens of Württemberg, as in other German states, were legally bound to fulfill a period of compulsory military service. This obligation was a heavy one, entailing a commitment of no less than twelve years: three continuous years of full-time

⁴⁶ Auswanderungen, Nr. 2018, Doc 1, p. [1] & Doc 2, p. [1]; Königlich Statistische Landesamt 1889, Part 2, p. 38.

active duty in the standing army; four years in the reserve forces of the same; and five years as a reservist in the *Landwehr*, or national militia force (Sarwey 1883, 226). Young men became eligible for military service on their eighteenth birthday, though they did not have to enter upon active duty—the most onerous and, from the occupational point of view, most disruptive portion of their service—until the beginning of the calendar year in which they celebrated their twenty-first birthday (p. 226). For Julius, then, the future held out the prospect of time in the barracks, followed by years in the workplace establishing himself in a trade in order to attain a position comparable to, or perhaps slightly better than, that of his father. One may well wonder whether he faced this with anticipation, equanimity, resignation, apprehension, or a mixture of these and other sentiments.

Whatever Julius's expectations for his future may have been, his *Lebenslauf* would take a different turn, for, not long before he reached his eighteenth birthday, his parents decided that the family would emigrate from Württemberg. The historical record does not disclose their motives for taking this step and so one can only speculate on their rationale for doing so. Economic considerations, a perennial factor in international migration, may have lain back of the decision. Certainly, economic conditions in Württemberg during the mid-1880s were not entirely propitious ones for the lower classes of that German state. In a report on the commercial lay of the land in the kingdom for the year 1885, the British Consul at Stuttgart painted a decidedly unpromising picture:

The most important industries of Württemberg suffer from severe depression, attributed principally to over-production, brought about by an ever-increasing competition. The principal feature of the year 1885 has been the realisation of moderate gains in return for great industry and exertion. Manufacturers in almost all branches, if not carrying on business at a loss, have had to content themselves with a bare margin of profit.

German farmers, in general, complain of the steadily increasing competition from all parts which they meet with nowadays, particularly from America, Russia, and Australia. The reduced buying power, and the increasing deteriorated condition of the country population as well as of the trading classes, is, in a general degree, observable everywhere. This is chiefly the case with those occupied in small and retail businesses, who deal with the country population, and who for the most part depend upon the various industries in connection therewith (Vansittart, in Consuls' Reports 1886).

Inasmuch as the Kaesers were a family of fairly modest means,⁴⁷ the challenges of maintaining their standard of living in such a precarious economic climate may well have

⁴⁷ The extant evidence for the economic condition of the Kaesers in the in mid-1880s is both meager and difficult to interpret. In March 1886, when Johann Kaeser petitioned Württemberger emigration

induced them to seek their fortune abroad. However, in the absence of any direct documentary evidence, it would surely be rash to draw any firm conclusions on this score: it may well be that other reasons, less readily discernible from a historical distance, provided the primary motivation for them to leave their natal land.

Unlike the overwhelming majority of German emigrants in the 1870s and 1880s, the Kaesers opted not to go to the United States of America, but selected Australia as their destination.⁴⁸ This choice can best be explained as a result of personal connections. Karoline Kaeser's elder brother, Johann Christian Völker (or, Voelker) had emigrated in 1861 to the Colony of Queensland, where, after a long stint as an agricultural laborer, he established himself as a successful fruit grower and orchard operator at Ormiston, an agricultural settlement approximately fifteen miles to the east of Brisbane (Voelker 1984). Reports of his antipodean experiences may well have inspired his sister and her husband to entertain thoughts of Australia as a new home, while knowledge of his presence there would have offered them assurance that they would not be entirely on their own in their new surroundings. The conditions under which the Kaesers came to Australia provide a further clue that personal connections played a decisive rôle in their choice of destination. The family emigrated to Queensland as free nominated immigrants.⁴⁹ Such a status, which accorded an immigrant free passage from London to Queensland, could be obtained only if a native or naturalized Queenslander requested it from the colonial authorities and paid a deposit on the immigrant's behalf (Corkhill 1992, 72, with n. 4; Pain & Woolcock 1889, 872,

officials to obtain a document acknowledging his renunciation of citizenship, he declared that he would take with him 600 Marks as his *Vermögen*, or monetary wealth (Auswanderungen, Nr. 2018, Doc. 1, p. [2] & Doc. 2, p. [2], no. 9). On the basis of similar declarations made by emigrants bound for the United States of America, the Royal State Office of Statistics (*Königliches Statistisches Landesamt*) of Württemberg annually computed an average amount of marks exported *per capita* (each *caput* being either an unmarried immigrant or the head of a household), which it published in its statistical yearbook. For 1886, the year of Kaeser's declaration, the average given is 428 Marks *per capita* (Königlich Statistische Landesamt 1887, vol. 1, 49, II.7.c) for a population of emigrants the majority (77.3 %) of whom were industrial or agricultural laborers. Against this figure, Johann Kaeser's reported sum of 600 Marks appears to be above average. If, however, one considers that the 600 Marks were to cover five family members, the amount seems considerably less substantial. In terms of contemporary purchasing power, 600 Marks would have amounted to approximately two-fifths of the sum necessary to cover the annual expenses of a debt-free working-class family of five, as estimated by a contemporary Stuttgarter labor-union leader who, interestingly enough, also happened to be a joiner (Kloss, cited in Carlin 1885, 557). On balance, then, one gains the impression that, at least in the period leading up to their emigration, the Käsers were not particularly well off.

⁴⁸ According to Walker (1964, 181), a million-and-a-half people emigrated from the German states between 1871 and 1885. Of those whose destination was recorded, 95 % settled in the United States, 2 % moved to Brazil, 1 % went to other Latin American countries such as Argentina and Chile, 1 % set off for Australia, and 1 % was distributed among Canada, African lands, and Asian countries.

⁴⁹ QSA, Item 18474, p. 256.

§§ 9–10 & 878–879; Woolcock 1986, 19). Given these requirements, it is evident that only prior contacts with a person already residing permanently in Queensland could have secured the Kaesers their status as free nominated immigrants: whether this person was Voelker, as seems most likely, or some other acquaintance is unknown.

Once the decision had been taken, emigration seems to have proceeded without complications. In late February of 1886, the Kaesers temporarily moved back to Stuttgart, doubtless to make arrangements for their impending voyage, and, in the middle of March, only days after Julius's eighteenth birthday, Johann Kaeser received the *Entlassungs-urkunde*, or document of discharge, that formally released him and his family from Württemberger citizenship and thus represented official permission to emigrate.⁵⁰ Almost two months later, on 12 May, the family departed from London aboard the steamer *Duke of Westminster*, and, after a voyage of almost two months that took them into the Mediterranean, through the Suez canal and into the Gulf of Aden, across the Indian Ocean to Batavia (today, Jakarta) in Indonesia and thence, via Timor and the Torres Straits to a path along the northeast coast of Australia, they arrived at Brisbane on 6 July 1886.⁵¹ The small but rapidly growing capital city of Queensland and its hinterlands would come to form the center of gravity of the family's life and work in its new home.⁵²

2.2. Coming of Age Down Under: Brisbane and Toowoomba, 1886–1892

Although little is known about the Kaesers' first years on Australian soil, sufficient evidence survives to show that Julius soon began charting a new course for his life. His new environment required that he develop a good working knowledge of the English language. He also continued his education, studying "under private tuition" in Brisbane (American Society of Mechanical Engineers 1928; Hercules Powder Company 1927): it is regrettable that extant sources do not specify what subject(s) he studied, from whom he received instruction, and how long his studies continued. Most significantly, he quickly set about making the transition from student to instructor, for he began working as "a teacher of

⁵⁰ Auswanderungen, Nr. 2018 & 2115.

⁵¹ QSA, Item 18474, p. 241; cf. Woodcock 1986, 19 & 77, Map B. *Pace Metcalfe* (1976, 177), followed by Dousa (2007, 2), who dated Kaiser's arrival in Australia to 1887. This errant dating is based on a statement in one of Kaiser's obituaries (Hercules Powder Company 1927) that he moved to Brisbane when he was nineteen years old. The passenger manifest for the *Duke of Westminster*, however, gives his age as eighteen (QSA, Item 18474, p. 256).

⁵² The population of Brisbane increased from "approximately 48,000 in 1881 to 104,000 in 1891" (Fitzgerald 1982, 273). In 1886, the year of the Kaesers' arrival, the population of the city (measured in a radius of 5 miles from the city center) stood at 73,649 (Luck 1888, 9).

languages and music” (American Society of Mechanical Engineers 1928). We are fortunate that contemporary documents allow us to catch a glimpse of how this process unfolded.

On 28 August 1886, a little under two months after the Kaesers had arrived in Queensland, the Brisbane Liedertafel, a recently established choral society, presented a concert featuring both choral singing and a series of soloists.⁵³ According to a report in the *Brisbane Courier* (hereafter, *Courier*), at that time the city’s chief daily newspaper, “[t]he novelty of the evening was a solo on the zither by Herr Kaser, who skillfully played Beethoven’s ‘Funeral March.’ He was recalled, and substituted [sci., played as an encore—TMD] a pretty waltz, the Anglicised name of which is ‘A compliment to a friend’”.⁵⁴ The performance of “Herr Kaser”—none other than Julius—on a quintessentially south German instrument little known to many of his Australian listeners evidently aroused considerable interest, for, only three days after this concert, the following announcement appeared among the *Courier*’s classified advertisements under the rubric of educational notices:

HERR JULIUS KASER, PROFESSOR OF THE ZITHER, Begg to announce to the Musical Public of Brisbane that he is prepared to give Lessons on the abovenamed Instrument, which has become of late so popular in Europe. Herr Kaser is also open to accept engagements for concerts, &c.⁵⁵

This primly, yet self-confidently, phrased statement set forth an agenda that Julius would follow over the next few years, as he endeavored to make his mark as a performer and to carve out for himself a career as a private teacher, first of music and then of language. On one hand, notices in the *Courier*, its weekly counterpart, the *Queenslander*, and the rival *Queensland Figaro and Punch* published between 1886 and 1889 provide evidence that he took part in a number of public recitals, concerts, and revues at various venues around

⁵³ Despite its name, the Brisbane Liedertafel was not a German, but an anglophone, choral society; see Austin 1962, 1057; Brisbane Apollo Male Choir Inc., 2009.

⁵⁴ *Brisbane Courier*, 30 August 1886, p. 1 (“Brisbane Liedertafel”). Digital copies of this, and all subsequently cited early issues of the *Brisbane Courier* and other Queensland newspapers, are available at <http://trove.nla.gov.au/newspaper>.

⁵⁵ *Brisbane Courier*, 31 August 1886, p. 1 (advertisement s.v. “Educational”) & cf. p. 6 (untitled announcement s.v. “Magisterial Inquiry”). Julius’s surname is routinely spelled as “Kaser” or “Käser” in this and other newspaper announcements and stories, though one occasionally finds the variants “Kaiser”, “Kayser”, and, once, even the deformation “Zafer”. It is clear from family documents that the family’s preferred spelling of its name in its Australian context was “Kaeser”. The title “Herr” was routinely used by the Queensland press at the time to designate adult men of German ethnicity, be they visitors from abroad or permanent residents of the colony; needless to say, for a music teacher, it was no disadvantage to claim a German heritage.

Brisbane.⁵⁶ These events invariably featured multiple solo performers who took the stage in sequence and Julius typically contributed one or two zither solos per concert: his performances appear to have been, on the whole, very well received.⁵⁷ On the other, tersely worded announcements placed in the educational section of the *Courier's* classified advertisements in 1887 and 1888 bear witness to further efforts to carve out a place on the local pedagogical scene as a freelance teacher:

HERR JULIUS KASER, Professor of the Zither and Teacher of German, RECEIVES PUPILS at Adelaide-street. (Opposite Stewart and Hemmant.)⁵⁸

HERR JULIUS KASER gives Lessons on Zither, Bow-Zither, Guitar, and German. For terms apply Adelaide-street, opposite Stewart & Hemmant.⁵⁹

GERMAN CLASSES commencing 15th September. Apply HERR JULIUS KASER, Adelaide-street, opposite Stewart and Hemmant's.⁶⁰

These advertisements indicate that Julius had expanded his teaching repertoire beyond the musical instruction he had initially envisaged to include language classes as well: they also

⁵⁶ *Brisbane Courier*, 14 October 1886, p. 5; 15 October 1886, p. 1; 16 October 1886, p. 5 ("Herr Köhler's Concert"); 23 October 1886, p. 5 ("Trinity Church, Fortitude Valley"); 20 November 1886, p. 5; 27 November 1886, p. 1 (Advertisements, s.v. "Entertainments"); 29 November 1886, p. 4; 13 December 1886, p. 6; 14 December 1886, p. 5 ("A Complimentary Concert"); 8 June 1887, p. 4; 5 March 1888, p. 2 (Advertisements, s.v. "Entertainments"); 13 March 1888, p. 6 ("Amusements. Pianoforte Recital"); 3 August 1888, p. 5; 8 August 1889, p. 5; *The Queenslander*, 23 October 1886, p. 656 ("Herr Köhler's Concert"); 27 November 1886, p. 856 ("Hospital Concert"); 17 March 1888, p. 406 ("Pianoforte Recital"); 26 March 1888, p. 498 ("The 90th Birthday of the Emperor William"); *Queensland Figaro and Punch* 11 August 1888, p. 27 ("Social at All Saints"); *The Lady, Supplement to Queensland Figaro and Punch*, 26 March 1887, p. 498 ("German National Gathering"); 18 June 1887, p. 979 ("Social at All Saints"); 17 March 1888, p. 458 ("Pretty Operas and Melodramas.—Quadrille Assemblies—Rev. C. Robinson's Concert.—Death of the Old Emperor—The Divine Right—At Finney, Isle's, & Co.'s.—How Beautiful is Night.—Unprotected Women").

⁵⁷ For example, the *Courier* reported of one early performance that "the selections on the zither by Herr Kaiser were received with an ovation which must have been quite satisfactory to him, he being twice encored" (*Brisbane Courier*, 23 October 1886, p. 5 ["Trinity Church, Fortitude Valley"]), while the supplement to the *Queensland Figaro and Punch* wrote of another, later one that "Herr Kaiser gave us two charming zither solos, "Kometen March" and "Die Elfengeister", executing some difficult variations with remarkable skill" (*The Lady, Supplement to Queensland Figaro and Punch*, 17 March 1888, p. 458 ["Pretty Operas and Melodramas.—Quadrille Assemblies—Rev. C. Robinson's Concert.—Death of the Old Emperor—The Divine Right—At Finney, Isles, & Co.'s.—How Beautiful is Night.—Unprotected Women"]). Most reports of these and other concerts gave comparably commendatory accounts of Kaiser's playing, though, occasionally, a reviewer hit a contrary note: see, e.g., *Brisbane Courier*, 14 December 1886, p. 15 ("A Complimentary Concert"); *The Queenslander*, 27 November 1886, p. 856 ("Hospital Concert"); 17 March 1888, p. 406 ("Pianoforte Recital").

⁵⁸ *Brisbane Courier*, 18 October 1887, p. 1 (advertisement s.v. "Educational.").

⁵⁹ *Brisbane Courier*, 7 July 1888, p. 2, (advertisement s.v. "Educational."); 9 July 1888, p. 1 (advertisement s.v. "Educational."); 10 July 1888, p. 1 (advertisement s.v. "Educational.").

⁶⁰ *Brisbane Courier*, 10 September 1888, p. 1 (advertisement s.v. "Educational."); 12 September 1888, p. 2 (advertisement s.v. "Educational.").

reveal that the quarters in which he held his lessons were located on one of Brisbane's primary streets, across from a well-known dry goods warehouse constituting one of the city's commercial landmarks.⁶¹ Whether he was able to support himself solely on the basis of his teaching and performances or whether he had to take on other jobs to make ends meet is unknown. At any rate, one of his obituarists would regard these initial pedagogical efforts as marking the beginning of his professional career (Association of the Society of Mechanical Engineers 1928)—a view most likely derived from Julius himself.

We have seen that there are good grounds to believe that Julius had already entered upon some sort of occupational *Laufbahn* in or around Stuttgart (See Section 1 of the present chapter). Nevertheless, the view of his professional beginnings set forth by his obituarist is quite justified. Julius's attempts to establish himself as a teacher suggest that he did not wish to enter the kind of trades-related occupation for which his schooling in Württemberg had destined him and was searching for a different way of making a living. In doing so, he fell back upon resources that his German ethnic background provided him in a largely anglophone Australian cultural setting. Trading on the fact that he could play a folk instrument widely known in his home country but still considered quite novel by music lovers in Brisbane, he almost immediately sought to parlay his skill into a livelihood by proclaiming his availability as a music instructor; in due course, apparently mindful that he possessed a native speaker's knowledge of a commercially useful language spoken by a small but socially significant ethnic minority in Queensland, he undertook to offer instruction in this as well. These efforts to make his way into what was for him a new occupation on the basis of a highly personal constellation of skills rather than on that of formal pedagogical training or qualifications betoken a mixture of resourcefulness, initiative, opportunism, adaptability, and a sense of his own individual powers—traits that, *mutatis mutandis*, he would manifest at other points in his professional life.

In 1891, a few years after his initial foray into the world of freelance teaching, Julius's pursuit of pedagogical work led him to Toowoomba, the chief town of the Darling Downs, a major agricultural and pastoral district, which lay some 100 miles to the west of Brisbane

⁶¹ See *The Queenslander*, 28 March 1896, pp. 30S–31S (“Messrs. Stewart and Hemnant’s [sic] Warehouse and Factory.”); *Sydney Morning Herald* 1888, p. 15. It should be noted that Kaiser gave lessons at this address from 1887 to 1889 (Pugh’s Almanac and Queensland Directory 1888, 35; 1889, 38). From late 1886 until early 1887, his teaching quarters were at the corner of Alice and George Streets (Pugh’s Almanac and Queensland Directory 1887, 34), while from 1889 until at least 1890, he was based in Leichhardt Street (Pugh’s Almanac and Queensland Directory 1890, 40), both locations being likewise situated in the heart of central Brisbane.

(American Society of Mechanical Engineers 1928; Levey 1892, 85, 381–382). Numbering a little over 7,000 inhabitants at the time—10,000 if one counted its rural hinterlands—and a center of German settlement in Queensland (Tampke 2006, 87), Toowoomba boasted several educational establishments, one of which, the Downs School, was a relatively new private school for boys, founded in late 1889 or early 1890 by a pair of local schoolmasters, Eric von Schultze and Joseph Arthur Baxendell.⁶² This partnership proved short-lived, for, by the end of 1890, the two men had parted company, with Baxendell taking over sole headmastership of the school.⁶³ Operating the Downs School (or, as it was sometimes called, the Downs Grammar School) as a boarding school that also accepted day pupils, Baxendell prospered in his educational enterprise, for enrollments increased rapidly: apparently needing assistance in covering the full spectrum of subjects in the curriculum of his growing school, he engaged Julius as second master in 1891 (American Society of Mechanical Engineers 1928).⁶⁴

Little is known of Julius's time as a teacher at the Downs School. The school's curriculum consisted of English and composition; arithmetic and algebra; science; physical and political geography; history; classical languages; modern languages, namely French and German; bookkeeping; and drawing: furthermore, inasmuch as Baxendell was a keen sportsman and a firm believer in the maxim *mens sana in corpore sano*, athletic activities, such as swimming and rugby, formed an integral part of its educational program.⁶⁵ Although the sources at our disposal do not record which classes fell to Julius's responsibility, there can be no doubt that

⁶² *Brisbane Courier*, 21 June 1890, p. 8 (advertisement s.v. "Educational."). On the circumstances that led to the founding of the Downs School, see Winn 2000, 95, 101–103. According to Baxendell, the school was founded in 1889 (e.g., *The Queenslander*, 6 October 1900, p. 17S ["The Downs School."]); one should note, however, that both he and Von Schultze still held positions at another school until early February of 1890 (e.g., *The Queenslander*, 8 February 1890, p. 288). Thus, even if the groundwork for the school had been laid in late 1889, it did not begin operation until 1890.

⁶³ *Brisbane Courier*, 31 December 1890, p. 2 (advertisement s.v. "Educational."); 3 February 1891, p. 8 (advertisement s.v. "Educational.").

⁶⁴ Sixteen students had enrolled for the first term of the school's existence in the spring of 1890 (*The Queenslander*, 6 October 1900, p. 17S ["The Downs School."]); by the end of 1891, the number of students had more than doubled that of the previous year (*Brisbane Courier*, 21 December 1891, p. 6 ["The Downs Grammar School"]). Our sources don't specify when, within 1891, Julius took up his duties there: most likely, this would have been at the beginning of one of the school quarters—that is to say, in early February (*Brisbane Courier*, 3 February 1891, p. 8 [advertisement s.v. "Educational."]), late April (*Brisbane Courier*, 16 April 1891, p. 1 [advertisement s.v. "Educational."]), late July (*Brisbane Courier*, 14 July 1891, p. 1 [advertisement s.v. "Educational."]), or early October (*Brisbane Courier*, 30 September 1891, p. 1 [advertisement s.v. "Educational."]).

⁶⁵ On the curriculum, see *Brisbane Courier*, 21 December 1891, p. 6 ("The Downs Grammar School"); for Baxendell's emphasis on sports, see *The Queenslander*, 6 October 1900, p. 17S ("The Downs School").

he was charged with providing tuition in German: it is also likely that he was called upon to impart whatever musical instruction the school may have offered. The education he had received at the *Bürgerschule* and *Fortbildungsschule* would also have fitted him to teach subjects such as drawing, arithmetic, bookkeeping, and, perhaps, French: however, Baxendell's own pedagogical expertise lay in such commercially-oriented subjects as well and, as headmaster, he may have preferred to take these classes for his own.⁶⁶ Inasmuch as Baxendell oversaw physical education at the school, it is unclear to what extent Julius was drawn into its sporting activities. Interestingly, in the final months of 1891, the Downs School established a school library, initially a modest collection consisting of “upwards of forty volumes”.⁶⁷ Extant sources do not inform us whether Baxendell himself took charge of setting up the library or whether he delegated this task to his second master: if the latter was the case, this may well have given Julius his first exposure to the practice of knowledge organization within a library.

Whatever Julius's duties at the Downs School may have been, he appears to have carried them out diligently and faithfully. Such, at least, was the opinion of Baxendell, who, at an assembly held just before the Christmas holidays in 1891, “expressed his appreciation of the services rendered by the second master, Herr Julius Kaser, and the untiring energy and interest that gentleman took in the school”.⁶⁸ Yet, for all his efforts at the Downs School, Julius's tenure there proved to be short-lived. In 1892, after about a year's service, he left the school, Toowoomba, Queensland, and, indeed, Australia altogether, betaking himself to the South American country of Chile (American Society of Mechanical Engineers 1928).⁶⁹ What constellation of factors led him to pull up stakes and depart for a distant land lying beyond the vast expanse of the Pacific Ocean is unknown.

⁶⁶ At the Toowoomba Grammar School, where Baxendell had taught for the two years previous to the foundation of the Downs School, he was responsible for the “modern school”—that is, the part of the curriculum, save for modern languages, oriented towards “mercantile education”; see, e.g., *The Queenslander*, 19 January 1889, p. 135 (advertisement s.v. “Educational.”). Early advertisements for the Downs School refer to him as the “late mathematical master” at Toowoomba Grammar School (e.g., *Brisbane Courier*, 21 June 1890, p. 8 [advertisement s.v. “Educational.”]).

⁶⁷ *Brisbane Courier*, 21 December 1891, p. 6 (“The Downs Grammar School”).

⁶⁸ *Brisbane Courier*, 21 December 1891, p. 6 (“The Downs Grammar School”).

⁶⁹ The *terminus ante quem* for Julius's departure from the Downs School is early October 1892, when Baxendell put out an advertisement announcing an open position for a “RESIDENT MASTER ... competent to teach German (*Brisbane Courier*, 5 October 1892, p. 2 [advertisement s.v. “Situations Wanted or Vacant”])—apparently a replacement for Julius. Of course, it is possible that he may have left the school well before then.

The move to Chile was not without personal consequences for Julius, for it entailed a considerable—and, as it would turn out, permanent—geographical separation from other members of his family, all of whom had struck roots in Queensland and would live out their days there. Sometime in the 1890s, his father, Johann Kaeser, abandoned his original *métier* of joinery and, like his brother-in-law, became a gardener: having settled in the coastal town of Sandgate some thirteen miles to the northeast of Brisbane (Levey 1892, 332), he acquired a small freehold property there and worked the soil until his death at the age of seventy-seven in 1916.⁷⁰ Karoline, who occupied herself with what were then called “home duties”, outlived her husband by nine years, dying at Sandgate a few months after having attained her eightieth year.⁷¹ Hermann Theodor, the second oldest of the three surviving Kaeser children, followed in the footsteps of his father and took up gardening as his livelihood. Residing with his parents while they were alive, the lifelong bachelor lived quietly at Sandgate until 1940, when he died at the age of sixty-nine.⁷² Julius’s other brother, Albert Emil Oscar, took a markedly different path. Like Julius, he was a talented musician and he played several instruments, among them the zither (Schuster n.d.). Balancing strong musical interests with the need to make a living, Albert moved from Sandgate to Brisbane and, in 1906, opened Kaeser’s Music Store, where he sold instruments and other pieces of musical apparatus well into the 1950s (Corkhill 1992, 243).⁷³ However, much of his time and energy appear to have been devoted to performing with various local musical groups: from 1917 on, he held the position of conductor for several civic and amateur bands and orchestras, presiding, over the next several decades, at numerous concerts around Brisbane (Albert Kaeser 1928; Corkhill 1992, 243). Achieving considerable local repute for his contributions to Brisbane’s musical life, Albert, who, like his brothers, never married, lived to the ripe old age of ninety-five, dying in 1968 (Corkhill 1992, 243). Whether Julius ever came to know

⁷⁰ See, e.g., QSA, Item ID 882272, Naturalisation no. 10178; Australian Electoral Rolls, 1903, Queensland, Division of Moreton, Subdistrict of Sandgate, p. 7. no. 497; 1913, Queensland, District of Lilley, Subdivision of Nundah, p. 46, no. 2289; QSA Item 743132, Copy of death certificate of Johann Jacob Kaeser & Inventory [of real estate] by Karoline Kaeser. Digital copies of the Australian Electoral Rolls cited here and in the subsequent notes are available at <http://www.ancestry.com>.

⁷¹ See, e.g., Australian Electoral Rolls, 1903, Queensland, Division of Moreton, Subdistrict of Sandgate, p. 7, no. 498; 1913, Queensland, District of Lilley, Subdivision of Nundah, p. 39, no. 2290; 1919, Queensland, District of Lilley, Subdivision of Nundah, p. 64, no. 3783; Queensland, District of Lilley, Subdivision of Nundah, p. 63, no. 3701; *Brisbane Courier*, 19 May 1925, p. 6 (Funeral Notices).

⁷² See NAA AI 1908/7878, Application for naturalization; Australian Electoral Rolls 1913, Queensland, Division of Lilley, Subdivision of Nundah, p. 39, no. 2289; 1919, Queensland, Division of Lilley, Subdivision of Nundah, p. 64, no. 3783; 1925, Queensland, Division of Lilley, Subdivision of Nundah, p. 62, no. 3700; *The Courier-Mail*, 13 March 1940, p. 24 (“Funeral Notices”).

⁷³ See, e.g., *The Courier-Mail*, 23 December 1952, p. 10 (advertisement s.v. “Pianos, Instruments”).

about ulterior developments in the lives of his parents and siblings after his departure for South America is uncertain: there is no evidence that he ever set foot in Australia again and, over time, he appears to have lost contact with his family altogether.⁷⁴

2.3. Chilean Interlude: Viña del Mar, 1892–1896

Julius's destination in Chile was Viña del Mar, a suburb of Valparaíso lying approximately five miles to the north of the great port city (American Society of Mechanical Engineers 1928). Located on a site that, until the coming of a railroad line linking the area to Valparaíso in 1855, had been sparsely occupied by *haciendas*, or rural estates, this seaside town underwent rapid growth in the final decades of the 19th century (Castagneto 2010, 45–85).⁷⁵ In doing so, it developed a complex, multifaceted urban profile. Favored by a pleasant climate and situated in a scenic setting marked by lush vegetation, Viña del Mar served as a summer retreat for well-heeled city dwellers from Valparaíso and the country's capital, Santiago. Its picturesque villas, chalets, and gardens garnered it the reputation of being the "Chilean Versailles"; it served as a venue for numerous sporting activities, including horse-racing; and, from the 1880s on, it began to develop areas of its beachfront for recreational use (Castagneto 2010, 17–19, 66, 71–75; Quiero, Boot, & Sabatini 2002, 40–41). Yet, while the town was becoming a residential suburb for well-to-do Valparaísans and a center for recreational tourism, it was also undergoing a process of industrial development. By the early 1890s, it was home to a major sugar refinery; a large slaughterhouse doubling as a plant for tallow-rendering and soap-making; and a factory for the manufacture of heavy machinery, including locomotives and warships; as well as a number of smaller industrial installations (Castagneto 2010, 134–138; Urbina 2003a, 177–191; 2003b 156–157). These

⁷⁴ Our sources provide clear indications that, by the early 1920s, communications between Julius and members of his family had ceased entirely. In a legal document filed in the spring of 1922, his mother stated that "I have not heard of the whereabouts of ... JULIUS OTTO KAESER for some considerable time and if alive I believe he is somewhere in the United States of America" (QSA, ID 743132, Affidavit of Karoline Kaeser in support of application to dispense with sureties); after his death about five years later, the persons charged with dispensing with his effects could find "no trace ... of any relatives" (Hercules Powder Company 1927). How far back in time this rupture in communication extended is unknown. The fact that Karoline Kaeser gave her eldest son's surname as "Kaeser" in her statement suggests that she was unaware of the fact that he had changed the form to "Kaiser" as early as 1893: if this was indeed the case, then communications may have ceased shortly after his departure from Queensland.

⁷⁵ The rate of increase in population may serve as an indice of growth. In 1854, the population of Viña del Mar stood at 518 persons; in 1875, it had more than doubled the number of residents to 1,318; in 1885, its population had almost tripled in size to 4,859 persons; ten years later, it had doubled in size yet again, numbering no less than 10,651 inhabitants (Urbina 2003a, 177; 2003b, 156).

enterprises employed substantial numbers of laborers, who lived either in housing complexes provided by their employers or in working-class neighborhoods that arose in various sectors of the town (Urbina 2003b).

The social landscape of Viña del Mar in the 1890s, then, was a decidedly heterogeneous one, running the gamut from inhabitants belonging to a tony, high-profile élite to a sizeable contingent of working-class residents (Urbina 2003b, 157). Furthermore, the town's proximity to Valparaíso opened it up to cultural influences from the great seaport, especially those of the latter's ethnic enclaves. Throughout the 19th century, Valparaíso was Chile's primary gateway for its import trade and so attracted a considerable number of foreigners engaged in commercial activities, especially those from two of the country's leading trading partners, Great Britain and Germany (Dorn 1892, 312, 315–316; Ford 1893, 151–152). By the final decades of the century, the British and German communities in Valparaíso had established a number of institutions, such as schools, churches, newspapers, and clubs that mediated and, to a certain measure, propagated their respective languages and cultural traditions within the city and its hinterlands (Brice 2007; Brühl 1897). Unsurprisingly, members of these relatively prosperous ethnic groups left their imprint on the burgeoning civic life of Viña del Mar as well, taking a hand not only in establishing many of its leading industrial enterprises but also in giving impetus to the development of its recreational beaches (carried out, in large measure, by entrepreneurs of German origin) and to the formation of a vigorous local tradition of sporting activities (largely under British influence) (Brice 2007, 31–32; Castagneto 2010, 66, 71–75). In short, Viña del Mar reflected the cosmopolitan nature of the urban center with which it stood in close association.

Such was the milieu into which Julius came in 1892 and where he again took up work as a schoolteacher. In his first year at Viña del Mar, he served as senior master at a school named the Instituto Inglés (American Society of Mechanical Engineers 1928). Although our sources are silent regarding the functioning of this institution, it was almost certainly a private school and, as its name suggests, offered instruction in English. In this, it was not unusual, for a number of English-themed private schools, whether for boys, girls, or both genders, were in operation in the greater Valparaíso area in the late 19th century in consequence of the strong British presence there (Edmundson 2009, 192–193). Local sentiment among the mercantile classes whose children attended these schools firmly favored an austere practical education focusing on subjects that would prepare students for a commercial career, such as reading, writing, arithmetic, geography, modern languages,

and bookkeeping (Brice 2007, 23–24). If, indeed, the Instituto Inglés followed this common pattern in its curriculum, it would have been an ideal venue for a teacher with Julius’s educational background.

Julius, however, did not remain long at the Instituto Inglés, for, in 1893, he became principal of Colegio Miramar, a position that he would hold for three years (American Society of Mechanical Engineers 1928). Virtually nothing is known about this school apart from its name, which provides only a few hints regarding its nature. The first element of the name, “*colegio*”, may evoke, in the mind of anglophone readers familiar with its English cognate “college”, a vision of an institution of higher learning or, at the very least, an upper-class boarding school. In late 19th-century Chile, the term could certainly carry such meanings: however, often it meant little more than that the school in question was a privately run establishment, regardless of educational level or quality (Chile 1886, 1017; Kunz 1890, 254–256), and it seems likely that this latter nuance was the operative one in the case of Colegio Miramar. The second element, “Miramar”, was the name of what was at the time the primary recreational beach in Viña del Mar, much favored by the city’s élites (Booth 2002, 114–116; Miori 2012; Quieres, Booth, & Sabatini 2002, 41–46; Urtubia 2008, 137–139): most likely, it served to indicate that the school was located in the vicinity of the beach, though it may well also have been intended to refract some of the élite appeal of the latter upon the former. Although much about the Colegio Miramar is shrouded in mystery, there can be little doubt that Julius played a leading rôle in its operation. As the principal and, perhaps, even proprietor, of a private school, he would have been responsible for setting its curriculum, doing much of the teaching, and overseeing its day-to-day administration: such work would have demanded the skills of a pedagogue, administrator, and small businessman alike.⁷⁶

Apart from the fact that Julius taught at the aforementioned schools, little is known about his life in Viña del Mar. His sojourn there doubtless provided an opportunity to add Spanish to his linguistic armamentarium, while the substantial British and German communities in nearby Valparaíso may well have provided venues for social contacts,

⁷⁶ The fact that Julius held the principalship of the school for three years strongly suggests that he had a personal stake in it: indeed, it is not beyond the realm of possibility that he had founded the school *de novo*—something that, according to one contemporary commentator on Chilean private education, was not difficult to do (Kunz 1890, 255–256). Intriguing as this scenario is, it must remain unverified speculation in the absence of any positive evidence about the nature of the school. Perhaps documents shedding light on the nature of the Instituto Inglés at Viña del Mar, the Colegio Miramar, and Julius’s work as a teacher at these institutions are to be found among the holdings of the Archivo Histórico de Viña del Mar (<http://sites.google.com/site/archivohistoricopatrimonial/>).

occasions for moonlighting work, and, perhaps, outlets for musical performance. However this may have been, Julius's stay in Chile did coincide with one lasting change in his life, for sometime around 1893, he definitively altered the spelling of his surname from "Kaeser" to "Kaiser".⁷⁷ Why he did so is unclear. It is unlikely that he made the change for phonetic reasons so as to guide non-German speakers in the pronunciation of his name: "Kaeser" and "Kaiser" are pronounced quite distinctly in German ("Kaeser" = /Kɛ:'sə/, whereas "Kaiser" = /Kai' sə/) and a shift to the latter form would hardly have led to an accurate rendering of the former.⁷⁸ Somewhat more plausible is the assumption that semantic considerations came into play: after all, sometimes persons who change their family names seek to encode some sort of meaning in their adopted surname.⁷⁹ Now "Kaeser" is the German word for "cheesemaker", whereas "Kaiser", which derives from the Roman name "Caesar", meant "emperor" (Flügel 1894, 460, s.v. "Kaiser", & 465, s.v. "Käser"): one might thus be tempted to interpret the shift from the former to the latter as signaling an ambition to elevate one's position in the world—after all, an emperor holds a loftier social status than a cheese-maker and to go from the style "Julius cheesemaker" to that of "Julius Caesar" would have been to give oneself no small onomastic promotion. Appealing as this explanation may be, there is no evidence that this was the rationale for Julius's decision to alter the spelling of his surname and so the question of why he did so must be left open. Nevertheless, the change appears to have held some sort of personal meaning for him, for, in subsequent years, he insisted on the new form "Kaiser", going so far as formally to declare the change to authorities in Germany and, later, in Great Britain.⁸⁰ Perhaps the answer lies in the

⁷⁷ See UKNA, HO 144/832/143880, Memorial "A", § 8, declared 20 June 1906. In this document, his application for British citizenship, Julius stated that he changed the spelling of his name in 1893. However, elsewhere in the application, he was surprisingly cavalier in his dating of events: for example, he asserted that his family arrived in Queensland in 1885, whereas the correct date was 1886 and claimed that his father had obtained British citizenship in 1889, whereas, in truth, he did so only three years later, in 1892 (QSA, Item ID 882272, Naturalisation no. 10178). Thus, the date of 1893 is best taken as an approximate one: nevertheless, it clearly suggests that the name change occurred sometime near the beginning of the period when Julius was living at Viña del Mar.

⁷⁸ Among English speakers, it would have led, at best, to mixed forms such as /Kɛi'sə/ or /Kei'sə/, while it would have completely deflected Spanish speakers from the target pronunciation.

⁷⁹ One well-known example of such a semantically-motivated name change from the realm of KO is that of the British indexing theorist Jason Farradane, who altered his surname from the original "Lewkowitsch" to "Farradane". Whether or not he changed his name to obscure his family's Eastern European origins, he appears to have chosen his new name—apparently compounded from the names of the natural philosopher Michael Faraday (Farra(d)-) and the biologist J. B. S. Haldane (-dane)—to signal his commitment to a scientific and rational approach to life (Justice 2004, 271).

⁸⁰ UKNA, HO 144/832/143880, Memorial "A", § 8, declared 20 June 1906. From this document, we learn that, when he applied to register the name change at Stuttgart, the authorities there were

elementary fact that a change in name typically implies a distancing from some aspect of one's past self and betokens a new phase in one's life: the assumption of a new name may have simply been a declaration on the part of Julius that he was now entirely his own man. Whatever the underlying motivation may have been, Julius Otto Kaeser would henceforth present himself to the world as Julius Otto Kaiser.

unable to change the name legally because he had ceased to be a German citizen. As for the British authorities, they registered him as "Julius Otto Kaeser, known as Kaiser", although he applied to them as "Julius Otto Kaiser (formerly Kaeser)".

Chapter 3. At the Philadelphia Commercial Museum, 1896–1899: The Origins of Systematic Indexing

3.1. Career Climacteric: from Chile to Philadelphia, 1896

Kaiser remained in Viña del Mar until 1896, a year that marked an axial point in his life. During that year, he undertook yet another major shift in residence, moving from the Chilean Versailles to the city of Philadelphia in the United States of America. At the same time, he abandoned the pedagogical career that he had pursued, in some form or other, for almost a decade across two continents and entered upon a new field of endeavor—library work—at the Philadelphia Commercial Museum (hereafter, PCM) (Hercules Powder Company 1927; American Society of Mechanical Engineers 1928). The circumstances surrounding Kaiser’s decisions to relocate and take up a new career are veiled in obscurity. Our sources do not relate whether he came to Philadelphia specifically to work at the PCM—a scenario that raises intriguing questions about how he would have learned about the institution and come into contact with its representatives—or whether he betook himself there without having made prior arrangements for specific employment and found a job at the museum only once he had arrived in the city.⁸¹ Neither do they indicate what considerations induced him to take his leave of teaching and embark upon library work. At any rate, it appears that, by the end of the year, he had been hired to work at the PCM, most likely on the strength of his knowledge of at least four major commercial languages—English, German, French, and Spanish, for polyglottism was a highly valued skill at that institution (See Section 2 of the current chapter).⁸²

⁸¹ There is suggestive, but inconclusive, evidence that the latter may have been the case. The Philadelphia city directory for 1897, published in March of that year, included under its entries for the surname “Kaiser” a “Julius Kaiser”, whose occupation was given as “languages” (Gopsill’s Philadelphia City Directory For 1897, 1025): there can be little doubt that this was the Kaiser who is the subject of this work. The curious occupational designation of “languages” and the fact that the work address associated with his name—2125 Arch Street—was not that of the PCM, suggests that, when he first settled in Philadelphia, Kaiser may have tried to make a living either as a teacher of foreign languages, as he had done in Australia and Chile, or as a translator. *If* this supposition is correct and if he was not engaged in his language-related activities concurrently as a sideline to his work at the PCM, it would be legitimate to conclude that he came to Philadelphia without the specific intention of working at the museum. The 1898 edition of the city directory, by contrast, gives Kaiser’s occupation as “librarian” and his work address there—233 South 4th Street—is that of the PCM (Gopsill’s Philadelphia City Directory For 1898, 1123).

⁸² Both Kaiser himself and his obituarist claim that he was working at the PCM in 1896 (American Society of Mechanical Engineers 1928; Kaiser 1911, § 20) and in this, they have been followed by virtually all later commentators (Dousa 2007, 2; 2011, 170; Metcalfe 1957, 235; 1959, 297; 1965, 44; Svenonius 1978, 134). The sole exception to this—Metcalfe’s (1976, 177) assertion that he began

Viewed in purely biographical terms, the significance of Kaiser's entry into work at the PCM lies primarily in the fact that it inaugurated a new phase in his career, placing him in an occupational field within which he would continue to operate, in one form or another, for the remainder of his life. From the perspective of the history of KO, however, it takes on additional significance, for it was in the course of his work at the PCM that he developed the initial version of what would become SI (Kaiser 1911, § 20; 1926, 20, §§ 1–3). If we are to understand the environment within which Kaiser began to formulate his indexing system, it behooves us to consider, in some detail, the nature and the workings of the PCM.

3.2. The Philadelphia Commercial Museum: Its Mission and Work

When Kaiser began his work the PCM, it was a relatively new institution, only a few years removed from its origins. It was the brainchild of William Powell Wilson (1844–1927), a professor of botany and director of the School of Biology at the University of Pennsylvania, who conceived of it while visiting the Columbian Exposition at Chicago in 1893 (Conn 1998a, 533, 535–536; 1998b, 118–119). Impressed by the range of exhibits on display there, Wilson, whose own field of specialization was economic botany, formed the idea of acquiring some of them and bringing them to Philadelphia, where they would serve as the basis for a permanent exhibition of “the varied products of the world which illustrate the commerce of the United States with foreign countries” (Philadelphia Museums [1897], 15; cf. Cherington 1908, 501–502). After canvassing local leaders in Philadelphia regarding his project, winning their support, and receiving an appropriation from the city for this purpose, he was able to procure, at the end of the World's Fair, some twenty-five boxcar-loads of material from over forty countries (Conn 1998a, 535–536; 1998b, 118–119). Originally, Wilson and his collaborators projected that the exhibition would form the nucleus of a cluster of museums—including an ethnological, a pedagogical, an

work there in 1895—is apparently based on a faulty calculation from Kaiser's (1926, 20, § 1) statement that “[j]ust thirty years ago I as working the Dewey system at a Philadelphia library”. However, the characterization of Kaiser's occupation in the city directories discussed in the previous footnote raises the question whether Kaiser did, indeed, start his tenure at the PCM upon arrival in Philadelphia in 1896 or whether, after arrival in Philadelphia, there was a period during which he worked as a specialist in “languages”, whether as teacher or translator, before taking up employment at the PCM, presumably sometime after March 1897. Although the directory evidence suggests that the latter may have been the case (and, as we saw at p. 82, n. 77 above, Kaiser's own dating of events in his life was not always accurate), it is not entirely probative, for other explanations for the pattern of entries is possible: for example, Kaiser may have initially held two jobs concurrently, one at the museum and another as a freelance specialist in languages, and, after a time, chosen to abandon the latter to concentrate on the former. In the absence of collateral evidence, it is not possible to determine the question; in what follows, I follow the standard chronological tradition.

archaeological, a general, and a commercial museum—that together would form a single overarching entity to be known as the Philadelphia Museums (Wilson 1899a, 114; cf. Cherington 1908, 502; Schroff 1909, 214; Zurier 1997, 13–14) and, indeed, a board of trustees for such an entity was created by ordinance of the City Councils of Philadelphia in 1894 (Philadelphia Museums [1897], 15; Schroff 1909, 214). However, as the project unfolded, the institution took the form of a commercial museum alone—the PCM.

According to Wilson (1899a, 114), the development of the Philadelphia Museums into the PCM was a response to “[t]he pressing necessities of the day”. Paramount among these, in his estimation, was the need “to increase the foreign trade of the United States and secure for our merchants and manufacturers a more direct and mutual trade with every nation of the world” (The Worlds’ Commerce and the United States’ Share of It 1899, 2). In the latter half of the 1890s, such a message had considerable resonance in the United States. In 1893, the year of the Columbian Exposition, the nation’s economy had tumbled into a period of depression that would last until 1897 (LaFeber 1998, 150–153). As domestic markets languished, government officials, manufacturers, and merchants alike came increasingly to look abroad, believing that an intensification of export trade in industrial goods and the opening up of new markets for American manufactures would ease problems of oversupply and provide the basis for future economic growth (pp. 150–185). The primary target for expanding foreign trade lay not in the markets of industrialized Europe, but rather in the nascent ones of Oceania, Asia, and, above all, Latin America, where relative geographic proximity to the United States, a presumption of shared hemispheric interests, and the potential for economic development proved particularly alluring to the American business community (pp. 186–196). In Wilson’s view, knowledge of these markets, their products, and their requirements was a necessary precondition for making an intelligent and successful entry into them. In this, however, he claimed, American businessmen stood at a disadvantage *vis-à-vis* their European counterparts and competitors. Whereas the latter, who had longer-standing interests in overseas commerce, had developed effective mechanisms for procuring firsthand information about external markets, the former, whose interest in export trade was comparatively recent, were hampered by “a lack of familiarity with foreign trade conditions and requirements” exacerbated by the lack of institutional channels whereby they might learn about commercial possibilities abroad (Wilson 1899a, 113; 1899b, 465). This, then, became the mission that the founders of the PCM set for their institution—to aid the national enterprise of economic expansion abroad by furnishing

information about foreign markets, their products, and their conditions to all interested American “manufacturers, dealers, and consumers” (Philadelphia Museums [1897], 14).

The PCM sought to fulfill its informational mission in several different ways. One took the form of the traditional museal practice of collecting, classifying, and arranging objects into exhibits for public viewing. Augmenting its initial corpus of objects by acquiring materials from other world’s fairs and industrial expositions, the PCM came to hold immense collections of samples of the natural products of developing countries and of the manufactured products that were being sold in their markets (Conn 1998b, 120; The Philadelphia Commercial Museum 1899, 126). These formed the basis for exhibits based on product type or country of origin, which, from 1895 until a move to more permanent quarters at the beginning of the new century, were installed in a large four-story office building, centrally located on South Fourth Street in downtown Philadelphia, that the museum rented from the Pennsylvania Railroad for a nominal fee (Cherington 1908, 503; The Philadelphia Commercial Museum 1899, 126; Zurier 1997, 16 & 108, Figures 6 & 7). Accessible to the general public at no cost for admission from mid-December 1896 on (Heskin 1952, 10), the PCM’s carefully arranged exhibits were intended to facilitate direct visual inspection of the types of goods produced by, and sold in, Latin American, Asian, Australasian, and African countries. In Wilson’s (1899a, 116) estimation, by dint of such observation, museum visitors engaged in manufacture or trade would have the opportunity to learn at first hand about raw materials from abroad that might be of use to them in their enterprises or to draw inferences about the needs and tastes of the populations inhabiting the markets to which they might wish to export. For the broader public—in particular, visiting schoolchildren, for whom the PCM instituted lectures and guided tours (p. 115), the exhibits would serve as a visually diverting introduction to commercial geography and present a panoramic view of international commerce.

The deployment of material objects in the PCM’s collections for informational purposes was not confined to public display in exhibits. In conjunction with its collections, the Museum established a “scientific and experimental department”, the purpose of which was “to make a careful study of the scientific and economic value of all products collected” (Philadelphia Museums [1896], 11; [1897], 19). By the middle of 1897, the PCM had installed a “laboratory of technology and tests” for carrying out physical analyses of samples of commercial products (Philadelphia Commercial Museum 1897, 76). This laboratory, which, according to a contemporary visitor to the museum, was “specially well furnished

with apparatus and appliances for the investigation and analysis of ores, minerals, and metallurgical products, coals, and animal and vegetable materials and fibres” (The Philadelphia Commercial Museum 1899, 129), was used to examine samples of foreign products either on the PCM’s own initiative or at the request of American manufacturers and merchants in order to ascertain their composition and properties and so assess their industrial value (Wilson 1899a, 116–117).

In addition to mounting exhibits of objects and running laboratory tests on samples of commercial products, the PCM established and maintained a Bureau of Information (hereafter, Bureau). Housed on the topmost floor of the Fourth Street building, this department of the PCM constituted, in the eyes of many contemporary commentators, “the soul of the entire undertaking” (Vosberg-Rekow 1900, 6; cf. Mohr 1899, 402; The Philadelphia Commercial Museums 1898). The remit of the Bureau was “to make a special study of foreign commerce, compile all facts relative thereto, and make them available in as concise and definite form as possible to American manufacturers and businessmen” (Philadelphia Commercial Museum [1896], [1]). This entailed an ambitious program of collecting, collating, organizing, and disseminating information pertaining to overseas markets and their products.

The Bureau drew upon a wide variety of sources of information for this purpose. It built up an extensive collection of printed materials, including basic reference works and monographs on commercial and geographical matters, maps, runs of major trade journals and newspapers from around the world, trade reports from chambers of commerce and boards of trade abroad, and official governmental publications, such as consular reports and statistical blue books from the United States of America and a number of other nations (Philadelphia Museums [1896], 9; [1897], 20; Wilson 1899a, 117). These were organized and maintained as a commercial library (Heskin 1952, 9–15; Philadelphia Museums [1897], 19–20; The Philadelphia Commercial Museum 1899, 129), the rapidly burgeoning collections of which formed, according to William S. Harper (1860–1931), the Bureau’s first director, “a remarkably full record of the world’s commerce” (Philadelphia Commercial Museum 1897, 66).⁸³ The Bureau also cultivated extensive epistolary contacts with a

⁸³ The library was first organized in 1896 (McFarlane, in *Some Representative Business Libraries* 1917, 278): by September of that year, a reading room containing “with 700 technical journals of trade, commerce and finance, coming from all parts of the world; sixty from London alone, of the best existing journals” was already in place (Wilson 1896, 243). An impression of the rapidity of the library’s growth during the early years of the PCM can be gained from the following figures: in 1897, the director of the Bureau of Information reported that the library held 6,008 books and pamphlets

number of correspondents privy to information about markets abroad, including American consuls, members of foreign governments, chambers of commerce and other trade organizations in lands overseas, as well as special correspondents recruited to report on current conditions in various foreign markets and representatives of the museum sent out on fact-finding missions (Philadelphia Commercial Museum 1897, 67–70; Philadelphia Museums [1897], 20; The Philadelphia Commercial Museum 1899, 128–129; Wilson 1899a, 117–118).⁸⁴ The constant inflow of communications from this worldwide network of informants accumulated in extensive correspondence files, the contents of which complemented those of the library's holdings, and frequently were accompanied by enclosures of foreign trade catalogs and samples (Philadelphia Commercial Museum 1897, 70). The Bureau thus possessed a broad and varied documentary base on which to carry out its informational work.

As documents entered the Bureau, they were subjected to a stringent process of analysis, classification, and indexing. This endeavor required assembling a pool of linguistically skilled workers, for the worldwide range of materials received by the Bureau and its extensive foreign correspondence entailed the processing of documents written in a number of different languages.⁸⁵ Members of the Bureau's multilingual staff was charged with the task of analyzing the contents of incoming documents; if need be, translating them; and indexing all commercially relevant pieces of information (Wilson 1899a, 117). Analysis and indexing were carried out at high level of granularity. An admiring description by a contemporary observer gives some indication of the degree of thoroughness that the Bureau bestowed on this phase of its work:

All ... newspapers and publications are systematically examined by the polyglot staff. Every piece of information, whether a couple of lines or a column affecting any description of trade, is extracted and indexed. Items of intelligence in foreign

and took 865 periodicals from around the world (The Philadelphia Commercial Museum, 1897, 65); by 1900, these numbers had grown to about 32,000 books and pamphlets and over 1,000 "trade journals and commercial periodicals regularly received" (Philadelphia Museums [1901], 6).

⁸⁴ The network was extensive indeed: by 1899, the PCM claimed to be "in constant communication with over 20,000 foreign correspondents, and in incidental communication with 65,000" (Pennsylvania Commercial Museum 1899, 414).

⁸⁵ In 1897, the "magazines and periodicals" received by the library were reported to emanate from 44 different countries and to be written in no fewer than 14 languages (Philadelphia Commercial Museum 1897, 66): by 1900, the number of languages represented in the library's collections was 28, while "[c]orrespondence and regular work of commercial reporting in the Bureau [was] necessarily carried on in all these languages and constant use [was] made of about 12 languages" (Philadelphia Museums [1901], 6).

languages are translated into English, and all the information thus collected is typewritten, indexed and filed (The Philadelphia Commercial Museum 1899, 128).

Card indexes served as the technological medium for recording, organizing, and storing the results of detailed document analysis: as one early report of the Bureau's activities put it, "[b]y means of an elaborate system of card indexing, all [periodicals received] are carefully digested and indexed, so that every item of information bearing on a specific line of products or special commercial subject is carefully noted and classified" (Philadelphia Museums [1897], 20). Articulated according to the Bureau's own indexing schemes, its card indexes functioned as "reference files" (Philadelphia Commercial Museum 1897, 67) providing "access to the[] facts" (N. 1899, 66) contained in its library's rich documentary stores. These files were intended to be comprehensive and up-to-date in their coverage of information relating to international trade: when the Bureau's director addressed a conference celebrating the official opening of the PCM at the beginning of July in 1897, he boldly claimed that

at the present time there is scarcely a commodity entering into commerce, scarcely an item of news of any possible interest to the business world, and scarcely a new development of importance in any country, concerning which the files of the bureau will not furnish ready reference" (Philadelphia Commercial Museum 1897, 67).

The Bureau of Information developed a number of avenues to make available to businessmen interested in pursuing international commerce the information that its workers were so assiduously gathering, analyzing, and collating. Visitors to the PCM not only had free access to its commercial library (Philadelphia Commercial Museum 1897a, 66-67; Philadelphia Museums [1901], 6) but could also request information regarding specific points of foreign trade of particular interest to them. To manufacturers and merchants interested in importing raw materials from abroad, the Bureau's reference service imparted data about the "prevailing prices in the country of origin, the means and cost of transportation, quantity available, and conditions under which the particular product desired can be procured", while those seeking "to enter into business relations with foreign markets" as exporters could obtain information and "advices [*sic*] concerning the commerce of all countries, their customs and commercial relations, their international treaties, their systems of communication and transportation, with special details of freight rates, tariffs, exchanges and currency" (Philadelphia Museums [1897], 20-21).

The Bureau's reference services were not limited to onsite visitors, but were also made available, via the mails, to interested individuals and firms throughout the United States.

Long-distance questions from “casual”, or sporadic, inquirers, were answered *gratis*, whereas those business concerns that wanted to make regular use of the Bureau to keep abreast of trade conditions abroad were required to become members of the PCM (Philadelphia Museums [1897], 22; The Philadelphia Commercial Museums 1898). Membership, which required the payment of an annual subscription fee, brought with it a number of benefits.⁸⁶ First, the Bureau issued to its subscribers, at regular intervals, bulletins digesting the latest information about foreign markets pertaining to their respective lines of business as well as preparing special reports upon request (Philadelphia Commercial Museum n.d. a, [2]; The Philadelphia Commercial Museum 1899, 128; The Philadelphia Commercial Museums 1898; Vosberg-Rekow 1900, 7–8). Compiled from the Bureau’s reference files, these reports dealt with a broad spectrum of topics from “steam fitting in Finland”, “locomotives in New South Wales”, and “steam and water engines and wind mills in use in Brazil” to “the lamp trade in Smyrna”, “confectionary in Jamaica” or “trade conditions in Vladivostok, Port Arthur, Talienwan and Newchwang” (Foley 1901, 1260; Philadelphia Commercial Museum 1900, 7–10; The Philadelphia Commercial Museum 1899, 128), providing data on a plethora of matters of practical import, including, *inter multa alia*, the lines of ware currently sold in the market of interest; manufacturing and selling prices of those wares, transport charges, tariffs and duties, type of packaging to be used, names of reputable import agencies, and so on (Betts 1900, 228; Borgius 1899, 98). Designed to impart “specific detailed knowledge ... essential to the successful prosecution of an export business” by means of text and statistical tables alike, the Bureau’s reports enjoyed a reputation among contemporary observers as being “exhaustive” in their treatment of their subjects (Betts 1900, 228; Borgius 1899, 98; The Philadelphia Commercial Museum 1899, 128).

Another major service offered to the PCM’s members was the use of customized card index directories of foreign business firms in their respective fields of trade. The Bureau of Information compiled an extensive Card Index Cabinet, each component card of which bore the name, location, contact information, and commercial profile of a single firm located abroad (Betts 1900, 229–231; Davidson 1899, 363; Philadelphia Commercial Museum 1897,

⁸⁶ Throughout the 1890s, the subscription fee was \$ 50.00 *per annum* (Pennsylvania Commercial Museum [1896], [3]; 1897, 71; The Pennsylvania Commercial Museum 1899, 126); by late 1899, it had risen to \$ 100.00 (Davidson 1899, 359) and, in the first decade of the 20th century, developed into a two-tiered system of \$ 25.00 and \$ 100.00 memberships, the former of which, known as “limited service”, appears to have been especially popular (Cherington 1908, 506).

72; Philadelphia Museums [1897], 22; Vosberg-Rekow 1900, 8; for an example, see Figure 1a on p. 128, below). Great care was taken to ensure that both the companies listed and the information about them were reliable. Only financial creditworthy firms were entered into the register and the data concerning them were either supplied by the company itself or were verified *in situ* by one of the museum's agents: this information, in turn, was subject to periodic updating and revision (Vosberg-Rekow 1900, 8; Wilson 1899a, 118). Subscribers received, on loan from the Bureau, a card cabinet containing sets of printed "address cards" (Cope 1899, back cover) copied from those of the master register and pertaining to the particular trade(s) of interest to them (Philadelphia Commercial Museum 1897, 72; 1899a, 414; [1899], [16]). When new firms were added to the register of the Bureau's Card Index Cabinet, copies of their address cards were distributed to the relevant subscribers; conversely, when the companies were removed from the master directory, notification of the withdrawals were sent out (see, e.g., Philadelphia Commercial Museum 1899b). The Bureau thus furnished its clients with a potent and up-to-date tool for identifying trading partners abroad.

Reports and card indexes did not exhaust the Bureau's services to its subscribers. In addition, it sent out "[l]etters to manufacturers and others, giving names, addresses and [sci., the financial—TMD] standing of firms abroad who have requested to be put in touch with American manufacturers whose goods they are desirous of importing", as well as missives "calling attention to open contracts, new enterprises, etc., in which American manufacturers can compete" (Philadelphia Commercial Museum 1900, 10; cf. Philadelphia Commercial Museum [1899], [16]), so providing its members with what was, in effect, a current awareness service about trade possibilities in overseas markets. Furthermore, the Bureau endeavored to help members of the PCM forge links with non-anglophone counterparts abroad by removing linguistic barriers that might hamper written communication between them. To this end, it offered a translation service, wherein its polyglot employees translated into English business correspondence or documents from abroad written in the language of the sender and rendered subscribers' letters into the vernacular idioms of their correspondents (Conn 1998b, 129; Davidson 1899, 365; The Philadelphia Commercial Museums 1898).

Although its activities were originally directed primarily toward furnishing American businessmen with the informational wherewithal for establishing commercial ties to foreign markets (Philadelphia Commercial Museum [1896]), the Bureau rapidly took on the

complementary task of bringing to the attention of foreign traders opportunities for doing business with their American counterparts. The strategies that it employed mirrored, to a large extent, the ones that it used to convey information to American businessmen. For example, the Bureau answered inquiries from abroad about American commercial markets, much as it did for American businessmen regarding overseas markets (see, e.g., Philadelphia Commercial Museum 1900, 1–4; Vosberg-Rekow 1900, 10–15). Furthermore, it developed an extensive card index directory of American manufacturers and exporters, exemplars of which were distributed across forty-five major commercial centers in Europe (in particular, Great Britain, France, and Belgium), Latin America and the Caribbean, South Africa, China, Japan, India, and Australasia (Philadelphia Commercial Museum n.d. b; Philadelphia Museum Card File 1898–1899; The Philadelphia Museum’s Index to American Trade 1898; Vosberg-Rekow 1900, 9–10). Kept in the offices of American consuls, local chambers of commerce, or boards of trade and maintained by agents of the PCM, these directories put at the disposal of merchants basic information about firms in the United States with which they might conduct business, also serving to advertise American willingness to engage in foreign trade.

The externally directed activities of the Bureau formed part of a broader program of informational outreach on the part of the museum as a whole. In June of 1897 and October of 1899, the PCM convened and hosted major conferences devoted to the subject of international trade, to which it invited not only representatives of chambers of commerce and trade associations from the United States but also delegates from foreign consulates and commercial organizations (Conn 1998a, 550–551; 1998b, 133–135). At the first of these congresses, which coincided with the official opening of the PCM, the foreign attendees were exclusively from Latin America, a region of cardinal importance for the United States’ efforts at economic expansion abroad (Philadelphia Commercial Museum 1897, pp. 83–85): after the conclusion of the meeting in Philadelphia, they were “taken by special train to visit other important cities of the United States” (limited largely to the upper East Coast and Midwestern regions), where they were received by local commercial organizations and “given every opportunity of inspecting the industrial and commercial establishments of the place” (Schoff 1900, 82–83). The second conference, which was held in conjunction with a National Export Exposition sponsored by the museum (Wilson 1899b), drew governmental officials and members of commercial organizations from over thirty countries around the world (Conn 1998a, 552; 1998b, 135; Philadelphia Commercial

Museum 1899, esp. pp. 403–407; Schoff 1900): here, American and foreign participants alike had the opportunity to listen to over 150 papers on, and to discuss, a range of issues in international trade and to peruse, at first hand, exhibitions of products manufactured in the United States available for export abroad. In holding these conferences and arranging the activities surrounding them, the PCM manifestly sought to bring both American trade products and their purveyors before the eyes of commercial men from abroad and so to impress upon the latter the burgeoning potentialities of the United States' export trade.

As contemporary commentators noted, the myriad informational activities of the PCM went well beyond those popularly associated with museums as institutions dedicated to the collection and exhibition of objects (e.g., Betts 1900, 223; Branford 1902, 244). In combining museal exhibitions with an information bureau, the PCM cannot be said to have been innovative, for it was following a pattern that had already been set by a number of comparable institutions in various European countries in the two decades preceding its foundation (Bairoch 1989, 101–102; Murray 1886, 8–18; Ney 1886, 528–536; Renouard 1896, 450–78). Two of these institutions, which Wilson (1896, 237; 1925) acknowledged as precedents for the PCM, may serve to illustrate this. The *Musée Commercial* in Brussels, created by the Belgian government in 1881 in the wake of a national commercial exhibition, not only kept exhibits of samples of raw materials from abroad, manufactured goods sold in foreign markets, and modes of packing merchandise, of which it published an annual catalog updated by weekly bulletins, but also maintained a commercial library equipped with a reading room and operated a series of information bureaux for foreign trade, trade contracts (pertaining to the Belgian and foreign governments alike), Belgian industrial data, transport and tariffs, emigration, and agriculture (Commissie 1899; Renouard 1896, 450–455). In England, the Imperial Institute in London, established in 1887 as a private foundation to commemorate the Golden Jubilee of Queen Victoria, was devoted to celebrating, and promoting knowledge of, the British Empire's variegated commercial resources: officially opened in 1893 and brought into operation piecemeal over the next several years, the Institute, which was supported by private subscriptions, voluntary donations, and some state monies, exhibited collections of commercial products from the colonies, formed a Scientific and Technical Department equipped with laboratories for testing commercial samples, and established a Department of Commercial Intelligence, the branches of which included a commercial library and reading room, an inquiry and correspondence service, and a publications department (MacKenzie 1984, 126–127;

Muddiman 2011, 109. 113–115; Renouard 1896, 463–465). Despite important differences in their formal constitution and institutional structure, the scope of their remits, and the relative success of their respective operations, the *Musée* and the Institute each integrated into its institutional structure a permanent exhibition of commercial products together with information services dispensing data, in written or oral form, about export and import markets to interested members of their respective national business communities—a pattern also found in other national-level institutions on the European continent, such as the *K. K. Österreichisches Handels-Museum* in Vienna and the *Magyar Kereskedelmi Múzeum* in Budapest (Renouard 1896, 468–476; Wendlandt 1905).

Although the PCM had not been the first commercial museum to complement its exhibits with information services, it rapidly won a worldwide reputation as one of the foremost institutions of its kind and a model to be emulated (e.g., American Commercial Museums 1901, 948; Borgius 1899, 97; Bransford 1902, 243; Davidson 1899, 357; Mohr 1899, 402–403). This reputation was due, in some degree, to its vast collections of samples, the sheer extent and variety of which won the admiration of a number of visitors (e.g., Davidson 1899, 356–357; Maduro, cited in Philadelphia Commercial Museum 1899, 416). However, it was the Bureau of Information that appears to have especially captured the imagination of contemporary commentators. Some remarked on the systematic nature with which the Bureau gathered and collated its sources of information: for example, a commercial official from New Zealand attending the International Commercial Congress in 1899 noted that he was “particularly impressed by the method displayed in the working the Bureau of Information, both as to the collection and the systematic arrangement of the records” (Barr, cited in Philadelphia Commercial Museum 1899, 416), while, a few years later, a Prussian writer on national export offices singled out for praise the Bureau’s “systematic exploitation of [its] library and periodical room by means of a clear, systematic rubrication of all the factual material contained in the printed materials” (Neufeld 1905, 124). The Bureau’s use of card index files, especially with regard to its directories of American business houses, evoked interest and favorable comment as well (e.g., Neufeld 1905, 75; Vosberg-Rekow 1900, 10; Wendlandt 1905, 725): one British writer went so far to assert enthusiastically, if erroneously, that “the Philadelphia Commercial Museum ... may be regarded as the birthplace of the modern system of recording and indexing information by means of cards and guides” (*Ironmonger*, October 3, 1908, quoted in Kaiser 1911, “Some opinions of the press”, p. [2]). More generally, the Bureau’s high degree of organization, its

comprehensiveness of scope, and the sheer variety of its informational services all commanded the interest and admiration of observers and led many, especially in the German-speaking world, to speak of the PCM as being the “International Commercial Bureau” of Philadelphia (e.g., Mohr 1899, 402–403; Vosberg-Rekow 1900, 5; Wendlandt 1905, 723–725 & 729).

Underlying the PCM’s ambitious program and manifold activities was an organizational structure that enabled it to draw material support from a number of different quarters. True to its name, the museum harbored very close relations with the city of Philadelphia: its Board of Trustees, which had been called into being by the City Councils of Philadelphia, included *ex officio* members from the municipal government as well as prominent residents of the city appointed by the City Councils and approved by the mayor (Philadelphia Museums [1897], 16).⁸⁷ Thanks to these municipal links, the PCM received substantial financial appropriations and a gift of land from the city of Philadelphia, as well as smaller subsidies from the state of Pennsylvania, some of the officers of which also sat as *ex officio* members on the museum’s Board (Davidson 1899, 359; Vosberg-Rekow 1900, 18; The Philadelphia Commercial Museum 1899, 126; Philadelphia Museums [1898], 7; Wilson 1899a, 114). Inasmuch as the directors of the PCM envisioned their institution as serving the commercial interests of the United States as a whole, they also sought and secured recognition from, and the cooperation of, the United States Government (Philadelphia Commercial Museum 1899, 414): thus, the State Department “directed consular agents to forward to the Museum all the information [sci., in their respective jurisdictions—TMD] ... directly or indirectly related to commercial intercourse” (American Commercial Museums 1901, 948; Foley 1901, 1258); the museum’s library was named a federal depository library in 1897 and so was entitled to receive a copy of all United States Government publications (Heskin 1952, 11); and, over the course of the latter half of the 1890s, Congress bestowed upon the museum sizeable appropriations for building up its collections, mounting exhibitions, and constructing a new complex of buildings (Davidson 1899, 359; Foley 1901, 1259; The Philadelphia Commercial Museum 1899, 126).

⁸⁷ *Ex officio* members were, at the municipal level, the Mayor of the City of Philadelphia, the Presidents of the Select and Common Councils of the City of Philadelphia, the President of the Board of Public Education of the City of Philadelphia, and the Superintendent of the Public Schools of Philadelphia; at the state level, the Governor of the State of Pennsylvania, the State Superintendent of Public Instruction, and the State Commissioner of Forestry.

In addition to its relationships with various levels of government, the PCM reached out to the national business community whose interests it was to serve by establishing for itself a National Advisory Board, the members of which were “elected by the Chambers of Commerce, Boards of Trade and other commercial organizations throughout the United States” (Philadelphia Museums [1897], 17). By 1897, it had formed a complementary Foreign Advisory Board made up of delegates from major Latin American commercial organizations and, moreover, had created a separate Honorary Diplomatic Board comprising government ministers from a number of South and Central American countries (p. 17): subsequently, membership was opened to members of trade organizations from “South African, Australasian, Asiatic and other countries” as well (Philadelphia Museums [1898], 9). Through these moves, the PCM affiliated to itself representatives of the public and private sectors of countries located in a market region of particular interest to the United States, who would support and promote its information-collecting and -diffusing activities there. More generally, the PCM sought to cultivate informal relations with a variety of public and private commercial institutions in other countries, which it enlisted as partners in the exchange of material samples and/or trade information (Conn 1998a, 553; 1998b, 136–137; Philadelphia Commercial Museum 1897, 76; Vosberg-Rekow 1900, 17): these became part of its worldwide network of correspondents. Supported by a combination of private subscriptions and public monies and mobilizing its formal and informal connections with a wide variety of institutions on the local, national, and international levels, the PCM thus proved to be a most resourceful institution in creating the organizational infrastructure needed to carry out its variegated informational activities.

3.3. Knowledge Organization at the Philadelphia Commercial Museum

Knowledge organization was a fundamental aspect of the institutional life of the PCM. As we have seen, the museum’s primary goal was to help American manufacturers and merchants participate in foreign trade by supplying them with the information necessary to make appropriate choices about what to buy, where to sell, and with whom to do business overseas (cf. Philadelphia Museums [1897], 14): to that end, it accumulated large collections of material objects and various kinds of documents deemed to be informative on the subject of international commerce. If the PCM was to deploy as effectively as possible the various sources of information that provided the raw material, so to speak, for its informational functions, it was necessary to develop suitable methods of processing and organizing them

so as to educe, and render accessible, the information that they carried. In other words, there was, quite naturally, a strong practical imperative for attending to the task of knowledge organization.

Other more ideologically oriented motives also contributed to the importance accorded to knowledge organization at the PCM. The museum's leaders envisioned their institution as embodying a "scientific" and "educational" approach to the treatment of international trade (Philadelphia Museums 1896, 11–12; Philadelphia Commercial Museum 1897, 9–10). That they should have done so is hardly surprising, for a number of them came from backgrounds in the natural sciences or allied fields:⁸⁸ it was thus only natural that they should have viewed those sciences' methods of observation and classification as models for acquiring and representing knowledge—in their parlance, "facts"—about the commercial world. This natural-historical model was certainly reflected in the establishment of the PCM's Scientific Department, which was responsible for operating the museum's laboratories and overseeing the classification and description of the natural products in the museum's collections (Philadelphia Commercial Museum 1897, 74–78; Philadelphia Museums [1896], 11; [1897], 18–19). However, the intent to establish the PCM "upon a truly scientific basis" (Philadelphia Museums 1896, 12) also reflected a looser, more expansive notion of science deriving from its standard late-Victorian definition as "knowledge amassed, severely tested, coordinated, and systematized" (Hunter & Morris 1897, Vol. 4, 4142, 2 s.v. "science"). On this view, the essential moment of science was "the impulse to create system and rationality out of all aspects of human experience" and so to reduce them to order (Conn 2010, 176): to be systematic was to be scientific. From this perspective, objects in the museum's collections were "scientifically arranged and classified" (Philadelphia Museums 1896, 14) into exhibits designed to reflect, in one recent commentator's felicitous phrase, a "systematics of commerce" (Conn 2010, 177–179): by virtue of their organization into configurations representing a meaningful intellectual context, the commercial objects on display could yield information to their viewers that they couldn't do in isolation (Conn 1998a, 537, 540; 1998b, 121–122; cf. 22–23). Furthermore, the activities of the PCM's Bureau of Information could also be perceived as

⁸⁸ William Pepper (1843–1898), the first president of the PCM's Board of Trustees and a major force behind the creation of the institution was a renowned medical doctor and educator who had previously served as Provost of the University of Pennsylvania (Harley 1899). Wilson, the first director of the museum was, as noted earlier, a botanist by training, as was Gustavo Niederlein (1858–1924), the first chief of the museum's scientific department (Harschberger 1899, 410; Hicken 1924).

scientific in their import. Such, at any rate, was the judgment of a contemporary British sociologist-*cum*-businessman, who held that

when one recognises ... that the Bureau is the means of co-ordinating a vast amount of crude economic experience that otherwise would remain as isolated facts or as detached items of thought, it is clear that the work of the Bureau has important scientific bearings (Bransford 1902, 248).

In his estimation, the Bureau's work of document analysis and collation of information from different sources represented a "systematisation of knowledge" relating to international commerce that not only constituted a contribution to "economic science", but also promised to have an "educational reaction on the manufacturers, merchants, and other members of the mercantile community" who made use of its services (p. 248). In short, the aspiration of the PCM to represent the world of foreign commerce in a manner that was scientific in tenor and educational in effect, in combination with the pragmatic requirements of arranging collections of objects into museum exhibits, ordering its documents in a library, and collocating collated materials into files, provided ample motivation for sustained engagement with various modes of knowledge organization across the various departments of the institution.

3.3.1. Knowledge Organization in the Museum Exhibits

The most visible manifestation of the PCM's systematics of commerce for most of its visitors lay in its collections of commercial products. These were divided into (1) exhibits of "the world's raw products" and (2) manufactured items "being sold in foreign countries, especially in the markets of Latin America, Australia, South Africa and other promising fields" (Philadelphia Museums [1898], 10, 12). The displays of raw products were arranged according to two distinct modes of organization, which the museum's curators characterized as being *monographic* and *geographic* in nature (A Commercial Museum 1897, 1011; Conn 1998a, 542; 1998b, 124; Davidson 1899, 360; Philadelphia Commercial Museum n.d. a, [1]; Philadelphia Museums 1896, 16–17; [1897], 17; Wilson 1896, 237–239; 1899a, 115–116). Monographic exhibits grouped together staple products from different countries by kinds of product:⁸⁹ these included, *inter alia*, displays of various types of woods, dyes, gums and resins, rubber, gutta-percha, fibers, spices, fruits and seeds, grains,

⁸⁹ Hence the name "monographic", apparently derived from the contemporary definition of the word "monograph" as "[a]n account or description of a *single* thing or *class of things*" (Whitney 1906, Vol. 5, 3840, s.v. "monographic"; emphases mine—TMD).

starches and flour, sugar, oils and oil seeds, teas, coffee, cocoa, hides and skins, wools, silks, animal products, and minerals (Philadelphia Commercial Museum [1896], 6–7; 1897, 75; Philadelphia Museums [1897], 18). Geographic exhibits, on the other hand, gathered together various types of raw materials by their country of origin: by the latter half of the 1890s, the museum boasted separate installations for Mexico, Guatemala, Costa Rica, Venezuela, Brazil, Uruguay, Paraguay, Chile, Argentine Republic, British India, Japan, Australia, and Africa (Philadelphia Commercial Museum [1896], 5–6; 1897, 75; Philadelphia Museums [1897], 18). The exhibits of samples of manufactured products were, in turn, arranged in accordance to “lines of manufacture”, a mode of organization akin to that of the monographic displays of natural materials (Davidson 1899, 360; Philadelphia Commercial Museum 1899, 415; n.d. a, [1]). Our sources say little about how these different modes of classification were articulated in detail. Geographical exhibits of raw materials appear to have been subarranged by kinds of products (Davidson 1899, 360–361; Wilson 1899a, 116). It is unclear to what extent geographically-based subdivisions were integrated into the physical arrangement of monographic exhibits of raw products or collections of manufactured products:⁹⁰ at any rate, geographical information about provenance and/or trade destination was a prominent element in the museum labels identifying and describing the objects in these displays (The Philadelphia Commercial Museum 1899, 127).

The PCM’s strategies for organizing its collections of objects drew upon well-established patterns within the world of commercial museums. The division of products into raw materials and manufactured items reflected, in part, the practice of the Belgian *Musée Commercial*, which partitioned its collections into three different kinds of exhibits: displays of samples of raw materials from foreign markets; exhibits of samples of manufactured products being sold in foreign markets by merchants from other European countries; and displays illustrating various methods of packing goods for shipment overseas (Commissie 1899, 39; Ney 1886, 533–534). Furthermore, the distinction between the monographic approach of organizing commodities by kind and the geographical one of collocating them on the basis of provenance was already well known in European commercial museums: indeed, both were recognized methods of arranging exhibits, although different institutions

⁹⁰ The writings of contemporary commentators on the museum imply that geographical provenance was reflected some way in these exhibits: however, their accounts of the exhibits do not give precise details of how this played out in the actual (sub-)arrangement of the objects; see American Commercial Museums 1900, 947; Branford 1902, 245; N. 1898, 65; The Philadelphia Commercial Museum 1899, 127.

varied in their preferences and deployment thereof. For example, the curators of the *Musée Commercial* classified its exhibits of raw materials and manufactured goods alike by kind of product, with provenance serving only as a secondary criterion of subdivision within product classes (Commissie 1899, 40; Murray 1886; 10; Ney 1886, 533): in other words, its exhibits of commercial products were essentially monographic in character. On the other hand, the director of the *K. K. Österreichisches Handels-Museum* in Vienna held that, for the purposes of display, manufactured goods imported into foreign markets should be classified primarily by the importing country and only secondarily by the line of manufacture, whereas raw and semi-processed exports from foreign lands should first be partitioned into broad classes by kind of material, then divided by provenance, and only after that subdivided into more minute product classes (Scala 1886, 3–4)—that is to say, in his opinion, a geographical approach was most appropriate for some kinds of exhibits, while what was, in effect, a variant form of the monographic approach worked best for others. Viewed against this background, the PCM's particular division of exhibits into monographic and geographic ones appears as a variation on a well-worn theme.⁹¹

The different kinds of exhibits mounted by the PCM presented distinct views on the world of international commerce and were designed to serve the varying requirements of American businessmen interested in the import or export of goods. The monographic collections of raw materials targeted men of affairs desiring information on particular kinds of commodities: by bringing together specimens of the same kind of product, they facilitated comparison of similar products from around the world—an activity of particular concern for merchants or manufacturers trying to assess which variety of a given product to import (American Commercial Museums 1900, 947; Davidson 1899, 361; Philadelphia Museums [1897], 18). The geographic collections of raw materials, on the other hand, catered to persons interested in “the resources and commercial features of [a] particular country” (Philadelphia Museums [1897], 18): combining displays of all the goods deriving from a given country with “maps, plans, statistics and other elements of information” about its physical and economic geography, these displays provided, in effect, striking visual profiles of potential geographic markets from which to import or to which to export (American Commercial Museums 1900, 947; Davidson 1899, 360–361). The exhibits of manufactured

⁹¹ Conn (1998a, 542; 1898b, 124) offers a yet broader museological perspective on the distinction, comparing the PCM's monographic approach to systematic display of raw materials to the taxonomic organization of natural history exhibits of the later 19th century and the geographic mode of organization to anthropological exhibits pertaining to particular places and peoples.

products sold in overseas markets, in turn, were intended to inform manufacturers and merchants interested in exporting particular lines of American products abroad about what competing products were being sold in different markets by foreign competitors, to allow them to assess what the tastes of consumers in those markets on the basis of these products, and so to determine which markets offered the likeliest prospects for success in placing their own wares (American Commercial Museums 1900, 947; Philadelphia Museums [1898], 19; Wilson 1899a, 116). Although differing considerably in their respective emphases and modes of articulation, the three kinds of exhibit at the PCM were, in the final analysis, constructed around two axial considerations: *what* kinds of products could be bought or sold in foreign markets and *where* overseas they could be bought or sold (cf. Conn 1998a, 542; 1998b, 124). This systematics of commerce predicated on product and place recurred, with some modification, in other areas of the PCM's informational activities as well.

3.3.2. Knowledge Organization at the Bureau of Information

Within the Bureau of Information, the primary focal point for knowledge organization was the commercial library. In the late 1890s, its collection was partitioned into two main sections—a “Book Division” and a “Journal Division” (Philadelphia Commercial Museum 1897, 66). The Book Division, in turn, was subdivided into a “Subject Division” and a “Geographical Division”—a schema reminiscent of the distinction between monographic and geographic exhibits in the museum proper. The Subject Division encompassed basic reference works and works on subjects deemed pertinent to international commerce and was classified according to the Dewey Decimal Classification (DDC) (Heskin 1952, 12), whereas the Geographical Division contained works bearing information on the commercial and industrial life of specific countries—in particular, government, statistical, and consular reports as well as the publications of local commercial organizations—arranged by country (Philadelphia Commercial Museum 1897, 66).⁹² As for the Journal Division, it was organized

⁹² Although Heskin's (1952, 13) summary description of the library's classification suggests that the DDC was used throughout the library, one may well wonder whether it served as the basis of the Geographical Division. The geographical classes of the DDC were located in the 900s, or History, classes and these interspersed geographical subdivisions, which were useful for the purposes of the PCM's Bureau, with historical period subdivisions, which were not (cf. Dewey 1894, 900s schedule, for numerous examples). Without extensive modifications, it would have been quite inconvenient to use and some of the usable parts—for example, its geographical subdivisions of South America—would have been insufficiently granular for the Bureau's purposes. For this reason, it is most likely that the classification of the Geographical Division was based either on a heavily modified (and

in a markedly different manner. Forty-six general subject classes of commercial interest—such as, for example, “Law”, “Insurance”, “Commerce and Shipping”, or “Transportation-Railroads”—were each assigned a number from “1” to “46” (Heskin 1952, 11–12). Under each of these class numbers, titles of periodicals dealing with the subject in question were listed in numerical order according to the chronological sequence in which the library had begun taking them. Thus, if the subject class “Commerce and Shipping” was assigned the number “24”, then the call number “24.1” would refer to the first journal or newspaper pertaining to the subject of commerce and shipping to which the library had subscribed; “24.2”, to the second journal or newspaper on the subject for which a subscription had been taken out, and so on (p. 12). In addition to its shelf classifications of books and journals, the library, like most other American libraries of its time, maintained a card catalog as a guide to its holdings, most likely a dictionary catalog (see Section 3.3 of the current chapter, below).

The library also served as the PCM’s primary site for document analysis and subject indexing, whereby items of information were transcribed from documents onto cards and filed in card cabinets (see Section 2 of the current chapter, above). The rubrics used to organize the card index files were “lines of goods” and “countries”, as well as general commercial subjects, such as “imports and exports, freight rates ..., duties, trade regulations, [and] systems of banking” (Philadelphia Commercial Museum 1897, 18 & 67; cf. N. 1899, 66). Separate card cabinets housed the indexes for each kind of rubric. A contemporary journalist’s account of how these index files were deployed paints a vivid picture of their organization in practice:

Suppose that it is desired to know something of chicle, or chewing-gum. One of the officers [sci., of the Bureau—TMD] will go to the cabinet and pull out the drawer labeled “Gums” and by the alphabetical arrangement lay open the card “Chicle,” ... Or if it is desired to know what there is in print about a country, an adjoining cabinet has all the cards that are in the subject cabinet, but instead of being arranged by the articles [i.e., products—TMD], in it will be found everything that relates to the country alphabetically classified according to the subjects. ... There is also a special cabinet, in which specific subjects appear, such as tariff, constructions of recent public works, bridges, railroads, and many other items of general interest not included in the index of products (A Commercial Museum 1897, 1011).

The analogies of this mode of indexing with the systematics of commerce embodied in the museum’s exhibits are patent. Here, as there, kinds of products and places were core

expanded) version of the DDC’s history schedules or on a homegrown scheme of geographical classification: it is regrettable that our sources are silent on this point.

categories around which a schema for knowledge organization was articulated. Furthermore, just as some of geographical exhibits were subarranged in a monographic fashion, so were the index files for individual countries subdivided by an alphabetically organized sequence of subjects. No less salient is the correspondence with the organizational structure of the library's Book Division: taken together, lines of goods and general commercial subjects were analogous to the idea of a Subject Division, while the rubric of countries corresponded directly to that of a Geographical Division. In short, the system of indexing in use at the Bureau made use of the same structural elements as other departments of the PCM did.

Striking as the congruence of the card index categories with key features of the PCM's other major organizational schemata is, it should not obscure the fact that they reflected the kinds of information that the Bureau's reference files were expected to yield in support of its tasks of answering inquiries from the commercial public and issuing reports to its members (See Section 2 of the current chapter, above). Consider, for example, five subjects of special inquiries addressed to the Bureau in late autumn of 1899:

- [1.1]. Import duty on shaving and tar soap in Argentina
- [1.2]. United States railway rates and freight rates per mile
- [1.3]. Trade in corsets in Cuba.
- [1.4]. Tariff duties for lubricating grease and axle grease in Shanghai
- [1.5]. Exports of cotton goods from the United States.⁹³

Of the underlined terms, those with continuous lines ("shaving [soap]", "tar soap", "corsets") refer to kinds of goods, those with dotted lines ("import duty", "railway rates", "freight rates", "trade") represent general commercial subjects, and those with line segments ("Argentina", "United States", "Cuba") denote geographical units of some sort. The topics of the Bureau's general reports on the export of American products abroad and conditions conducing thereto were likewise interpretable in accordance with these categories, as a few examples of the subjects of such reports, stemming from approximately the same period, may serve to illustrate:

- [2.1]. Anvils [to] Luxemburg

⁹³ These examples, along with many others, are given in Philadelphia Commercial Museum 1900, 6–13, which cites the Bureau's report of the work of its Compiling Department for the period between 23 October and 11 November, 1899. The underlining is mine.

- [2.2]. Coal [to] Algiers
- [2.3]. Construction wood, unworked, [to] Durban, Natal
- [2.4]. New market conditions [in] South Africa
- [2.5]. Mining industry [in] Greece
- [2.6]. Pliers and tools [to] Venezuela
- [2.7]. Canned vegetables [to] Shanghai, China.
- [2.8]. New gasworks [in] Devonshire, England.⁹⁴

Apparently, the Bureau's indexing categories provided a useful conceptual grid for identifying the subjects of inquiries, framing the topics of reports, and determining where in the reference files to search for relevant items of information.

A constant feature of inquiries and reports alike was that they routinely brought into relation subjects belonging to different categories: as the examples in the previous paragraph show, kinds of products and general commercial subjects were almost invariably associated with particular countries. The Bureau's reference files supported the construction of such linkages. One contemporary commentator, impressed with the "manifold cross-references" of the card index files, approvingly remarked that "'Cabots' [can] be found under 'Textiles,' as well as under Turkey, subsection 'Smyrna,' the town importing the article" (Betts 1900, 226). As this glimpse at a very small fragment of the reference files suggests, terms denoting specific kinds of goods (*in casu*, "Cabots", a type of "coarse gray or bleached, heavily sized cotton sheeting in the Balkan States and Asiatic Turkey" [Harmuth 1915, 30]) were set into relation with terms referring to the broader class of goods to which they belonged (*in casu*, "Textiles"), as well as to the names of the geographical entities with which they were associated (*in casu*, "Smyrna", a city located on the Aegean coast of Turkey). Viewed from another angle, the example shows that index entries for individual countries could be subdivided by terms denoting smaller geographical units within the country (*in casu*, a city) and related to terms referring to kinds of goods (*in casu*, a specific type of textile) and, one assumes, general commercial subjects as well. Although details of the classificatory syntax of the Bureau's reference files remain elusive, it is apparent that their mode of interlinking between products, places, and general

⁹⁴ These examples are listed, along with many others, by Vosberg-Rekow (1900, 13–15), whose source was the Bureau's report of the work of its Compiling Department for the week ending 21 October, 1899. The format given here, with its suppletion of prepositions is mine, as is the underlining: the original format took the form "[PRODUCT/SUBJECT], [COUNTRY]." (e.g., "Anvils, Luxemburg." and so on).

commercial subjects bore a certain analogy to the PCM's strategies for organizing its museal displays, wherein geographic exhibits were subarranged by kinds of products.

The categories of product and place also left their imprint upon one other prominent aspect of the Bureau's work: the compilation of its card index directories of foreign firms for the benefit of its American members, which we shall call domestic directories, and its preparation of card index cabinet listings of American businesses to apprise potential foreign trading partners abroad of their existence, which we shall call foreign registers (See Section 2 of the current chapter, above). That they should have done so is hardly surprising, for many of the inquiries directed to the Bureau were expressly for information about manufacturers or merchants dealing in certain types of goods in a given geographical locale, as is shown by the following examples:

[3.1] Trustworthy manufacturers of cardboard in the United States

[3.2] Californian dealers in wine and castor oil

[3.3] American manufacturers of railway materials

[3.4] Manufacturers of sheet copper in Germany, England, Scotland and Belgium

[3.5] Buyer of Mining machinery in St. Petersburg, Russia

[3.6] Flour dealers in Australia and South America.⁹⁵

Queries such as these appear to have provided the original impetus for the creation of the domestic card directories, which, in turn, helped set the stage for the development of the foreign ones (Philadelphia Commercial Museum 1897, 71–72); their content, at any rate, left its imprint on the internal ordering of the directories.

Although serving similar functions, the domestic directories and foreign registers differed from one another in their internal mode of organization. Typically, the domestic directories lent to members of the PCM contained only cards pertaining to the branches of trade of interest to their respective recipients: these were classified by countries, which, in turn, were subdivided by cities, under which individual firms were listed in alphabetical

⁹⁵ The first three examples are drawn from Vosberg-Rekow (1900, 11–12), while the latter three are quoted from Philadelphia Commercial Museum (1900, 8, 11, 13). For the original sources, see the previous two footnotes. The format follows the original wording, but the underlining is mine. One should note that such inquiries often omitted explicit mention of a geographical entity—e.g., “Shippers of hickory blocks”, “Exporters of cotton, pork, fats, preserved meats, cottonseed and linseed”, “Manufacturers of typewriters and office furniture”, and so on (Philadelphia Commercial Museum 1900, 9). In such cases, only the provenance of the sender of the inquiry could allow one to discern whether the geographical designation “United States” (in the case of foreign inquirers) or “foreign countries” (in the case of American inquirers) should be understood.

order (Vosberg-Rekow 1900, 8; cf. Davidson 1899, 363).⁹⁶ The foreign registers, on the other hand, used two parallel modes of organization (Philadelphia Commercial Museum n.d. b; Vosberg-Rekow 1900, 10). In the first of these, they were divided into about thirty different broad classes of product types, such as “Machine tools”, “Agricultural Machinery”, and “Builders’ Hardware”, arranged in a classified order (Philadelphia Commercial Museum n.d. b, 5–13). Each of these broad classes, in turn, was subdivided into a single series of specific (kinds of) products listed in alphabetical order: for example, the members of the broad category of “Tools” ranged from “Adzes”, “Agricultural Tools”, and “Anvils” to “Twist Drills”, “Vises”, “Well-drilling Tools”, and “Wrenches” (p. 10). This mode of arrangement, which mirrored, to some extent, the arrangement of entries for lines of goods in the library card index files, corresponded to a form of what Kaiser (1911, §§ 203, 206–207, 213) termed “alphabetico-classed” (See Glossary). The second mode of organization involved listing all the classes, broad and specific alike, in a single, alphabetical sequence (pp. 14–24). In both the alphabetico-classed and the alphabetical orders, cards for individual American firms were filed in alphabetical order under the appropriate headings.⁹⁷ The bipartite structure of the foreign registers bears an interesting resemblance to the combination of classified schedules and alphabetical index typical of many bibliographical classifications. Of greater moment for our purposes, however, is the fact that, in emphasizing the kinds of goods with which firms were to be associated, they followed, in essence, a monographic approach to arrangement, whereas their domestic counterparts adopted a form of the geographic approach. The underlying reason for the difference was doubtless that the domestic directories were customized to correspond to the interests of individual businesses and sought to present information about many geographically defined markets pertaining to specialized lines of business, whereas the foreign registers, which targeted the foreign business community in general, presented the United States as one big geographical market to be differentiated by its different exportable manufactures. Underlying this specific rationale, however, was the more general dialectic of product and place, which dominated the intellectual infrastructure of knowledge organization at the PCM as a whole.

⁹⁶ Although written descriptions of these domestic card index cabinets are minimal, the Country–City–Firm structure of subdivisions is neatly reflected in the layout of the Card Withdrawal Lists occasionally issued by the Bureau to indicate to users of the card index cabinet service which address cards had, for various reasons, become superannuated; for an example, see Philadelphia Commercial Museum, 1899b.

⁹⁷ Individual firms, which paid \$ 25.00 annually for the privilege of having their address cards incorporated into the register, could have up to five different cards filed under different headings (Philadelphia Commercial Museum n.d. b, 2).

3.3.3. The Origins of Systematic Indexing

Knowledge organization and translation work formed the *Leitmotifs* of Kaiser's tenure at the PCM, which, according to our sources, lasted from 1896 to 1899.⁹⁸ During that period, he served as "librarian and chief of the Bureau of Translations" (American Society of Mechanical Engineers 1928), positions that situated him within the ambit of the Bureau of Information.⁹⁹ As the wording of these occupational designations implies, his job not only involved the substantive work of librarianship and translating but carried significant managerial responsibilities as well. As he later recounted to a prospective employer, he oversaw the work of twenty-eight persons, including twelve indexers, "each one selected with a view to a special purpose"; five translators "to deal with languages he did not know himself"; "one expert stenographer, who could take down communications in five different languages"; "three or four ordinary stenographers", and three catalogers, as well as several library assistants "who kept the shelves tidy and that sort of thing".¹⁰⁰ This roster of subordinates is notable for two reasons. First, it indicates that Kaiser held no mean position within the organizational structure of the PCM's Bureau of Information. In 1899, the year of his departure, the staff of the Bureau numbered about one hundred and twenty-five persons (Vosberg-Rekow 1900, 7; Wilson 1899a, 118); if, as seems likely, the figure of twenty-eight subordinates derives from the end of his time at the Bureau, a little under a fourth of its manpower answered to him then. Second, the nature of the tasks carried out by the persons under Kaiser's charge reflects the kinds of activities with which he was especially

⁹⁸ See, however, Section 1 of the current chapter, esp. p. 84, n. 82, above, for the some doubts about the year in which Kaiser's work at the PCM began.

⁹⁹ The attribution of the position of librarian to Kaiser by his obituarist runs counter to Heskin's (1952, 10) statement that "[f]or the first four years [*sci.*, of the existence of the PCM's library, *i.e.*, 1896–1900—TMD] there was no librarian (as such) designated, but Dr. Wilson was in charge", to which she adds that it was only in 1900 that a librarian was formally appointed. This discrepancy can perhaps best be explained by reference to shifts in the organizational structure of the PCM, although these are difficult to pin down precisely. In the late 1890s through 1900, the library appears to have fallen under the purview of the Bureau of Information (cf. Philadelphia Commercial Museum 1897, 65–67; [1901], 5–6), whereas in 1900 or shortly thereafter, it became an administratively separate unit on a par with the Bureau and other major divisions of the museum (cf., e.g., Philadelphia Commercial Museum [1906], 10–11; Wilson 1908, 133–134). Thus, it is likely that Kaiser fulfilled, *de facto*, the function of librarian at a time when the position was not yet *officially* recognized as a major office within the PCM. At any rate, he clearly considered librarianship to form part of his remit, for he would later describe himself in his first publication as having been "Librarian of the Philadelphia Commercial Museums [*sic*]" (Kaiser 1908, t.p.).

¹⁰⁰ TCP, 6/1/28, Hewins to Pearson, 1 January 1903 [read: 1904]: a letter in which W. A. S. Hewins, secretary of the Tariff Commission, discusses an interview with Kaiser conducted during negotiations to secure his services. See also Marrison 1996, 196.

concerned. On one hand, the presence of the multilingual stenographer and translators for languages unknown to him indicates that he took an active part in the work of translation. On the other, that of the catalogers and, above all, the large number of specialist indexers points toward a sustained involvement with indexing: indeed, as he would disclose a few years later to the aforementioned prospective employer, this team “thoroughly indexed 1,000 journals and 500 volumes a month”.¹⁰¹

Kaiser’s engagement with indexing at the Bureau of Information provided the impetus for his initial formulation of SI, which, according to a later statement of his, he worked out in 1896–1897 (Kaiser 1911, § 20). In his final exposition of SI, written and published in 1926, he gave a short account of the motivations that led him to begin developing a new indexing system. Although composed well after the fact and so naturally subject to *ex post facto* interpretative embellishment, this foundation narrative constitutes our most detailed source on SI’s origins and so deserves to be examined *in extenso*. Kaiser began by setting the scene:

Just thirty years ago I was working the Dewey system at a Philadelphia Library. Besides cataloguing, there was an unusual amount of indexing occupying an entire department of some dozen workers. Dictionary catalogue and index were not only for use of the public, but also constituted the main equipment of a set of men compiling reports on any required subject. This acted both to some extent as driving power as well as a check on both catalogue and index (Kaiser 1926, 20, § 1).

This passage corroborates a number of details that we have already encountered in our previous discussion of the PCM’s commercial library: use of the DDC; the presence of a catalog, specified as a “dictionary catalogue”; the indexing of its holdings; and the utilization of the catalog and index by the Bureau’s researchers for the preparation of reports for the museum’s members (See Section 3.2 of the current chapter). Noteworthy here is Kaiser’s observation that the requirements of the Bureau’s compilers both provided the “driving power” and served as a “check” on the library’s catalog and index: this implies that the design and content of both of these bibliographic tools were configured—at least “to some extent”—to respond to the needs of the Bureau’s researchers, for whose use the library had been established in the first place (Heskin 1952, 15).

¹⁰¹ TCP, 6/1/28, Hewins to Pearson, 1 January 1903 [read: 1904].

The catalog and index appear to have already been in place when Kaiser assumed his duties at the PCM's library. He soon found them wanting in various ways. As regards cataloging, his recollection was that

[t]he dictionary catalogue did not work particularly well for the books, although constructed by trained labour and on the most approved lines. There were large collections of photographs, for instance, which could not be placed under the assigned numbers. To get over the difficulty I finally used the whole range of Dewey numbers for them, prefixing an initial letter to distinguish them. A similar procedure was followed for maps and charts (Kaiser 1926, 20, § 2).

Because of the compressed manner in which it was composed, this critique is obscure and difficult to interpret in detail. On one hand, Kaiser claimed that PCM's library made use of a dictionary catalog—a genre of catalog so called because “the headings (author, title, subject, and form) are arranged, like the words in a dictionary, in alphabetical order” (Cutter 1891, 12)—and that this catalog was not very effective in its representation of the books in the library's collection, despite the fact that it had been built up “on the most approved lines”. On the other, the burden of his complaint was the unsuitability of “Dewey numbers” for characterizing non-book materials such as photographs, maps, and charts. The niceties of classificatory notation, however, were not germane to the construction of dictionary catalogues as such: rather, they were typically the concern of librarians working with an altogether different type of catalog—the classed, or classified, catalog, defined by one of its leading American proponents as “a catalog of subject entries arranged logically, *usually by class numbers*” (Dewey 1898, 7 [emphases mine—TMD]). At first blush, then, Kaiser's citation of difficulties with applying DDC numbers to graphic materials as an instance of the shortcomings of the PCM's dictionary catalog appears to identify an issue pertinent to the construction of a classed catalog as if it were a matter of central importance to the constitution of a dictionary catalog: that is to say, he seems to confound two very different types of catalog. Just how one is to account for this is unclear. One possibility is that Kaiser used the term “dictionary catalogue” as a synonym for “catalogue” *tout court* and so applied it erroneously to what was actually a classed catalog employing the DDC as its ordering mechanism. Because no other contemporary description of the PCM's catalog seems to be extant, we are not in a position to confirm or refute this hypothesis definitively; nevertheless, there is room for strong skepticism on this score. For one thing, by the 1890s, libraries in the United States were increasingly tending to adopt some form of the dictionary catalog, whereas classed catalogs were comparatively rare (e.g., Lane 1896, 839–

840): a catalog constructed “on the most approved lines” would most likely have taken the former form rather than the latter.¹⁰² Second, it seems highly unlikely that a man who, elsewhere in his writings, warned indexers against “using the term *India rubber* indiscriminately for all kinds of *rubber*” (Kaiser 1911, § 318) would have been so careless in his own usage of technical terms.¹⁰³ Finally, later in the foundation narrative, Kaiser would speak of the PCM’s catalog as being based on a “catchword” plan comparable to that of the library’s index, which was clearly based on a file structured on the basis of verbal headings rather than class numbers, albeit on what appears to have been an alphabetic-classed system (See Section 3.2 of the current chapter, above, & p. 117, n. 107, below): this suggests that, whatever the precise file structure of the catalog was, it was closer to that of a dictionary catalog than to a classed one organized on the basis of DDC notation.

How, then, is one to account for Kaiser’s invocation of class numbers in a “dictionary catalogue”? Here it is important to observe that, in contemporary cataloging practice, class numbers, such as those of the DDC, routinely formed part of bibliographic records in dictionary card catalogs as well as to those in classed ones (for examples, see Dana 1913, 102–103; Dewey 1898, 34, sample card 3; 32, sample card 16; 33, sample card 19; 42–43, sample cards 63–67). They had, however, a significantly smaller rôle within the economy of dictionary catalog records than did their counterparts in classed catalog records. In a classed catalog record, a DDC class number served both as a mechanism for determining the record’s place within the sequence of subject entries in the catalog and, when coupled with an author number to form a call number, for indicating the location of book in question on the shelf; in a dictionary catalog record, however, it performed only the latter function. In light of this, it seems most likely that Kaiser did not mischaracterize a classed catalog as a dictionary catalog, but rather focused his attention on an element of dictionary catalog records that pertained to the indication of shelf classification rather than to the constitution of the catalog’s file structure. On this view, he would appear to have conflated cataloging with classification. There was precedent for this in his writings, for, in his earliest work, *The Card Index*, he claimed that “in library language”, “cataloguing” referred to the

¹⁰² In fact one may wonder whether “on the most approved lines” might be an oblique reference to Cutter’s *RDC*, which, in the 1890s, was in its third edition, and enjoyed a reputation as the “Cataloguer’s Bible”—that is to say, an authoritative source on cataloging best practice—among American librarians in the 1890s (cf. Heisey 1976, 225).

¹⁰³ One should note, though, that in another context, Kaiser used the term “dictionary catalogue” to refer to what was actually a hybrid catalog containing alphabetical, alphabetic-classed, and classed sections. See Chapter 9, Section 2, p. 755, n. 583, below.

determination of the class of a book and the affixation of “a number and initials”—that is to say, a call number—to it (Kaiser 1908, § 77). This conceptual confounding of cataloging with classification is perhaps understandable if we keep in mind that Kaiser had not undergone formal training in library economy but most likely learned about the various techniques of knowledge organization for libraries while on the job at the PCM. Nevertheless, it is surprising that it appears to have persisted to the very end of his career, especially as he was quite concerned with matters of terminology (See Chapter 1, Section 4, above).

At any rate, Kaiser’s ostensible criticisms of the PCM’s “dictionary catalogue” were primarily directed at what he saw as shortcomings in the representational capacity of the DDC. His primary example of the latter was its treatment of photographs. The classification schedules of the fifth edition of the DDC, which was the most current one in the late 1890s, had a general class for “collections of photographs” (Class Number 779) as such and several classes for photographs of specific subjects, mostly animals and astronomical bodies (Dewey 1894, 529): however, apart from the latter classes, they did not provide a mechanism for simultaneously treating photographs as a particular form of document and indicating the subject thereof.¹⁰⁴ Thus, whereas one could classify or index a given collection of photographs as a collection of photographs, it was impossible, within the framework of the DDC, to indicate what the subject of this collection was, unless it happened to be one of the few classes of subjects for photographs explicitly given in the schedules. Kaiser’s workaround to this limitation, as recounted in our passage, was to draw upon the entire range of DDC class numbers to indicate the subjects of photographs, while signaling their documentary form *qua* photographs by means of a prefixed initial letter—a method that he applied to the comparable cases of other document types, such as maps and charts. The strategy of using a prefixed initial to indicate documentary format, which, interestingly enough, paralleled a technique recommended by Dewey (1894, 33–35) for distinguishing various subcollections within a library,¹⁰⁵ would, *mutatis mutandis*, come to play an

¹⁰⁴ The fifth edition of the DDC did not give any instructions for subdividing collections of photographs by subject or for making references from its class number to those of other subjects, as it did, for example, for freehand drawing (Class Number 740). Nor did its table of (rather heterogeneous) form divisions make any provisions for photographs (Dewey 1894, 580).

¹⁰⁵ More specifically, Dewey suggested that, if one were so inclined, one could prefix the letter “J” to class numbers for books in the juvenile, or children’s, section of a library; the letter “B” to Cutter numbers indicating the subjects of the biographies or class numbers indicating particular classes of persons (e.g., musicians, writers) so as to create a special biography section; “T” to class numbers for books having to do with travel; and various letters to generate sections for books in different foreign

important ancillary rôle in the elaboration of SI (See Chapter 6, Section 3.1, below). Here, it is enough to note that, by Kaiser's own account, difficulties that he encountered in using the DDC to represent certain kinds of documentary materials within the catalog of the PCM's library induced him to find a solution by partially reconfiguring the scheme—an indication of a practical interest in, and affinity for, the technical aspects of knowledge organization, as well as a certain independence of mind.

Kaiser's critique of knowledge organization practices in the PCM's library extended to its system of indexing as well. As he remembered it,

[t]he indexing was done on the catchword plan. It was rather weak, the main trouble being duplication, i.e., the same information could be found under several headings (not counting localities), which made it obligatory to search the cards under all likely subjects so as not to miss desired information (Kaiser 1926, 20, § 2).

Key to understanding Kaiser's criticism here is the notion of catchword, which requires a word of explanation. In contemporary library parlance, the term "catchword" referred to the use of a prominent, easily remembered, word in a book's title as an entry term under which a record for the book was entered in an alphabetically organized catalog (e.g., Cutter 1891, 13, 43–44; Hulme 1901, 38; Linderfelt 1890, 45). Although some authors restricted the meaning of the term to denote a significant title word "other than the first word and not indicative of the subject" of the book (Cutter 1891, 13), others applied it to title words expressive of subjects treated in books (e.g., Hulme 1901, 38; cf. Metcalfe 1943, 242). The latter meaning corresponded to the usage of many writers on indexing, for whom a catchword—or subject catchword, as it was sometimes called—was that word in the title of an article (in the case of periodical indexers) or the text of a book (in the case of back-of-the-book indexers) selected to designate a given subject in an index (e.g., Hudders 1915, 1; R. R. Bowker in Leypoldt 1902, iv; Petherbridge 1904, 39). Two variations in usage must be noted, though. First, whereas catchwords were often understood to be single words that either stood alone or to be the initial word in a noun phrase constituting a heading (e.g., Jacobi 1903, 18–20 & 76; *Our Index for 1905*; *Some Valuable Lessons to be Learned From It*

languages (e.g., G for "German", "F" for "French", "I" for "Italian", and so on). Of course, the strategy could be extended to other categories of library materials as well. Thus, for example, one of the most fervent contemporary advocates for the use of the DDC in British public libraries, Louis Stanley Jast (1868–1944) reported in the mid 1890s that, at the Peterborough Public Library over which he presided, not only was "J" used as a prefix to denote books in the children's collections, but also "E" to denote "Ephemerae" or "books of only temporary value" and "P" to indicate materials in the library's pamphlet collections Jast (1895, 173–174); some thirty years later he would note his employment of a comparable method to indicate such non-book series of items as press clippings, pamphlets, trade catalogs, and maps and charts in the card catalog of the Manchester Public Library (Jast 1925).

1906; Wheatley 1879, 72, Rule 9; 1902, 151–152), some indexers applied the term more broadly to short noun phrases as a whole (e.g., Suplee & Cuntz 1901, “To the User”). Second, although the term “catchword” often served to denote words directly extracted from a title or text, some writers used it to refer to words chosen by an indexer to express, within a given index, the subject of a given article or of a passage within a book, whether they occurred in the title of the article or the text of the passage being indexed or not (e.g., Jacobi 1903, 19–20; Suplee & Cuntz 1901, “To the User”; Wheatley 1879, 42–44, 72, § 9; 1902, 178; cf. Metcalfe 1943, 242). In this latter usage, it verged on becoming a generic designation for a subject term *tout court*.

Although there was ample historical precedent for the use of catchwords in the sense of title- or text-derived terms for the framing of subject entries within a catalog or index (Metcalfe 1965, 24–26; Pettee 1947, 25–28), they were considered problematic by leading cataloging theorists of the day (Cutter 1876a, 535–536; Hulme 1901, 38). Not only were they frequently far from reliable guides to the subjects of the books for which they served as entry terms, but, even when they were, the titles of different books about a given topic might vary in their vocabulary, with the result that records for books treating on the same topic would be entered under different terms and scattered through the catalog (Hulme 1903, 28–29; Metcalfe 1959, 34, 48). Conversely, books on different topics whose titles shared homographic words were liable to be unhelpfully lumped together under the same term (cf. Grolier 1935, 236, 239; Pettee 1947, 28). Within the world of library cataloging, then, the idea of the catchword was surrounded with an odor of disrepute that, to a certain degree, penetrated into the discourse of both literary and commercial indexing (e.g., Petherbridge 1904, 39; Scholfield 1923, 132–133).

For Kaiser (1911, § 652), a catchword was “any term”—typically taking the form of a noun or a short noun phrase—“which happens to be sufficiently catchy” to be selected for the purposes of indicating the subject of a given item of information. Like many of his contemporaries, he found indexing by means of catchwords to be a problematic endeavor, albeit for reasons quite different from those given by other commentators. In his view, the fundamental difficulty with what he called alternately called the “catchword plan” (Kaiser 1926, 20, § 2) or the “catchword method” (Kaiser 1911, §§ 649, 652) lay not in its potential to mislead the user of an index as to the subject of a given item of information or in its incapacity to deal with problems of synonymy and homography, but rather in the fact that it led to material inefficiencies in the treatment of items of information about complex

subjects within the framework of a card index. His arguments regarding this point are not easy to follow in the abstract and are best approached by means of an example.

Suppose that one were to index an item of information for the PCM's Bureau of Information, such as the special inquiry pertaining to "Exports of Cotton Goods from the United States" (Expression No. [1.5] in Section 3.2 of the current chapter). According to Kaiser, indexing according to the catchword method would require preparing and entering a card record for this special inquiry under three distinct headings corresponding to three different catchwords: EXPORTS, COTTON GOODS, and UNITED STATES (cf. Kaiser 1911, § 649).¹⁰⁶ As a result, "the same information could be found under several headings" (Kaiser 1926, 20, § 2), none of which, he assumed, would undergo further subdivision (1911, § 649). Now certain forms of multiple entry—namely, the entry of an item of information under a heading indicating the locality to which it pertained (*in casu*, UNITED STATES) in addition to its entry under headings denoting subjects (*in casu*, COTTON GOODS and EXPORTS)—were, in Kaiser's estimation, acceptable: although he did not specify a rationale for this in his retrospective account, one may well suppose that he had in the back of his mind the Bureau's distinction between "subjects"—products, lines of manufacture, and general commercial subjects—and "countries" as the two primary categories for indexing and the possibility that a user of its reference files might want to conduct a search for an item of information either under the subject or under the country (See Section 3.2 of the current chapter). On the other hand, he understood the entry of a given item of information under multiple subject catchwords (*in casu*, COTTON GOODS and EXPORTS) to constitute "duplication", which he judged to be problematic on the grounds that it "made it obligatory to search the cards [sci., in the card index—TMD] under all likely subjects so as not to miss desired information" (Kaiser 1926, 20, § 2; 22, §§ 6–7; see Chapter 9, Section 4.1, below).

As formulated by Kaiser in the passage under consideration, the argument against duplication may seem, at first blush, a difficult one to sustain. Indeed, the claim that one must search under "all likely subjects"—that is to say, all relevant catchword headings denoting subjects—to find a given piece of information may strike some readers to be

¹⁰⁶ For an even more extreme case of assigning multiple headings to a single piece of information, see the example given by one of Kaiser's contemporaries, an indexer at the Library of Congress writing on "the science of indexing": "[I]t is impossible to prepare a satisfactory alphabetical index without frequently duplicating references two or three or even six or more times, according to the various words which might reasonably be thought of as catchwords. For example, a reference to action by the Secretary of the Treasury refunding duties paid on iron ore at a certain port might reasonably be indexed under "Secretary of the Treasury," under "Refunds," under "Iron ore," and under the name of the port and of the person to whom the duties are funded" (McClenon 1918, 468).

internally inconsistent, as was the case with one skeptical observer who rejoined that “[i]f the same information could be found under several headings (as, indeed it ought to be) it was obviously *not* necessary to search under all likely subjects for it” (P. K. Turner, *apud* Kaiser 1926, 34 [emphases his]). This critique has merit if one assumes that indexers working on the catchword plan will consistently enter items of information pertaining to a given subject under all relevant catchwords and that the catchwords in question reflect the vocabulary of the persons using the index: in such a case, if the user of the Bureau’s index were interested in the export of cotton goods, he could search under either *Exports* or *Cotton Goods*, and, once he had searched through all the cards in either of the relevant files, he could be confident that he had found all the items of information pertaining to the subject in question. However, as Kaiser argued elsewhere, the catchword method offered no assurance of such consistency. An indexer could well enter a given item of information about exports of cotton goods under *Cotton Goods* at one time or *Exports* at another, so that users might “not remember the right catchword under which it is filed” (Kaiser 1911, § 652). Moreover, Kaiser averred, catchwords are often chosen “under the stress of the moment” and so reflect a temporally bound interpretation of a given piece of information (§ 652). The point of view from which a given item was considered and, hence the kinds of catchwords used to characterize it might change over time, so that items of information pertaining to it that had been entered under catchwords once in vigor but now fallen into desuetude might come to be lost, for all practical purposes, to users of the file (§ 652). In short, indexing by catchword resulted in too unpredictable a use of entry terms to allow a user of a card index desirous of examining all the items of information pertaining to a given subject to be confident that he had found them all without conducting a thorough search of the cards under every entry term likely to refer to it—a laborious process that, according to Kaiser, involved “a good deal of extra time” and was marked by “considerable uncertainty as to what headings should be searched or disregarded” (Kaiser 1926, 22, § 6).

For Kaiser, unpredictability in the use of entry terms was not the only element of duplication that rendered the catchword method of indexing problematic. He believed that, even in the best-case scenario of catchword indexing consistently carried through so as to enter an item of information under all the relevant catchwords, there would be considerable inefficiencies for indexer and user alike. Here, again, an example may prove useful. Let us revert to the subject of Exports of Cotton Goods from the United States and stipulate that there were 5 items of information concerning it to be registered in a card index. On the

catchword plan, each of these 5 items would have to be entered three times—once under *Exports*, once under *Cotton Goods* and once under *United States*—so that 15 cards would have to be prepared in all. This would require considerable duplicative work on the part of the indexer or his clerical assistants. They would have to prepare and file a series of cards, two thirds of which contained no new information (cf. Kaiser 1926, 22, § 6), though in the case of the entry under the geographical entity *United States*, such redundancy might be a price worth paying. Yet, in Kaiser’s view, even such thoroughness in duplication provided no guarantee that users would readily find the cards in question. So long as the number of cards filed under each of the three catchwords in question was low (say, at the order of 20 cards per heading), a user of the index looking for information about the trade in corsets in Cuba would experience “no great hardship” in finding the relevant cards under one or other of the three headings (Kaiser 1911, § 649). However, as more and more items of information came to be added over time under each catchword (say, on the order of a hundred cards per heading), it would become correspondingly more difficult for users to find the cards in question under any of the three, unless the manager of the index were to introduce subdivisions under each heading—a feature that, as noted earlier, Kaiser assumed to fall outside of the purview of the catchword method as such. In short, the catchword plan, as Kaiser understood it, was an inherently uneconomical and materially inefficient method for entering and organizing items of information within an index composed of “large masses of cards” (Kaiser 1926, 20, § 4). It is unsurprising, then, that, throughout his writings, “catchword” served as a term of opprobrium and the catchword method was presented as the epitome of “unsystematic” indexing, the very antithesis of what he claimed to be his “systematic” approach (e.g., Kaiser 1911, §§ 14, 17, 310, 579, 649–652).

Now, according to Kaiser’s (1926, 20, § 2) foundation narrative, the index maintained by the library of the PCM’s Bureau of Information followed the catchword plan and so was subject to the inefficiencies of duplication, which were shared, albeit “to a less degree”, by the library’s catalog.¹⁰⁷ Dissatisfaction with the index spurred Kaiser to consider how it

¹⁰⁷ Kaiser’s characterization of the index as a catchword one does not seem entirely accurate, in that it suggests that there was no subdivision within the index files: however, early descriptions of the PCM’s index files seem to indicate that some form of alphabetico-classed division was being used (See, e.g., *A Commercial Museum* 1897, 1011, quoted at pp. 103–104, above). As for the nature of the catalog, Kaiser’s claim that it, too, followed the catchword plan supports the supposition that the catalog of the PCM’s library was, indeed, a dictionary catalog, for catchwords, in the sense that Kaiser used the term, would not be an issue of importance for a classed catalog.

might be improved: as he later recounted, “[m]y problem ... was to work out a suitable system for the indexing” (p. 20, § 3). His initial impulse was to develop a scheme applicable to index and catalog alike on the grounds that “there was an obvious advantage in having both cataloguing and indexing done on the same basis, especially in view of the use made of them by the compilers” of the Bureau’s reports (p. 20, § 3). This goal of unifying the organization of catalog and index led Kaiser to contemplate using what he considered to be one of the catalog’s most salient features as a foundation for the index as well: in his words, “it induced me to examine the Dewey system rather more minutely than I had done previously, in order to discover if such a common basis existed or could possibly be worked out” (p. 20, § 3). Just how he envisioned utilizing the DDC within the framework of the index he did not specify. At any rate, the “Dewey system”, about which he already had misgivings with regard to cataloging, did not withstand the scrutiny to which he subjected it, for, in his recollection, “I found so many weak spots that I finally decided against it” (p. 20, § 3). This experience, which appears to have instilled in him the lasting conviction that the DDC was inadequate for indexing purposes—a judgment that he would later extend to the UDC as well (Kaiser 1911, §§ 271–274; 1926, 28–29, §§ 26–30)—brought to an end any attempt to find a scheme of indexing that would tie the index to the catalog. Instead, Kaiser (1926, 20, § 3) fell back on his own resources and “worked out plans which developed into Systematic Indexing”.

Little is known about the initial stage of SI’s development, which Kaiser recounted with all-too-severe brevity in his latter writings. By 1897, he had produced a “first draft” of the protocols for his new scheme, which he proceeded to try out in practice (Kaiser 1911, § 20).¹⁰⁸ After “some years of constant application involving an index of some 50,000 cards”, he rewrote the protocols “in the light of experience gained” (§ 20), most likely toward the end of his tenure at the PCM. Over the next decade, Kaiser would have “ample time and opportunity” to test and refine his indexing method “in all its bearings”, as he applied it, in turn, to three other indexes (§§ 21, 20). Such an accumulation of experience allowed him, by his own account, to add “many improvements” to the protocols; nevertheless, in his major exposition of SI in 1911, he would maintain that “the scheme is essentially the same as

¹⁰⁸ *Pace* Chan, Richmond, & Svenonius (1986, 52) and Svenonius (1978, 134), there is no evidence that Kaiser “published” this first draft—at least, in the usual sense of publication as making a work available to interested members of a public through some formal mechanism of dissemination.

drafted at the beginning” (§ 21).¹⁰⁹ This claim, upon which Kaiser did not further elaborate, is of considerable interest, for it suggests that he had developed the basic framework of SI within a year or so of having taken up library work as an occupation, at a time when, as we have seen, he was encountering, assimilating, and assessing the mechanisms of knowledge organization deployed at the PCM’s library. If we take the claim at face value, its significance is twofold. First, it suggests that Kaiser was not only a quick study in matters of knowledge organization, but also independent-minded enough to develop his own approach to indexing not long after having taken up the activity as an occupation in the first place. Second, it underscores the formative importance of the PCM as the setting within which Kaiser first worked out what he took to be the essential features of SI: as we shall have occasion to see in Chapter 7, Sections 1 and 3.4, several fundamental aspects of Kaiser’s conceptualization of SI appear to have been affected by the culture of information provision and the régime of knowledge organization that obtained within the PCM’s Bureau of Information.

Whereas the milieu of the PCM affected Kaiser’s conceptualization of his indexing method, it is much more difficult to assess the impact of his new system upon the indexing practices of the museum’s Bureau of Information. Contemporary accounts of the Bureau’s activities by external observers frequently noted the meticulousness and systematic nature of its indexing (e.g., *A Commercial Museum* 1897, 1011; Betts 1900, 226; N. 1899, 66; *The Philadelphia Commercial Museum* 1896; 1899, 128; *The Philadelphia Commercial Museums* 1898). However, none mentioned Kaiser by name nor did those that sought to describe the indexing system go beyond the summary characterizations found in the PCM’s own publications, which, likewise, did not breathe a word about him (e.g., *Philadelphia Commercial Museum* 1897, 18 & 67). As a result, it is unclear whether the features that they do discuss—such as the division of the library’s index into sections arranged by countries,

¹⁰⁹ Adding plausibility to this claim is a series of examples of index items reproduced, in whole or in part, in *Systematic Indexing*, all of which bear a date of information (on which, see Chapter 7, Section 4.3, esp. p. 531, below) between 1897 and 1899; see Kaiser 1911, §§ 462, 465, 468–472, 475, 480–485; cf. §§ 512–513 (?), 523 (?). For reasons outlined at p. 16, n. 6 above, there is some reason to believe that these examples are based on index entries from the PCM’s Bureau of Information’s index. To the arguments adduced there, one may add that most of the examples cited here share a common stylistic feature—a brief extension taking the form of a descriptive annotation (on which, see Chapter 7, Section 4.3, esp. pp. 522–523, below)—though there are a few outliers to this pattern that may, in fact represent cards from another source: these are followed by a question mark in the enumeration of paragraphs given above. At any rate, if the index items in question could be definitively shown to be based on originals from the Bureau’s index, they would fully bear out Kaiser’s statement, for they are formulated according to the structures of SI set forth in *Systematic Indexing*.

lines of goods, and general subjects (Section 3.2 of the present chapter, above)—are to be taken as reflecting its original structure or as representing elements of Kaiser’s new method. If one accepts Kaiser’s aforementioned claim that the mature form of SI was “essentially the same as drafted at the beginning” and weighs it against the general principles of monographic and geographic modes of organization employed at the PCM, one can only come to the conclusion that the extant descriptions of the Bureau’s indexing systems do not contain any elements *uniquely* diagnostic of SI. For one thing, they do not mention a *process* category, though, as we shall have occasion to see, the category of general subjects bore some analogy to, and may well have provided the inspiration for, this important conceptual feature of SI (See Chapter 7, Sections 3.3 & 3.5, below). Neither do they speak of any mechanisms for producing the complex index terms, or statements, that were the hallmarks of Kaiser’s system (see Chapter 1, Section 2, above; Chapter 7, Sections 3 & 3.5, below). Such absences may simply reflect the fact that most commentators on the Bureau gave only very succinct and general descriptions of the index that did not dwell on the niceties of its design. However, it is possible that they have a deeper significance: it is striking that the aforementioned features are lacking even in the more detailed descriptions of the index (e.g., *A Commercial Museum* 1897, 1011; Betts 1900, 226). In short, the currently available documentary evidence for the impact of SI upon the indexing régime at the Bureau is simply too exiguous and uncertain in its interpretation to allow the formulation of any hard and fast conclusions: here, we must conclude, reluctantly, with a *non liquet*.

Kaiser’s own tersely worded recollections of his time at the PCM are slightly more revealing, even though they provide only the barest of hints about the place of his new indexing method within the Bureau’s overall economy of knowledge organization. He did not divulge in his writings the identity of “the index of some 50,000 cards” (Kaiser 1911, § 20) that served as the testbed for the initial version of SI. It seems reasonable to suppose that the index in question was one pertaining to the documents kept in the PCM’s commercial library, though it is unclear whether it was formally a part of the library’s original index or a new file set up alongside the former. If one accepts this hypothesis, it is possible to gauge, albeit in a very rough manner, the position of the prototype version of SI *vis-à-vis* the library’s reference files as a whole. By the beginning of June 1897, at a time when Kaiser’s scheme was apparently still in its nascent stages, the Chief of the Bureau of Information estimated that the library’s index files already contained a stock of about

“about 157,000 reference cards” and were, moreover, being augmented daily by “hundreds of such references” (Philadelphia Commercial Museum 1897, 67).¹¹⁰ If one assumes that the figure of approximately 50,000 cards cited by Kaiser represents the maximum number prepared in accordance with the prototype of SI during his time at the PCM and so most likely marks the total from the end of his employment there in 1899, the conclusion follows that they would have constituted only a small proportion of the library’s reference files. In other words, whatever the precise relation of Kaiser’s testbed to the library’s index may have been, it appears that his initial version of SI found only circumscribed application within the library’s reference files.

Although the preliminary version of SI seems to have been used only to a limited extent at the PCM’s library, it is clear that, by 1899, Kaiser had achieved much in the course of his work at the PCM. Having begun without any formal training in librarianship, he had rapidly—if arguably incompletely—familiarized himself with the rudiments of knowledge organization, critically examined the classification and indexing systems used at the Bureau’s library, and, manifesting considerable initiative, developed the protocols for a new system of indexing, which he was able to test on a substantial card index, albeit one that apparently formed only a portion of the library’s reference files. Furthermore, he had overseen a rapidly expanding library, supervised a highly-regarded indexing operation, and served as a translator for the Bureau. His growing technical skill in indexing, knowledge of the PCM’s information practices, and the managerial experience that he had acquired, coupled with his multilingual background and a capacity for sustained work that, according to one of his later employers, allowed him “to work 16 hours a day without getting tired, and with great rapidity”,¹¹¹ must have made him a valuable, if publicly invisible, member of the Bureau’s staff. These qualities did not go unnoticed, for, as we shall see in the following section, in his third year of work at the museum, Kaiser was recruited to take up a position at a newly forming company in London that both cultivated ties with the PCM and aspired to emulate key elements of the Bureau’s activities—the Commercial Intelligence Bureau, Ltd.

¹¹⁰ Another source, dating from October 1897, claimed that the daily increment ranged from “600 to 1000 cards” (A Commercial Museum 1897, 1011). Note, however, that a visitor to the Bureau in late 1898 estimated the size of library’s index files then to be “over 175,000 cards”, a figure that suggests that the rate of increase may have been considerably less than these optimistic estimates.

¹¹¹ TCP, 6/1/28, W. A. S. Hewins to C. A. Pearson, 1 January 1903 [read: 1904]. Although this characterization stems from a slightly later stage of Kaiser’s career, there is no reason to doubt that the statement about his stamina held true for his time at the PCM as well.

Chapter 4.
First Years in London, 1899–1903:
At the Commercial Intelligence Bureau, Ltd., and British Westinghouse

4.1. The Commercial Intelligence Bureau, Ltd.

The origins of the Commercial Intelligence Bureau, Ltd., (hereafter, CIB) can ultimately be referred back to increasing public concern in late Victorian Britain about the nation's standing in the arena of international trade. At mid-century, Britain had held a preeminent position in world commerce: as a result of her early industrialization, she was at that time the leading producer and exporter of manufactured goods, a status encapsulated in the confident national self-characterization as "the workshop of the world" (Freidberg 1988, 27–28). Over the latter half of the century, as other countries—above all, the United States of America and the newly unified Germany—developed their industrial capacity and refined their commercial infrastructure, the economic dominance of Britain began to erode. To be sure, it would be wrong to speak of an absolute decline in the British economy, for, "[b]etween 1870 and 1900, the country's gross national product grew from £ 1.317 billion to £ 2.084 billion" (p. 24). Yet, although overall productivity held strong in absolute terms, the rate of growth of the British gross national product was slowing down at a time when those of its industrial rivals were in the ascendant (Friedberg 1988, 25; McCord 1991, 436). The result was a relative decline in Britain's performance *vis-à-vis* her competitors in both manufacturing and trade in manufactured goods. To cite but one general indice, the British share of total manufacturing production plunged from 31.8 % in 1870 to an average of 19.5 % for the period of 1896–1900, while that of the United States shot up from 23.3 % to 30.1 % and Germany's rose from 13.2 % to 16.6 % (Cain 1979, 34, Table 1; Friedberg 1988, 26, Table 2.1). Relative decline in production was accompanied by comparable trends in trade. Britain's share of world trade in manufactures sank from 37 % in 1883 to 28.4 % by 1900. The rate of growth of her exports by value of manufactured goods decreased sharply from 2.9 % *per annum* in the 1880s to 0.4 % *per annum* in the 1890s, while the proportion of imports by value in manufactured goods jumped from 17.3 % in 1880 to 25 % in 1900 (Cain 1979, 34–35). And, by the same token, the traditional deficit in Britain's balance of trade showed a marked increase, from an average of -£ 64,000,000 in 1871–1875 to -£ 159,000,000 in 1896–1900 (p. 37, Table III). These developments should not obscure the fact that, by virtue of her robust shipping capabilities, well-established financial services, and wide range of capital investments abroad, Britain continued to be a potent force in

international commerce (McCord 1991, 437, 439): late Victorian Britons could still take pride in her standing as a major industrial and mercantile power and many continued to believe in her overall commercial supremacy (e.g., Ackland 1897, 35–37). Nevertheless, the rise of the new industrial rivals was disquieting and, for a number of British businessmen and members of the political élite, the twilight of Queen Victoria’s reign was a time of mounting anxiety about the future of their nation’s place within what had become a multipolar and competitive world economy.

The perception that John Bull was contending with vigorous and aggressive economic rivals spurred British government officials and businessmen alike to consider various ways in which to improve British manufacturers’ and merchants’ prospects in foreign and colonial markets. One area that received attention was the public provision of information concerning international trade. The collection and diffusion of such information had traditionally been the bailiwick of certain departments within the national government. The Board of Trade, the branch of the state charged with overseeing national commerce, included a statistical and commercial department that was responsible for monitoring changes in foreign and colonial tariffs and for collecting statistics pertaining to trade: some of the results of its endeavors were published in the *Board of Trade Journal*, issued monthly from 1886 onward (Black 1996, 134; Black & Murphy 2012, 192–193; Warren 1901, 3). The Foreign and Colonial Offices also set up commercial departments, the former of which published Consular Reports about trade conditions abroad, while the latter issued Colonial Reports (Black 1996, 134; Black & Murphy 2012, 194; Warren 1901, 6–7). There was little coordination among the commercial departments of the Board of Trade, Foreign Office, and Colonial Office in their informational work: thus, even though their publications were made available to organizations and individuals interested in foreign commerce, “[t]he process by which commercial data were collected and disseminated was ... complicated and confusing” (Black 1996, 134; cf. Black & Murphy 2012, 193). Apart from these governmental departments, there were few institutions of national scope that took up the task of dispensing commercial information. The Imperial Institute, which, as noted earlier, confined its remit to Britain’s commercial relations with her colonies, had instituted a Department of Commercial Information, which, from 1892, issued periodicals containing information on colonial trade and, from 1895, ran an enquiry service; however, the restricted scope of the Department’s coverage and logistical problems in the operation of the enquiry service were viewed as limitations on its effectiveness (Muddiman 2011, 114–115). In view of the fact

that existing mechanisms for diffusing information about colonial and foreign trade were failing to give satisfaction to its constituency, the Board of Trade appointed, in 1897, a departmental committee to inquire into the dissemination of commercial information (Black & Murphy 2012, 193). The most notable result of the investigations of this committee, which were made public in a report issued in July of 1898, was a recommendation to establish “an office whose function it shall be to meet the constantly increasing demand for prompt and accurate information on commercial matters, as far as it can be met by government” (Commercial Intelligence Committee 1898, 8, cited in Muddiman 2011, 115): acting on this proposal, the Board of Trade established its Commercial Intelligence Branch, in effect a governmental information bureau that commenced operations in October of 1899 (Black & Murphy 2012, 195; Gibson 1909, 712; Muddiman 2011, 115; Warren 1901, 5–6, 175–176).

Although the Board of Trade’s report was directed primarily toward the reform of governmental provision of commercial information, its enunciation of the need for disseminating “prompt and accurate information on commercial matters” was heeded in other quarters as well. One response to the call was that of Henry Sell (1851–1910), the proprietor of a leading London advertising agency (*A Great Enterprise* 1886; *The History of Advertising Trust* n.d.) and publisher of two well-known directories, *Sell’s Dictionary of the World’s Press*, an annual press guide also containing articles on advertising, journalism, and related matters, and *Sell’s Directory of Registered Telegraphic Addresses*, essentially a Yellow Pages for users of the telegraph in the United Kingdom that was greatly valued by British business men (Linton 1984, 24; Robertson 1903, 594).¹¹² Within four months of the appearance of the report, at the end of October of 1898, he launched *Sell’s Commercial Intelligence*, a penny weekly newspaper “entirely devoted to the spread of authentic commercial information” in the British business community (Sell’s *Commercial Intelligence* 1898). The aim of this journal, the title of which was soon shortened to *Commercial Intelligence*, was “the furtherance of British trade” through “the publication of useful information” culled from a variety of sources and presented in a compact and easily digestible form: as Sell put it in his inaugural editorial,

[t]he modern methods which have made our daily newspapers so bright and readable, will be applied to trade news. We shall not bore our readers with an endless array of statistics, showing in appalling columns that we are by so many

¹¹² *Commercial Intelligence*, 27 July 1910, p. 23 (“Death of Mr. Henry Sell”); *The Times*, 29 September 1898, p. 6 (“Publications To-Day”).

millions better or worse than in the 'corresponding month of the preceding year'. That sort of thing is interesting, no doubt, but it does not help a merchant or manufacturer to find a new market for his goods. We shall endeavor by brief and lucid references to the monthly returns, without reference to what is merely casual and temporary. ...

... By careful scrutiny of the official reports of our own, and of foreign consuls and diplomatic agents; by a study of references to trade developments in the Colonial and foreign Press; by careful watching for signs of inroads on markets where we grow too confident of supremacy, and for new opportunities of development, which our competitors have been quicker to realize, we hope to render useful service alike to the individual interests of British merchants and manufacturers, and to the total volume of our national prosperity.¹¹³

In subsequent issues, *Commercial Intelligence* plied its readers with brief reports on current developments in foreign and colonial markets, notices of opportunities for export, financial news and exchange rates, articles on political issues pertaining to trade policy, and country reports featuring attractively prepared maps considered by contemporary observers to constitute a valuable educational resource for the study of commercial geography (e.g., F. D. H. 1906; Hooper & Graham 1901, 67, n. *). Cloaking its contents in a mantle of mercantile patriotism, the newspaper was warmly received in British commercial circles and, enjoying a reasonably wide distribution in the United Kingdom, achieved some status as a vehicle for trade-related information in the last years of the 19th, and opening years of the 20th, century.¹¹⁴

In the year-and-a-half following the initial appearance of *Commercial Intelligence*, Sell set into motion another, more ambitious enterprise relating to the provision of commercial information—the creation of a for-profit commercial information service situated in London operating along the lines of the PCM's Bureau of Information. To this end, at the beginning of June of 1899, he formally incorporated a small, nominally capitalized company named the Commercial Intelligence Bureau London, Ltd., the headquarters of which were situated in the editorial offices of *Commercial Intelligence* at 168 Fleet Street.¹¹⁵ Sell also

¹¹³ *Commercial Intelligence*, 29 October 1898, p. 1. ("Sell's Commercial Intelligence: Markets of the World—New and Old"),

¹¹⁴ For an indication of the breadth of distribution, see the geographical list of newsagents selling the paper in *Commercial Intelligence*, 24 December 1898, p. 6. *Commercial Intelligence* continued to appear as a weekly until the middle of November 1913, after which time it was renamed *Export World and Commercial Intelligence* and issued as a monthly until January 1929 (North 1997, Vol. 6, p. 4309, no. 20, 594).

¹¹⁵ UKNA BT 31/8569/62403, Memorandum of Association of the Commercial Intelligence Bureau London Ltd., 1 June 1899; Notice of the Situation of the Registered Office of the Commercial Intelligence Bureau London Ltd., 1 June 1899.

forged links with William Harper, the energetic and much-travelled Chief of the Bureau, who was Kaiser's superior at the PCM and a man not averse to organizing international trade ventures (The Class of '83 Scheff. 1908, 50–52), and, by early July, was negotiating a contract with the PCM, apparently regarding information-sharing between it and his proposed institution.¹¹⁶ In October of the same year, Sell was among the foreign invitees who took part in the International Commercial Congress held in conjunction with the National Export Exhibition at the PCM (Chapter 3, Section 2, above): tellingly, he came as a “delegate from Commercial intelligence Bureau, London” (Philadelphia Commercial Museum 1899a, 406) and presumably made use of the occasion to inspect the functioning of the museum's Bureau at first hand. In the next year, matters proceeded apace in the development of the new organization. Having secured financial backers for his scheme, reincorporated the company as the Commercial Intelligence Bureau, Ltd., transferred its offices to 24 Queen Victoria Street, and presided over a public demonstration of its services at the Hotel Cecil, Sell opened the doors of the CIB to the public at the beginning of August of 1900.¹¹⁷

The primary objective of the CIB, as stated in its articles of incorporation, was “to foster by systematic effort and by new and effective methods the export of manufactures and products of the United Kingdom of Great Britain and Ireland”¹¹⁸—a goal that echoed, save for national identity, the aims of the PCM. In its choice of “new and effective methods”, the new institution likewise took its lead from the PCM's Bureau of Information. Working on a subscription plan, the CIB offered its subscribers a range of services predicated on the collection, analysis, and collation of trade-related information from around the world, including:

- The distribution of “printed cards giving extracts from home and foreign literature, including consular reports of all countries, also reports from Chambers of Commerce and other commercial organizations, trade papers, &c.” on a host of topics ranging from those pertaining to “raw materials, tools, and accessories”, through those relating to “finished goods”, to those having to do with “marketing”;

¹¹⁶ UKNA BT 31/8875/65304, Promotion Agreement regarding the Commercial Intelligence Bureau, Ltd., 21 February 1900 alludes to this contract; Memorandum of Association, 9 March 1900, p. 1, § 3c mentions information-sharing.

¹¹⁷ UKNA BT 31/8875/65304, Certificate of Incorporation, 13 March 1900; Notice of Registration of the Situation of the Registered Office, 1 May 1900; *Leeds Mercury*, 20 July 1900, p. 4 (“From our London Correspondent”); *The Times*, 21 July 1900, p. 6 (“A new commercial bureau”).

¹¹⁸ UKNA BT 31/8875/65304, Articles of Incorporation, 26 February 1900. p. 1, § 3a,

- The preparation of reports in reply to “all enquiries” from subscribers concerning matters “not covered by the Printed Index Cards” on the basis of “printed matter in the [sci., Bureau’s—TMD] library and from correspondence with agents in various countries”;
- The loan of a four-drawer “reference cabinet” containing a card-index registry of the addresses of “foreign buyers” in the subscriber’s line of business, which would be constantly updated in the light of new information;
- The inclusion of five cards bearing key information about a subscriber’s business within a card-index register of “British manufacturers and merchants ... arranged alphabetically under the various goods they make or deal in”, copies of which were to be installed in the offices of chambers of commerce, boards of trade, and British consulates at a number of major cities around the world “so that the foreign buyer may quickly inform himself as to who make [*sic*] or sell [*sic*] the article he desires to buy”;¹¹⁹
- Access to a “printed index of trade literature ... epitomis[ing] the commercial information of the world appearing in print”, full versions of which would be filed “in cabinets in Chambers of Commerce and other commercial bodies”, while customized ones “printed on slips of thin paper and classified according to individual business interests” would be sent to subscribing businesses.¹²⁰

Some of these services, such as the production of reports in response to individual inquiries, the provision of customized card-index directories of traders abroad, and the advertisement of subscribers’ business concerns by incorporating them into card registers of home manufacturers destined for foreign shores, were direct adaptations of those offered to American businessmen at the Bureau (cf. Chapter 3, Sections 2 & 3.2, above). In this, the CIB appears to have followed its model very closely indeed, as a comparison of a sample index card from the Bureau’s domestic registers with an exemplar of one from its British counterpart suggests (see Figure 1a and Figure 1b). On the other hand, the sending out of printed cards bearing extracts from the sources at the CIB’s disposal and the compilation of

¹¹⁹ The number of cities in which the Commercial Intelligence Bureau, Ltd., intended to set up the cabinets varies in its announcements, ranging from 100 (so *Commercial Intelligence*, 21 July 1900, p. 11 [“British trade.”]; *Western Mail*, 23 July 1900, p. 3 [Commercial Intelligence Bureau (Limited)“] to 70 (so *Commercial Intelligence*, 4 August 1900, p. 21 [“The Commercial Intelligence Bureau: what it is—why it is”]; *The Times*, 31 January 1901, p. 8 [“British manufacturers and commercial information”]). How many of the projected cabinets actually went into use is unknown, though the fact that the British consul in New York did not receive one until mid-1903 (Industrial Items 1903) suggests that this was probably not the strongest point of the Bureau’s program.

¹²⁰ All quoted passages in the first four points of this list derive from *Commercial Intelligence*, 21 July 1900, p. 11 [“British trade.”]; that in the fifth comes from *Commercial Intelligence*, 4 August 1900, p. 21 [“Commercial Intelligence Bureau: what it is—why it is”]. Cf. the descriptions of the Bureau in *The Leeds Mercury*, 20 July 1900, p. 4 [“From our London Correspondent”]; *The Times*, 31 January 1901, p. 8 [“British manufacturers and commercial information”]; *Western Mail*, 23 July 1900, p. 3 [“Commercial Intelligence Bureau (Limited)”].

A. S. PATRIKIOS & Co.,
Constantinople,
Turkey-in-Europe.

Established in 1847.
 Telegraphic address "Patrikios." Codes: A1, ABC 4th edition.
 Branches at Ismid and Galata.
 Bankers, commission merchants and real estate brokers.
 Importers: agricultural machinery, steam engines, cereals, flour, etc.
 Exporters: cereals, raw silk, silk cocoons, etc. Proprietors of
 steam mills.
 Representatives at Ismid for the "Banque Imperial Ottomane,"
 Constantinople, Turkey-in-Europe.


E 2558

Property of the Philadelphia
 Commercial Museum.

Figure 1a: Example of a card from the domestic directory of the PCM
 (Source: Betts 1900, 230).

Sargood, Son & Ewen,
Lichfield Street, Christchurch,
New Zealand.

Established in 1863.
 Head Office at Melbourne, Australia.
 Buying and finance office: 11 Bunhill Row, London, E.C., England.
 Branches at Sydney, Brisbane, Perth, Fremantle, Ballarat, and Bendigo, Australia,
 Auckland, New Plymouth, Napier, Wellington, Dunedin, Invercargill, Oamaru, and Wan-
 ganui, New Zealand.
 Buyers at Paris, Berlin, New York, Yokohama, and Hong Kong.
 Manufacturers, importers, and warehousemen. Import Manchester, Bradford and
 general drapery goods, boots and shoes, books, carpeting, haberdashery, umbrellas, hosiery,
 mantles, matting, hardware, stationery, saddlery, elastic web, silk, thread, paper, jute, candles,
 slate, toys, plate-glass, clothing, scrim, hessians, canvas, flour bags, tobacconists' and
 chemists' ware, perfumery, cutlery, and sporting goods. English, American, and colonial
 boots and shoes, grindery and leather. American oil clothing. At Melbourne, proprietors
 of clothing, boot and shoe factories. At Auckland, N.Z., clothing factory. At Dunedin,
 N.Z., boot and shoe factory.



O 242

Property of the Commercial
 Intelligence Bureau, Ltd.

Figure 1b: Example of a card from a reference cabinet of the CIB, Ltd. (Source:
Commercial Intelligence, 4 August 1900, 21; © The British Museum Board,
 Shelfmark: 745 [Newspaper Collection]).

an index of trade literature constituted departures from the PCM's practice, albeit to different degrees: the former put into public circulation—at least among subscribers—information in the digested form restricted, in the PCM's Bureau, to its internal reference files, while the latter appears to have had no direct parallel at the PCM. Of these various services, it was the customized reference cabinets, touted by the CIB as “a living, growing, accurate index to the buyers in [a given] trade throughout the world” that appears to have caught the imagination of the business public:¹²¹ at a slightly later date, one observer would characterize it as “a clearinghouse for the exchange of addresses in the interest of English export trade” (Neufield 1905, 94).

Unlike the PCM, which operated as a non-profit, “quasi-municipal” (Branford 1902, 403) institution and was dependent, to a large degree, on subventions from various levels of government (See Chapter 3, Section 2, above), the CIB was “a private joint-stock venture, conducted on business lines”.¹²² As such, it made its services available only to that portion of the British business community willing to pay a subscription fee, although visitors to its premises could obtain “information respecting the various lines of goods manufactured in Great Britain” free of charge.¹²³ Yet, interestingly, these policies mirrored those of its counterpart in Philadelphia. As noted earlier, members of the public visiting the PCM in person had free access to the museum exhibits, the commercial library, and the Bureau's inquiry service; and the Bureau answered some kinds of long-distance inquiries without cost as well: however, the Bureau offered many of its regular long-distance services only to business concerns that became members of the PCM by paying an annual subscription fee (See Chapter 3, Section 2, above). To be sure, there was a significant difference in the ostensible motivation for subscriptions in the PCM and the CIG. For the PCM, which prided itself on its status as a public institution working for the public good, the subscriptions were

¹²¹ *The Times*, 31 January 1901, p. 8 (“British manufacturers and commercial information”).

¹²² *The Times*, 4 January 1904, p. 6 (“The commercial development of the crown colonies. II”). The company was capitalized at £ 60,000, of which £ 40,000 were ordinary £ 1 shares and £ 20,000 were in 6 percent cumulative £ 1 preference shares; see UKNA BT 31/8875/65304, Statement of nominal capital, 9 March 1900.

¹²³ *The Times*, 31 January 1901, p. 8; 4 January 1904, p. 6 (“The commercial development of the crown colonies. II”); Business Notes 1901, 105. The regular subscription rate was £ 10 *per annum*, though at its opening, the CIB offered a promotional rate of £ 6 to the first 2,000 subscribers. One may note that subscribers had to pay additional fees for enhanced services, such as the inclusion of more than five cards in the card-index registers of home manufacturers and merchants or the preparation of “special lists of purchasers of any specific line of any trade, local jobbers, retailers, &c. not contained in the card cabinets supplied at any time on request”; see *Commercial Intelligence*, 4 August 1900, 21 (“Commercial Intelligence Bureau—what it is—why it is”).

intended solely to defray “the cost of copying, compiling, printing, and mailing the reports and information sent” (Philadelphia Museums [1898], 15), whereas those made to the CIB were meant to cover operating costs *and* to generate profits. Yet, in both cases, the practical effect was the same: money changed hands in exchange for the provision of information about commercial conditions abroad. Contemporary observers were quite sensible to this fact: as one commentator writing in a German trade publication trenchantly noted with regard to the two institutions, “information (*Die Auskünfte*) is offered to the public entirely as a commodity in the strictest sense (*durchgängig als Ware im eigentlichsten Sinne*) through yearly subscriptions” (Handelsmuseen und Export-musterlager 1902, 100). Although formulated a bit too peremptorily, this statement does underline an essential point of continuity between the PCM and the CIB in their treatment of information. Despite the former’s status as public institution, the subscription policy of its Bureau was a first step on the road toward the commoditization of information; Sell, already well versed in selling informational products such as advertisements, directories, and *Commercial Intelligence*, took its lead and brought it to its logical conclusion in the form of the CIB.

Given the strong links between the CIB and PCM and the former’s wholesale adoption of methods developed by the latter, it is unsurprising that Sell and Harper, who became manager of the London bureau,¹²⁴ should have recruited personnel from the museum to work for their company. Among these was Kaiser, who had arrived in London by the end of October of 1899, apparently to assist in preparations for the public launch.¹²⁵ At the time of the CIB’s opening in the summer of 1900, he held the position of librarian, which he continued to occupy throughout his tenure with the firm.¹²⁶ He also held shares in the company and so had a personal financial stake in it.¹²⁷ Since the historical record bears no

¹²⁴ UKNA BT 31/8875/65304, Summary of Capital and Shares of the Commercial Intelligence Bureau, Ltd., 19 July 1900; Copy of register of directors or managers, sealed 5 February 1901; *The Times*, 21 July 1900, p. 6; 31 January 1901, p. 8. Although Harper held the position of manager at the opening of the CIB, he does not seem to have taken up his duties in London fulltime until resigning his post at the PCM in late 1900 or early 1901.

¹²⁵ UKNA, HO 144/832/143880/C458752, Memorial “A”, no. 5, declared 20 June 1906.

¹²⁶ UKNA BT 31/8875/65304, Summary of Capital and Shares of the Commercial Intelligence Bureau, Ltd., 19 July 1900; American Society of Mechanical Engineers 1928; Hayem & Schoss 1902, 41.

¹²⁷ UKNA BT 31/8875/65304, Summary of Capital and Shares of the Commercial Intelligence Bureau, Ltd., 19 July 1900; Ditto, 23 December 1904; Ditto, 13 June, 1906. According to these documents, Kaiser held £ 300 in preference shares in 1900 and 1904, converting £ 100 from this total to ordinary stock by 1906. The amount appears modest, but was by no means insubstantial, especially when one recalls that, for men engaged in clerical labor in England, “a reasonable annual salary at the end of the 19th century was £ 80” (Delgado 1979, 21). One may well wonder whether

unequivocal traces of Kaiser's work at the CIB, little can be said about his time there.¹²⁸ One may surmise that, in most general terms, he recapitulated the activities that he had carried out at the PCM—that is to say, translating, indexing, and supervising the organization of the library, the holdings of which appear to have consisted primarily of trade newspapers, governmental publications, and reference works.¹²⁹ In his capacity as librarian, he presumably oversaw the transfer of the library when the CIB moved to new, more spacious premises at 49 & 51 Eastcheap, in the late autumn of 1900.¹³⁰ Our sources are silent, however, as to whether he organized its holdings according to the subject-based bibliographic classification in force at the PCM's library (see Chapter 3, Section 3.2, above) or made use of the format-based model of classification that he would favor in his own writings (see Chapter 6, Section 3.1, below). As regards indexing, the CIB's offices almost certainly housed the first of the three indexes to which Kaiser applied SI after his departure from the PCM (Kaiser 1911, § 20), though definite details are lacking.

4.2. In Library Service to the British Westinghouse Corporation

All told, Kaiser spent about three years working at the CIB (American Society of Mechanical Engineers 1928). Early in 1903, however, he left the employ of the bureau to

Kaiser purchased these shares or, more likely, was awarded them as an enticement to work for the CIB.

¹²⁸ Note, however, that, as was the case with the index of the Bureau of Information at the PCM (See p. 119, n. 109 above), it is possible, even likely, that a number of the examples of index items reproduced, in whole or in part, in *Systematic Indexing*, originally derive from the CIB's index. These examples, virtually all of which bear a date of information (on which, Chapter 7, Section 4.3, esp. p. 531, below) from 1899 or 1900 are found at Kaiser 1911, §§ 466–467, 473–474, 478, 487–512, 515–522, 524–533; cf. 513–514 (?), 523 (?). In addition to sharing dates of information that, for reasons outlined at p. 16, n. 6, most likely indicate approximately the time when the original versions of these index items were composed, virtually all of the examples in question contain expressions taking the form of informative condensates (on which, see Chapter 7, Section 4.3, esp. pp. 523–527, below)—a feature consistent with the CIB's stated aim of producing “printed cards giving extracts from home and foreign literature” for the benefit of its subscribers (cf. see *Commercial Intelligence*, 21 July 1900, p. 11 [“British trade.”]). If these index items could be unequivocally shown to be based on originals from the period in question, they would provide a valuable witness for the form of indexing carried out by Kaiser at the CIB.

¹²⁹ Blue books; consular reports, both domestic and foreign; reports from chambers of commerce and commercial organizations; and trade newspapers are genres of literature explicitly mentioned in the CIB's description of its sources of information; see, e.g., *Commercial Intelligence*, 21 July 21 1900, p. 11 [“British trade.”]; Business Notes 1905, 105.

¹³⁰ *The Times*, 23 November 1900, p. 11 [“Money matters”]; UKNA BT 31/8875/65304, V. Fabini to the Registrar of Joint Stock Companies, 1 December 1900; Business Notes 1901, 105. After May 1902, it shared these quarters with the newly relocated enquiry offices of the Imperial Institute, which were soon absorbed by the Board of Trade's Commercial Intelligence Branch, as well as colonial information bureaux from Canada and Queensland (Abel 1902, 207; *Brisbane Courier*, 18 October 1902, p. 9 [“An Australian in London”]).

take a job at a major corporation in the electrical machinery industry, the British Westinghouse Electric and Manufacturing Company, Ltd. (hereafter, British Westinghouse).¹³¹ As its name implies, Kaiser's new employer was a component in the corporate empire of the American inventor and industrialist, George Westinghouse (1846–1914) and, at the time, represented the latest stage in what had been a gradual expansion of Westinghouse's electrical interests into the British market. As early as 1889, three years after the formation of the Westinghouse Electric Company—soon renamed the Westinghouse Electric and Manufacturing Company—in Pittsburgh, Westinghouse had called into being the Westinghouse Electric Company, Ltd., of London as an agency for selling and installing the products of the American firm's factories (Dummelow 1949, 1–2). By the end of the century, he had decided that the time was ripe to undertake the manufacture of Westinghouse products in Britain; accordingly, in July of 1899, the British Westinghouse Electric and Manufacturing Company, Ltd., was formed “for the purpose of establishing works for the production of every description of electrical machinery and appliances” (p. 3). As had been the case with its precursor, the corporate offices of the new company were located in London: initially housed at 32 Victoria Street, they were moved, by the end of 1899, to Westinghouse Building at 2 Norfolk-Street, Strand (Dummelow 1949, 12 & 10; Trade Notes and Notices 1899, 202). The new factory, however, was situated in the industrial North, at Trafford Park in Manchester (Dummelow 1949, 3–9; The British Westinghouse Works 1903). Rapidly built over the first half of 1901 and fully operational by 1902, the monumental British Westinghouse plant produced “all kinds of electrical apparatus from huge dynamos and gas engines of thousands of horse power to arc lamps and delicate measuring instruments” (The Manchester Geographical Society 1902, 77), becoming, in the eyes of many contemporary observers, an emblematic example of the implantation of American industry and its methods on British soil (American Ideas and Enterprise in England 1901; Fayant 1904; McKenzie 1902, 84 & 157–164; The British Westinghouse Works 1903, 631).

¹³¹ A rough indication of the date at which Kaiser took a job at British Westinghouse can be found in his naturalization papers. One of the witnesses who attested to his good character was Daniel Nicol Dunlop, an assistant manager of the Publishing Department at British Westinghouse and, apparently, Kaiser's superior there. In mid-August 1906, Dunlop asserted that he had known Kaiser for three-and-a-half years. (UKNA, HO 144/832/143880, Declaration of Daniel Nicol Dunlop on behalf of Julius Otto Kaiser, 15 August 1906). If, as seems most likely, Dunlop first met Kaiser when the latter began working for him, then it follows that Kaiser most likely began work at Westinghouse sometime in the first three months of 1903.

At British Westinghouse, Kaiser was engaged in “library service” and so apparently was associated with an in-house company library (American Society of Mechanical Engineers 1928). Little is known about this library: no contemporary account of it appears to be extant nor does it seem to have fallen within the field of vision of later commentators.¹³² Nevertheless, there is sufficient evidence to reconstruct, at least to some degree, its place within the firm and even to catch a glimpse of Kaiser’s work there. An important hint regarding the library’s location within the corporation may be gleaned from a set of directives issued to a new employee of British Westinghouse’s Patent Bureau at the beginning of October 1903. His charge was to monitor the appearance of information about patent claims that might affect the work of the company and so he was set the task of reviewing documents relevant to this end. In addition to perusing patent specifications, the employee was instructed to read, “in relation to the Westinghouse interests”, “the catalogues, pamphlets and literature published by the Westinghouse Companies” and “the current technical literature as indexed by the Publishing Department, particular reference being paid to articles descriptive of Westinghouse apparatus”; while, “in relation to the work of competitors”, he was expected to cover “the current technical literature as indexed by the Publishing Department, particular attention being paid to the articles describing apparatus made by other firms working on similar lines to the Westinghouse Companies”.¹³³ When one combines the allusions to “current technical literature ... indexed by the Publishing Department” in these instructions with the fact that the name of the same department appears in the lists of subscribers recorded in journals issued by various engineering societies (e.g., American Society of Naval Engineers 1902, 14; The Institution of Mining Engineers, 1902, lvi), it becomes evident that the British Westinghouse Publishing Department, which was housed at the company’s Norfolk-Street headquarters in London and was otherwise involved in generating publicity for the firm (Dummelow 1949, 12–13), was the unit in the company responsible for receiving, processing, and indexing technical literature. Given that the collection and indexing of printed literature were typical functions of company libraries and that one can find parallels for the emergence of such libraries within the publicity departments of other (albeit American) firms in the same period

¹³² The standard company history of British Westinghouse and its successor, Metropolitan-Vickers Electrical Company (Dummelow 1949) does not mention this library nor does it figure among the examples of early (i.e., pre-World War I) British company libraries in discussions of British corporate library history (e.g., Ashworth 1971, 636; Black 2004a, 421–422; 2007b, 153–154; Marshall 1968, 108–109).

¹³³ MS. Marconi 2839, p. 73, General Order 58: Preliminary routine for Mr. Mahon, 1 October 1903.

(Kruzas 1965, 68), there is ample justification for concluding that the Publishing Department was the division of British Westinghouse within which Kaiser carried out his work as librarian.

Another significant piece of evidence regarding Kaiser's work at British Westinghouse is embedded in one of his own writings. Towards the end of his first book, he discussed the utility of compiling a "Daily Record"—that is to say, a current awareness bulletin enumerating "the most interesting items" that had been entered into a card index on a given day (Kaiser 1908, § 345). To illustrate what such a bulletin might look like, Kaiser reproduced a photographic image of one (see Figure 2). Although he circumspectly identified this example as emanating from "a London firm" (§ 348) and effaced from the illustration both the name and address of the company in question, there is good reason to view the bulletin portrayed in the photograph as a product of the British Westinghouse Publishing Department. For one thing, most of the subjects listed—"Air Brakes", "Automatic Liquid Switch", "Dynelectron", "Electric Industry, UK", "Electric Traction", "Electric Switches", "Motor-Drive Air Compression", "Railway Signals", "Siemens-Schuckert" (the name of a leading German electric engineering company), and "Steam Turbines"—were concerned with railway and electrical engineering—two areas of principal concern to British Westinghouse and its sister Westinghouse companies. Second, the Daily Record pictured in the illustration was, according to the imprint at its bottom, "published" by a department within the firm in question. Although the bulletin was clearly intended solely for internal distribution within the company, the fact that the imprint in question formed part of the printed paratext of what was otherwise a mimeographed document suggests that the unit in question was one that routinely engaged in publication and, in the context of British Westinghouse, this was undoubtedly the Publishing Department.¹³⁴ Finally, the bulletin bears the date 23 December 1903 and so stems from a period in which Kaiser was still working for British Westinghouse: thus, he would have had access to what was otherwise a document expressly intended "for Private Circulation only" and so restricted to

¹³⁴ It is true that, at British Westinghouse, there was a division of labor between the publishing and printing departments: the company's printing presses were located not in London, but at the Trafford Park works (The British Westinghouse Works 1902, 632; The Manchester Geographical Society 1902, 179). However, given that, by the early 1900s, mimeographs were becoming a standard piece of office equipment (Dale & Weaver 1993, 45–48; Delgado 1979, 82–84), it is likely that the London offices of British Westinghouse, as well as the works offices at Trafford Park, had such a machine.

Daily Record

(for Private Circulation only)

No. of Issue 48

LONDON

23 Dec 1903

No. of Items
Quoted Below Only

- 391 AIR BRAKES
Ill. descrip. Christensen & Hewitt & Rhodes air
brakes. Elec. Times, 24XIII (P33-34-925)
- 392 AUTOMATIC LIQUID SWITCH
Descrip. Sandycroft Foundry Co's switch for peri-
odically starting & stopping motors for pumping
machinery, etc. Elec. Rev. London (P30-35-1028)
- 393 COMMERCIAL TRAVELLER IN DISGUISE
A manufacturing firm engages novelist & journalist
to reconnoitre markets of the world for trade
information which is to be absolute property of
employers. (S1-106)
- 394 DYSELECTRON
Invention by JE Reid for getting electricity direct
from any fuel, reducing cost to one sixth. Brook-
lyn Eagle (S1-103) & NY Commercial (S1-104)
- 395 ELECTRIC INDUSTRY, UK
Digest of agreement between Nat. Elec. Contractors'
& Nat. Elec. Mfg. Assos. Elec. Rev. London (P30-35-1025)
- 396 ELECTRIC TRACTION
Short ill. descrip. Danbourned Redrith elec. trolley
twy for carrying ore. Kilnes loco, BTH elec.
equip. Elec. Rev. London, 26XIII (P30-25-1035)
- 397 World's Progress of Steam & Electric Traction,
ED Dunlop. Ry. Mag, 14 (P102-9-72)
- 398 ELECTRIC SWITCHES
HC Woodfin on switch construction, with diag & ta-
bles, details of EP single knife switch. Elec. Rev.
London, 26XIII (P30-35-1045)
- 399 GAS ENGINES
Detailed descrip. of the Lackawanna Steel Co's
plant, Korting gas engines driving GE & Sprague
generators. (E) motors. Power, XIII (P94-8-663)
- 400 LIBRARY ADDITIONS
Daily Mail Year Book 1904, 416pp.
Whitaker's Almanack 1904, 792pp.
Directory of Contractors & Public Works Annual,
1903-4, Wiggan, 495pp.
- 401
- 402
- 403 MOTOR-DRIVEN AIR COMPRESSORS
Descrip. Lacy-Halbert "Boreas" Compressor. Clearance
reduced to minimum by concentric valves. Elec.
Times, 24XIII (P33-34-946)
- 404 RAILWAY SIGNALS
On the Chicago, Burl. & Qcy. RR tests are being made
with JPPeters' Ry Signals which promise to revo-
lutionize present methods. Galtsburg Mail (S1-102)
- 405 SIEMENS-SCHUCKERT
Compagnie Belge d'Electricite formed at Brussels.
Capital £20000. (P30-35-1029)
- 406 STEAM TURBINES
General principles of turbine engine & its pre-
decessor, the Parsons, DeLaval & Curtis engines,
20 years of progress and the present stage of de-
velopment by ECromie & FEHebbek. Wld's Work (S1-105)

Published by [redacted] 17, York Street, London

Figure 2: A mimeographed "daily record", or current awareness bulletin, most likely issued by the British Westinghouse Publishing Department (Source: Kaiser 1908, § 349).

in-house use. Taken by themselves, none of these features would be probative: taken together, they induce the conclusion that the image in Kaiser's book does, indeed, reproduce a document connected with the library kept at the British Westinghouse Publishing Department.

The reproduction of the Daily Record in Kaiser's book sheds some light on the holdings of the British Westinghouse Publishing Department's collection as well as on his work at the department. The bulletin, which represents the 48th issue of a series, contains sixteen entries consisting of items of information derived from newly indexed journal articles or, in three cases, the titles of newly acquired "Library Additions": the list is "arranged in alphabetical order by principal subjects" (Kaiser 1908, §§ 349–50). A perusal of the items enumerated shows that the department received British and American trade journals pertaining to the electrical industry (*The Electrical Times*, *Electrical Review*), engines and machinery (*Power*), and railroads (*Railway Magazine*), (clippings from?) American newspapers and general interest magazines (e.g., *Brooklyn Eagle*, *NY Commercial*, *Galesburg Mail* and *World's Work*), and reference works (*Daily Mail Year Book*, *Whitaker's Almanack*, and the *Directory of Contractors & Public Works Annual*)—all items that one might expect in a library belonging to a concern such as British Westinghouse, which had major interests in electrical and railway engineering (Dummelow 1949, 2–3). As regards the organization of the collection, the call numbers assigned to the individual items indexed, found in all the entries save for those of the library additions, indicate that Kaiser had adopted a version of the format-based document classification and the notational conventions that he would later advocate in his writings (see Chapter 6, Section 3.1, below). The terms for subjects under which the items are entered consist of unitary noun phrases—in effect, they follow the catchword plan that Kaiser would criticize with such vehemence in his works (See Chapter 3, Section 3.3, above): only one of them, "Electric Industry, UK", hints at the system of categorial subdivisions that was the hallmark of SI. The absence of the categorial structure of SI in the subject headings used in the Daily Record does not mean that Kaiser was not utilizing his indexing protocols at British Westinghouse. For one thing, his use of the qualified term "principal subjects" to refer to the subject terms used in the bulletin strongly implies that they represented a simplified form of indexing akin to that of used in library catalogs or card registers (See Chapter 6, Section 3.4, below). Furthermore, one must keep in mind his claim that, after leaving the PCM, he constructed three indexes in accordance to the protocols that he had formulated there (Kaiser 1911, § 20): in light of the

fact that British Westinghouse was the second organizations at which he worked after his departure from Philadelphia, it seems likely that its Publishing Department's index files constituted the second of these.¹³⁵ However this may be, a final point to note is the serial number of the bulletin in question. If, indeed, the British Westinghouse Publishing Department's Daily Record was issued at the rate of periodicity to which its title laid claim, then its first issue would have appeared in mid- to late-October of 1903, a number of months after Kaiser had taken up work at the department. From this, one may infer that he took a hand in introducing the use of the Daily Record there. Although it remains unclear whether he introduced it on his own or was implementing a directive from a superior, his apparent willingness to embrace an innovation such as a current awareness bulletin is consistent with the initiative that he had manifested at the PCM (see Chapter 3, Section 3.3, above).

The meager evidence at our disposal suggests that Kaiser's time at British Westinghouse was a productive one and that he was given considerable scope in organizing the Publishing Department's library. However, his tenure there proved to be of relatively brief duration. At the beginning of December of 1903, W. A. S. Hewins (1865–1931), secretary of the Tariff Commission, a newly forming organization that was to undertake a large-scale economic investigation pertaining to tariff issues, learned that the man he had chosen to serve as indexer for the latter would be unable to do so. This was a cause of considerable concern to him and his colleagues on the Commission: as one of them remarked in a missive to the secretary, "a good man in this place [sci., the position of indexer—TMD] is of great importance" and "I know from personal experience how very difficult it is to find a really

¹³⁵ Lending credence to this supposition are three examples of index items from the series reproduced in *Systematic Indexing*—namely, Kaiser 1911, §§ 463–464 & 483—which share three features in common. First of all, they have 1903—the year during which Kaiser worked at British Westinghouse—as their date of information (on which see Chapter 7, Section 4.3, esp. p. 531, below) and record information published in trade periodicals during that same year: as explained on p. 16, n. 6 above, there is good reason to believe that the original index items were composed shortly after the publications to which they referred came out. Second, they all pertain to subjects—namely, the management of electric cranes; the description of insulating material; and the description of an electric railway in Ohio—that fell within the sphere of interests of the British Westinghouse Company. Third, the extensions of the index items, which tend to take the form of descriptive annotations, all have, at their end, a figure that gives the number of words in the article (See Chapter 7, Section 4.3, esp. pp. 523, Ex. [7.5] & 528, Ex. [7.22], below). This trait distinguishes the three examples in question from all the others in the series and so strongly suggests that they are based on originals taken from a single index. Taken together, the three features of the index items cited above make it highly likely that these latter were ultimately derived from the indexes of the Publishing Department of the British Westinghouse Company. If this inference is just, the index items in question would provide evidence that Kaiser was employing, at British Westinghouse, a version of SI virtually identical to that set forth eight years later in *Systematic Indexing*.

competent man for work of this kind”.¹³⁶ Over the course of the next month, as the Tariff Commission underwent an accelerated organizational gestation, inquiries were made about potential candidates and, by the beginning of the new year, Kaiser had come to the attention of its officers. After interviewing him on the first day of January of 1904, Hewins came away with the impression that “he is a thoroughly competent man with great experience in this sortof [sic] organisation”. Hewins also did not fail to take note of Kaiser’s “knowledge of foreign languages”—a skill that, in his view, “would save a good deal of money in the course of the inquiry”—or his capacity for putting in 16-hour days.¹³⁷ Moreover, as Hewins observed in a letter to a colleague, “I have made enquiries everywhere, but I cannot hear of anybody else who will do, and all my advisers with one accord recommend Kaiser”—an indication that the latter had already achieved a local reputation for his indexing skills within certain circles of the City’s business community.¹³⁸ Hewins had clearly found his man and so, about a year after Kaiser had entered into the service of British Westinghouse (American Society of Mechanical Engineers 1928), he left it to take up work at the Tariff Commission.

¹³⁶ TCP 6/1/26, C. A. Pearson to W. A. S. Hewins, 2 December, 1903.

¹³⁷ TCP 6/1/26, W. A. S. Hewins to C. A. Pearson, 1 January, 1903 [read 1904].

¹³⁸ TCP 6/1/26, W. A. S. Hewins to C. A. Pearson, 1 January, 1903 [read 1904]. In this regard, it is interesting to note that Sir Robert Herbert (1831–1905), former Permanent Under-Secretary to the Colonial Office and the first Chairman of the Tariff Commission, had also served as chair of an advisory board for the CIG and was presumably informed of its operations: could he have been one of the advisers who recommended Kaiser? On Herbert’s involvement with the CIB, Ltd., see, e.g., UKNA BT 31/8875/65304, List of CIB’s shareholders, 19 July 1900; Ditto, 23 December 1904; *The Times*, 21 July 1900, p. 6 (“A new commercial bureau”).

Chapter 5.

At the Tariff Commission, 1904–1911: The Elaboration of Systematic Indexing

5.1. The Tariff Commission: Historical Background and Origins

The wording of the designation “Tariff Commission” may initially bring to mind the image of an official body appointed by the state to conduct a public inquiry into an issue of great moment for the nation’s trade: after all, in 19th and early 20th century Britain, royal commissions were a standard mechanism for undertaking governmental investigations into matters of social and economic importance (Cannon 2009, 561; Fife 2009, 573). However, the Tariff Commission that took Kaiser into its employ at the beginning of 1904 was not a governmental body; rather, it was a privately constituted organization associated with the protagonist of a fierce debate on the fundamentals of trade policy that roiled the British political landscape in the early years of Edward VII’s reign. To understand the nature of the Commission and its mission, it is necessary to consider the historical context within which it emerged.

Ever since the repeal of the agricultural protectionist measures known as the Corn Laws in 1846, the British government had followed a program of free trade in its commercial policy (Bairoch 1989, 13, 25–26; 1896, Smith 1896, 151). Construed in terms of economic theory, this entailed adhering to a “system of commercial policy which draws no distinction between domestic and foreign commodities, and, therefore, neither imposes additional burdens on the latter nor grants any special favours to the former” (Bastable 1896b, 143). Translated into the more concrete terms of practical policy, it meant abolishing customs duties, or tariffs, on certain sorts of imports and keeping others at a low rate so that they might generate revenue for the maintenance of the national government without serving as impediments to the international exchange of goods (Warren 1901, 14–15). The absence of tariff barriers, it was argued, brought economic benefits to the nation: its consumers were not subject to the increases in prices occasioned by the imposition of duties upon imports and so would be able to buy goods cheaply, while its producers, stimulated by open competition from abroad, would be encouraged to make the most efficient use of their labor and capital, and their efforts in this direction would contribute to the material prosperity and further industrial progress of the country (Nicholson 1896, 817 & 820).

For many Victorian observers, the experience of the three decades following the institution of free trade seemed to bear out these claims. The value of Britain’s exports shot

up fourfold in the period between 1842 and 1870 (Friedberg 1988, 29; Thomson 1950, 82–83), while, at home, industrial production expanded and real wages were on the rise (Bairoch 1989, 27–28; McCord 1991, 330). Whether or not these favorable developments were the results of free trade,¹³⁹ many contemporaries believed that they were and this impression became ingrained in the collective memory of the nation. Decades later, a proponent could aver that “[t]he world admits that England has prospered under free trade; indeed, it is difficult to deny this fact ...” (Rogers 1890, 758), while the author of an Edwardian school textbook on modern commerce would assert that “[i]n order to appreciate the benefits which have followed its [*sci.*, free trade’s—TMD] adoption, it is only necessary to point to the vast industrial and commercial development of England during the last sixty years” (Pitman’s Commercial Readers [ca. 1903], 131).

Economic considerations alone did not exhaust the rationale for British adherence to free trade. The policy also embodied some of the cardinal assumptions animating the mid-to-late Victorian political culture of Liberalism. Foremost among these was the idea of *laissez-faire*, with its emphasis on the rights of individual persons and voluntary or co-operative associations to make their own way and its preference for minimal state intervention in those spheres of life capable of self-regulation (Matthew 2010, 522). On this view, freedom from customs duties was perceived as part and parcel of “a liberty of production and exchange ... unfettered by any of the restraints which have been imposed, in order that special industries may be artificially stimulated, by the machinery of a fiscal system” (Rogers 1890, 760) and so made a corollary to political liberty. By the same token, the claim that “[t]he essence of free trade is equality and uniformity in the financial treatment of home, colonial, and foreign produce of the same kind” (Nicholson 1896, 816) not only savored of a cosmopolitanism that reflected Britain’s pivotal rôle in world commerce (Friedberg 1988, 29, with n. 34), but also bespoke an ethos of equality of opportunity and fair play that underwrote wider social ideals of self-help and self-reliance (Matthew 2010, 522). Free trade thus came to be invested with social values and represented, in the eyes of many, not just an economic policy but a sustainer of British civilizational mores.

The continuity between material conditions, economic policy, and politico-cultural ideology gave free trade a tight grip on the public imagination. In the mid-1840s, during the

¹³⁹ Latter-day historians have tended towards skepticism on this score; for a sampling of opinions, see, e.g., the brief review in Marrison 1996, 1–3, adding the comments of Matthew 2010, 528.

run-up to the repeal of the Corn Laws, the central economic argument for adoption of the policy had been that it would lower the price of food—an argument encapsulated in the image of the “cheap loaf”. This potent image proved to have long-lasting resonance. In early Edwardian England, it was associated with a historical *mythos* that the period preceding the abolition of the Corn Laws had been one of unremitting blight and hunger for Britain, in which the populace had to pay high prices for the “dear loaf” occasioned by protectionist measures: it thus functioned as a symbol of the material benefits and economic uplift attributed to a free-trade régime that allowed the British consumer to obtain food relatively cheaply (Trentmann 2008, 34–45, 89). However, it was also mobilized as a metonym for the principles of progress on which the social and political order of the day was understood to rest: as one latter-day commentator has put it, “[t]he ‘cheap loaf’ ... symbolized a pillar of liberal society. It stood for the ‘development of civilization’ and the spread of ‘enlightenment of the masses’, manifestations of free trade’s contributions to human progress under Britain’s providential leadership” (Trentmann 1998, 231). Deeply embedded within a *Weltanschauung* of Liberal progress and popularly associated with material prosperity, the commercial policy of free trade was a well-nigh inviolable touchstone of British political orthodoxy.

Although the doctrine of free trade continued to hold sway in British government circles throughout the 19th century, by the early 1880s, the force of economic circumstance was leading some Britons to harbor doubts about its merits. During the 1860s and early 1870s, a number of countries on the European continent had followed the British lead and begun to move in the direction of free trade and to liberalize their trade policies (Bairoch 1989, 40–43; Cameron & Neal 2003, 292–294). However, the period from the mid-1870s to the mid-1890s proved to be a turbulent one as Europe underwent what some latter-day historians have termed a “great depression” characterized, *inter alia*, by declines in prices, diminution of increase in the volume of exports, and a marked slackening in economic growth (e.g., Bairoch 1989, 45; Cameron & Neal 2003, 296; Friedberg 1988, 35). The general response of continental governments to this parlous situation was to institute protective tariffs, a policy that had already long been in operation in the United States and had been intensified at the outset of Civil War (Cameron & Neal 2003, 296–297; Friedberg 1988, 35; Letwin 1898, 655–666; Zebel 1940, 162–164). This new tide of protectionism did not fail to leave its mark on British industry and trade at a time when the rate of growth of its national economy was, by and large, exhibiting signs of slowing down (Bairoch 1989, 83; Friedberg

1988, 34–35). One effect was the emergence of agitation, in some quarters, for a new, quasi-protectionist policy of fair trade.

In the parlance of contemporary economic theory, the term “fair trade” referred to “commerce on which no restriction is imposed by either party or on which equal restrictions are imposed by both”: in other words, it denoted a condition of reciprocity between trading partners (Bastable 1896a, 13). In Britain, the cause of trade reciprocity was taken up by the National Fair Trade League (NFTL), a political pressure group composed of Conservative Members of Parliament (MPs) and industrialists that was active between 1881 and 1891 (Zebel 1940, 167–182; 1967, 135). Decrying the idea of unilateral free trade, the NFTL called for the imposition of retaliatory tariffs on the manufactured goods of foreign countries levying protective duties on British exports as a means of inducing the countries in question to drop their tariffs (Bastable 1896a, 13; Friedberg 1988, 36; Zebel 1940, 169). It also advocated “[a] very moderate duty to be levied upon all articles of food from foreign countries, the same being admitted free from all parts of our empire, prepared to take our manufactures in reasonably free interchange”.¹⁴⁰ This proposal for duties on comestible goods from all foreign countries, save those within the British Empire willing to countenance some form of intra-imperial free trade, was, in effect, a call for a policy of imperial preference whereby trade advantages were offered to colonies and dependencies with regards to tariff rates. Predicated on the fact that “the only colonial goods that Britain imported were foodstuffs and raw materials” (Green 1999, 355), it was intended to foster closer commercial ties between Britain and her colonies, thus strengthening the bonds of empire as a whole (Bastable 1896a, 13; Zebel 1940, 169, 176). In the late 1880s, the NFTL made a bid to place tariff reform on the agenda of the Conservative party (Zebel 1940, 177–181). Although it failed in this attempt and, shortly thereafter, disbanded, it had given voice to a current of thought that would soon come to occupy a much more prominent place in the political life of the nation.

In the later 1890s, the idea of imperial preference was taken up anew by one of the leading political figures of the day, Joseph Chamberlain (1836–1914). In him, it found a charismatic, energetic, indefatigable, and relentless advocate, one who was no stranger to controversy and inspired devotion and hatred in equal measure. Over the course of his career, Chamberlain had charted a wide-ranging and idiosyncratic course across the British political landscape. Born into a non-conformist family of moderately prosperous

¹⁴⁰ *The Times*, 3 August 1881, p. 12 (“National Fair-Trade League”), quoted in Zebel 1940, 169.

manufacturers in London, he had, as a young man, moved to Birmingham, where he soon made a fortune as manager and co-proprietor of a screw-manufacturing business (Browne 1974, 24–26; Crosby 2011, 7–12). Retiring from commercial life at an early age, he entered into politics as a radical social reformer. After cutting his teeth as an advocate for educational reform, Chamberlain served as mayor of Birmingham from 1873 to 1875, vigorously carrying through a program of civic betterment, the chief planks of which included establishing municipal control over the city’s water supply and clearing slums for civic redevelopment (Browne 1974, 26–30; Crosby 2011, 12–13, 17–20). Elected as an MP for Birmingham in 1876, a position he would continue to occupy for the next thirty-eight years, he cast his lot with the Liberals, quickly assuming a leadership rôle within the radical wing of the party; between 1880 and 1885, he served as President of the Board of Trade—a Cabinet-level position—and, throughout that period, continued to act as a forceful parliamentary advocate for such reformist issues as freedom of education, improved housing for the poor, and the amelioration of living conditions for agricultural workers (Browne 1974, 34–43; Crosby 2011, 27–36).

In 1886, Chamberlain broke with his party over the issue of Home Rule for Ireland on the pretext that granting Ireland its own parliament would inexorably lead to Irish separation from British rule (Crosby 2011, 62). Although his opposition to Home Rule appears to have been fueled as much by his infighting with other leading Liberals as by political conviction (Browne 1974, 49–51; Crosby 2011, 55–68), Chamberlain’s stance was congruent with another aspect of his political *persona*—a deep commitment to the unity, and development, of the British Empire. Already in the early 1880s, he had manifested a favorable disposition towards an assertive imperial policy and an interest in imperial issues: indeed, when, prior to his fallout with the Liberal party, he was offered a new cabinet position at the beginning of 1886, he sought that of Colonial Secretary (Browne 1974, 49 & 88; Crosby 2011, 39–47, 58).¹⁴¹ In the aftermath of the rupture, as Chamberlain became a leading figure among a bloc of fellow expatriates from the Liberal party known as the Liberal Unionists and cultivated alliances with the Conservatives, he continued to nourish his interest in the cause of empire (Fraser 1994, 281, 284, 293–296, 304–306): when, in 1895, he was invited to take a Cabinet post in a new Conservative government, he selected that of Secretary of State for the Colonies (Browne 1974, 52).

¹⁴¹ At all events, he did not get it, but became President of the Local Government Board.

As Colonial Secretary, Chamberlain sought to implement an ambitious program of “constructive imperialism” predicated on “the deliberate adoption of the Empire as distinguished from the United Kingdom as the basis of public policy” (Hewins, 1929, vol.1, p. 56, cited in Green 1999, 347). In general terms, its three primary goals were “to develop the economic viability of the colonies; to consolidate and (where possible) to extend the power of the British Empire; and to create an imperial federation” by tightening the commercial ties among the various component parts of the Empire (Crosby 2011, 112–113). These imperially focused aims were rooted, in large measure, in an acute sense of the challenges posed to Britain by rising powers and a fear that, in the near future, Britain might lose her dominant status in world affairs and markets (see the beginning of Chapter 4, Section 1, above). Chamberlain subscribed to the opinion held by many imperially-minded contemporaries that a major advantage possessed by such economic rivals as the United States and Germany was the size of their territories and their populations, which far outstripped those of the United Kingdom, and that this imbalance could only be countered by means of Empire (Friedberg 1988, 30–33; Green 1995, 195; 1999, 348–349). On such a view,

[t]he British isles as such might be too small to compete economically with the new monolithic superstates. But if Britain could forge its empire into a single commercial unit (albeit one made of widely scattered components), the country would be a match for all comers (Friedberg 1988, 46).

In addition to buttressing Britain’s position as a world power, consolidation of the inner commercial bonds of Empire could also serve to counteract the centrifugal tendency of self-governing colonies, such as Canada or Australia, to chart their own economic courses—a tendency troubling to Chamberlain, since it opened up the possibility that they would fall into the economic ambit of rival powers, thus fragmenting the Empire and weakening Britain’s position in the world (Cain 1979, 40; Green 1995, 196–197; 1999, 353–354). Intensifying the commercial links between Britain and the colonies was thus, in theory, a concrete means of bolstering imperial unity through the creation of shared economic interests: as Chamberlain memorably put it, “we must draw closer our internal relations, the ties of sentiment, the ties of sympathy—yes, and the ties of interest”.¹⁴²

Over the course of his time in the Colonial Office, Chamberlain sought to steer British colonial policy towards his plans for commercial unity. His initial attempt did not meet with success. In 1896, he proposed the creation of an imperial *Zollverein*, or imperial customs

¹⁴² J. Chamberlain at Birmingham, 16 May 1902, quoted in *The Advertiser*, 24 June 1902, p. 8 (“A Preferential Policy”).

union. On this plan, “[w]ithin the limits of the empire there would be ‘free trade,’ but each of its elements could impose whatever duties seemed suitable on the products of foreign powers”, with Britain raising tariffs on foreign goods—primarily comestibles—competing with the products of the colonies (Friedberg 1988, 48; Zebel 1967, 139–140). At the third Colonial Conference, held the following year, this proposal was rejected by the Colonial premiers, who were reluctant to subject their manufacturing industries to British competition (Cain 1979, 40). However,

[w]hat the colonies wanted, and what they pressed on Chamberlain ... was a system of mutual preferences which would give them a securer foothold in the British market for their foodstuffs while in return they discriminated in favour of British exports in their own markets (pp. 40–41).

Imperial preference would henceforth be Chamberlain’s policy of choice for strengthening the economic bonds between Britain and her colonies, even though it manifestly clashed with hallowed governmental traditions of free trade.

A second wave of efforts to bring about a policy of imperial preference ensued. A first concrete step in this direction was taken on colonial initiative in 1897, when Canada unilaterally instituted a policy of preference with regard to British imports, reducing their tariff rates by 12.5 % (Crosby 2011, 165; Zebel 1967, 141). This concession was followed by further reductions over the next few years, but without any requital from the British side. The fourth Colonial Conference, held in London in 1902, ratcheted up pressure to take action on the issue. For one thing, the colonial premiers manifested an increasing enthusiasm for the idea of imperial preference: the Conference adopted resolutions affirming the desirability of the policy and recommending that it be adopted by those colonies that had not done so (Bairoch 1989, 112–113; Browne 1974, 92–93). More urgently, Canada served notice that it would not continue to give preferential treatment to British goods “unless there were a reciprocal response” (Crosby 2011, 165; cf. Browne 1974, 93).

At this critical juncture, Chamberlain seized upon a recent fiscal development in an attempt to effect reciprocity. In order to offset the heavy costs of the ongoing Boer War, the Chancellor of the Exchequer—the cabinet minister charged with setting the national budget—had instituted, in the spring of 1902, a Corn Registration Duty of 1 shilling a quarter (= 28 pounds) on all imported grain (Friedberg 1988, 51–52; Zebel 1967, 142). Although this tariff had been conceived as a temporary revenue-generating measure, Chamberlain urged that it be made permanent, with an exemption to be made for Canada

(Browne 1974, 64). The calculation was twofold: not only would the enactment of such a measure meet Canadian demands, but it would also provide an opening that might lead to a more generalized policy of imperial preference (Judd 1977, 235). In the autumn of 1902, Chamberlain made a case for his proposal to the Cabinet and, despite strenuous opposition from the new Chancellor of the Exchequer, a fervent proponent of free trade to whom such a preferential tariff was anathema, won provisional approval for his plan (Zebel 1967, 144–146). However, in the spring of 1903, while Chamberlain was on a tour to South Africa to survey the results of the recently concluded Boer War, the Chancellor took up the issue again and orchestrated a reversal of the original decision: the corn duty was duly dropped, reciprocity for Canada went into abeyance, and imperial preference remained a policy on paper alone (Friedberg 1988, 54; Zebel 1967, 145–146).

In the wake of this disappointing defeat, which underlined the softness of support for Chamberlain's pet scheme among his colleagues and reflected the hold of free trade thought in government circles, he undertook to mount a public campaign on behalf of imperial preference in a bid to win public approval for it and so to force the government's hand on the issue (Browne 1974, 65). In the middle of May 1903, he fired an opening salvo in a speech at Birmingham, in which he called for "a discussion ... [to] be opened" regarding reciprocity for the colonies and proceeded to initiate it with a ventilation of his own views on the matter.¹⁴³ "My idea of British policy", he intoned, "is that ... we should show our cordial appreciation of the first step to be taken by our Colonies to show their solidarity with us": "[i]f they see a way of drawing the Empire together let us help them in that".¹⁴⁴ The mechanism for "drawing the Empire together" was none other than "the offer of preferential tariffs" bestowed by Canada, to which other colonies had given assent.¹⁴⁵ It was necessary to confront the contentious issue of tariffs, Chamberlain averred, for "the question of trade and commerce is one of the greatest importance. Unless that is satisfactorily settled, I for one do not believe in a continued union of the empire".¹⁴⁶ If the Empire were to endure and Britain to keep its status as a world power, the government had to take an active hand in strengthening the trade relations between the mother country and her colonies:

¹⁴³ J. Chamberlain at Birmingham, 15 May 1903, in Gilmour 1903, 13.

¹⁴⁴ J. Chamberlain at Birmingham, 15 May 1903, in Gilmour 1903, 8 & 10.

¹⁴⁵ J. Chamberlain at Birmingham, 15 May 1903, in Gilmour 1903, 9.

¹⁴⁶ J. Chamberlain at Birmingham, 15 May 1903, in Gilmour 1903, 6.

I say that it is the business of British statesmen to do everything they can, even at some present sacrifice, to keep the trade of the Colonies with Great Britain[,] to increase the trade, to promote it, even if in doing so we lessen somewhat the trade with our foreign competitors.¹⁴⁷

Although Chamberlain carefully couched his discourse in general, patriotic tones and was careful not to issue any explicit policy proposals, the challenge to the fiscal *status quo* was unmistakable: the venerable free trade policy of not discriminating between colonial and foreign commodities in the matter of customs duties was to be given up for a preferential tariff régime favoring the colonies.

Chamberlain's challenge resounded like a thunderclap within the British political establishment and immediately ignited heated debates in both press and parliament about the merits of tariff reform (Marrison 1977, 216). Over the summer months, as the top levels of government struggled to come to some measure of agreement about what course of action to take on an issue that sharply divided members of the Cabinet (Friedberg 1988, 54–68), Chamberlain and his supporters began to float more specific ideas about his plans for a tariff (Marrison 1996, 27–29), while pressure groups were formed to mobilize support for the cause, the most prominent and influential of which was the Tariff Reform League (Bairoch 1989, 87; Fraser 1994, 568–569; Thompson 1997, 1036–1037; Zebel 1967, 153–154). However, it was not until Chamberlain resigned from his position as Colonial Secretary in mid-September that the campaign intensified in earnest.¹⁴⁸ From October through December, Chamberlain toured England and Scotland, delivering a number of major speeches, in which he outlined his program for tariff reform in somewhat greater detail (Crosby 2011, 170–172). Calls for imperial unity and arguments for imperial preference continued to be *Leitmotifs* of these speeches; however, Chamberlain also began to spell out his policy in greater detail. Preferential tariffs in favor of the colonies would require placing duties on foodstuffs—a measure that, according to the doctrines of free trade, would raise food prices and so contravene the popular ideal of the cheap loaf.¹⁴⁹ However, Chamberlain argued, by judiciously combining tariffs on assorted agricultural products with remissions on duties for such staple products as tea, coffee, cocoa, and sugar, it would be possible to offset the rise in prices of the former with the fall in prices of the latter: in other words, one could institute a régime of preferential tariffs without adversely

¹⁴⁷ J. Chamberlain at Birmingham, 15 May 1903, in Gilmour 1903, 6–7.

¹⁴⁸ For discussion of the political calculations that led Chamberlain to resign, see Browne 1974, 66–67; Crosby 2011, 168–169.

¹⁴⁹ J. Chamberlain at Glasgow, 6 October 1903, in Gilmour 1903, 39.

affecting the cost of living for the British populace.¹⁵⁰ To this end, he sketched out a preliminary conspectus of agricultural tariffs that, he claimed, would fulfill these ideal conditions.¹⁵¹

At the same time that he was fleshing out his scheme for imperial preference, Chamberlain developed another, protectionist theme that had hitherto remained largely—though not entirely—in the background: the imposition of tariffs on manufactured products (Marrison 1977, 218–221; 1996, 28). Warning that “it is not well to-day with British industry”, he argued that, in recent decades, the growth rate of British exports of products “has been practically stagnant” while that of its industrial competitors had markedly increased.¹⁵² Furthermore, he claimed, Britain’s rivals were making inroads on her home markets: “while our exports to them have been continually decreasing, their exports to us have been continually increasing”.¹⁵³ The decline in growth of British exports abroad he attributed to the protective tariffs maintained by Britain’s competitors, the effect of which, in his view, was to shut out British products in favor of domestic manufactures.¹⁵⁴ As for the increase of foreign imports into British markets, Chamberlain also connected it to the protectionist policies of Britain’s foreign rivals. His argument was that, having built up their industries behind tariff barriers and achieved high levels of production, they were now offering bounties—i.e., state subsidies—to their manufacturers as incentives to export their wares and engaging in the predatory practice of dumping—i.e., selling their surplus goods below cost of production in markets overseas.¹⁵⁵ Inasmuch as England was the only industrial nation adhering to the open-door policy of free trade, its markets formed a natural target for competitor nations looking to dump off their excess products abroad.¹⁵⁶ This, in Chamberlain’s view, had deleterious, and potentially dire, effects upon British industry, for an influx of cheap products would reduce demand for their domestic

¹⁵⁰ J. Chamberlain at Glasgow, 6 October 1903, in Gilmour 1903, 39–42.

¹⁵¹ J. Chamberlain at Glasgow, 6 October 1903, in Gilmour 1903, 40. This entailed a tariff of 2 shillings a quarter on corn, a duty of “about 5 per cent. on foreign meat and dairy produce”, and “a substantial preference to our colonies on colonial wines, and perhaps on colonial fruits”: maize and bacon were exempted on the grounds that these foods were especially popular with “the poorest of the population”. As for the remissions, Chamberlain proposed “to take off three-fourths of the duty on tea, and half of the whole duty on sugar, with a corresponding reduction on cocoa and coffee”.

¹⁵² J. Chamberlain at Glasgow, 6 October 1903, in Gilmour 1903, 30 & 31.

¹⁵³ J. Chamberlain at Greenock, 7 October 1903, in Gilmour 1903, 49.

¹⁵⁴ J. Chamberlain at Greenock, 7 October 1903, in Gilmour 1903, 47.

¹⁵⁵ J. Chamberlain at Greenock, 7 October 1903, and at Liverpool, 27 October 1903, in Gilmour 1903, 50, 53–54, 215–216, 227.

¹⁵⁶ J. Chamberlain at Greenock, 7 October 1903, in Gilmour 1903, 52.

counterparts, thus subverting key sectors of home manufacturing and sapping the industrial strength of the nation as a whole.¹⁵⁷ The retention of a free trade policy in the face of these developments, would inevitably lead to industrial and commercial decline for Britain; the remedy was to abandon it and introduce tariffs on foreign manufactures as protection and retaliation.¹⁵⁸ Chamberlain suggested a rate of approximately 10 %, which, he averred, would yield £ 9,000,000 in revenues to the state, more than enough to counterbalance the shortfall of £ 2,800,000 that, according to his estimation, would result from his proposed remissions of duties on staples.¹⁵⁹ Combining a protectionist tariff régime on industrial products with a preferential tariff for colonial foodstuffs, he maintained, would aid domestic industries, strengthen markets at home, enhance the national revenue, and assure Britain's standing on the world stage by intensifying trade relations between her and her various colonies.

Although still very much in a process of evolution, Chamberlain's new, more detailed proposals offered a firmer basis for public discussion. This, however, continued to flow largely in partisan grooves, as spokesmen for free trade launched attacks on the validity of the statistics he had used as the basis for his pessimistic assessment of the course of British trade and called into question his analysis of the effects of his proposed tariffs upon the British economy (Marrison 1977, 226–227; 1996, 30–31). As the public debate on tariff reform became more and more convoluted in the autumn of 1903, it also seemed to be becoming more and more inconclusive. Neither tariff reformers nor free traders were able to muster knock-down arguments for their respective positions, while their conflicting interpretations of statistical data and historical examples only served to cast doubt upon both the information they were using and their methods of interpreting it (Coats 1968, 206–208; Fraser 1994, 588–589; Marrison 1996, 33). Such a state of stasis posed a greater danger to the cause of tariff reform than to that of free trade, for the onus of convincing the British public of the need to alter a national trade policy lay squarely on the shoulders of Chamberlain and the supporters of his proposals: if they could not give the public “an unequivocal demonstration of the superiority of the new policy”, it would doubtless rest content with the default position of free trade, which enjoyed a *de facto* warrant in “the habits, practices, and conditioning of the previous half-century” (Marrison 1996, p. 33).

¹⁵⁷ J. Chamberlain at Greenock, 7 October 1903, in Gilmour 1903, 52–55.

¹⁵⁸ J. Chamberlain at Greenock, 7 October 1903, in Gilmour 1903, 55.

¹⁵⁹ J. Chamberlain at Glasgow, 6 October 1903, in Gilmour 1903, 42–43.

There was also concern among some of Chamberlain's more farsighted allies that, even if he should succeed in converting the public to his views and tariff reform were taken up in earnest by the government, the further development of his policy "would be stifled by the inquiry which would necessarily take place before it could reach the House of Commons stage" (Hewins, 1929, Vol. 1, 73). In their estimation, the various government departments "were not ready for such a great enterprise as the organisation of a tariff" on account of the relative "deficiency of information" regarding the issue: in the course of an official inquiry, "[d]ifferences would develop" among them, thus dissipating any momentum for adoption of Chamberlain's proposals (The Tariff Commission 1922, p. [1]; Hewins 1929, Vol. 1, 73). This fear was not unfounded, for official inquiries ran the risk of breaking down along partisan lines, were often dilatory in their manner of proceeding, and not infrequently led to recommendations that were inconclusive or were simply not acted upon (Cannon 2010, 561): in fact, Balfour, the current Prime Minister, who personally inclined towards a much milder form of tariff reform than Chamberlain was advocating (Friedberg 1988, 62–68), had resisted repeated calls to convene a Royal Commission on the issue on these very pretexts (Coats 1968, 204). The need to cut through an increasingly fruitless political debate, to provide more conclusive arguments for tariff reform based on better information than what was currently available, and to develop tariff schedules outside of the constraints of a governmental inquiry provided the conditions of possibility for the formation of the Tariff Commission.

The idea of a Tariff Commission emerged from a discussion in late October of 1903 between two leading supporters of tariff reform, the economist W. A. S. Hewins, who had been participating in press debates on the economics of protectionism and was acting as an informal economic adviser to Chamberlain (Hewins 1929, Vol. 1, 66–72), and Sir Vincent Caillard (1856–1930), an imperially-minded financier who was, at the time, sitting on the boards of directors of the National Bank of Egypt and the prominent arms manufacturer Vickers, Sons, & Maxim (Davenport-Hines 2004, 443). Early in November, Caillard put Hewins, who appears to have been the *primus movens* of the idea, in touch with the newspaper magnate C. A. Pearson (1866–1921) who was, at the time, serving as chairman of the Tariff Reform League (McKernan 2004, 310); the latter communicated the idea to Chamberlain, who almost immediately gave it his *imprimatur* and asked Hewins to serve as secretary of the proposed commission, an offer that was finalized on 17 November (Hewins 1929, Vol. 1, 73–74, 77; Marrison 1996, 49). By the middle of the month, Hewins had drawn

up a memorandum outlining the scope and methods of the commission, which was accepted by Chamberlain, and throughout the rest of November and early December, the new organization began to recruit members (Hewins 1929, Vol. 1, 75–79; Marrison 1996, 50–52). In mid-December, the process of organization had proceeded to a point that a formal public announcement of its existence could be made.

On 16 December, in a speech delivered in Leeds, Chamberlain announced, “amid an intense hush” according to one contemporary witness, the creation of the new commission and briefly limned its agenda:

I am going to make a statement of some importance, as I think it will prove in the future We are going to form, we have gone a long way in the direction of forming, a commission—not a political commission, but a non-political commission of experts—to consider the conditions of our trade and the remedies which are to be found for it. ... This commission will comprise leading representatives of every principal industry and of every group of industries, representative of the trade of India and the Crown Colonies and the great self-governing Colonies. ... It will invite before it witnesses from every trade, and it will endeavor, after hearing all that can be said, not merely in regard to the special interests of any particular trade, but also in regard to the interests of all the other trades which may be in any sense related to it—it is going after that to frame a model tariff.¹⁶⁰

Chamberlain made grand and sweeping claims for the work of the new commission. After an extensive investigation into the commercial condition of various British industries that would consider evidence going well beyond the standard sets of statistical sources—trade returns and so on—traditionally invoked in debates about fiscal policy (Friedberg 1988, 44–45), this body, whose members were men of wide experience in various fields of industry and commerce, would formulate a proposal for a tariff. The resultant proposal, according to Chamberlain, would constitute nothing less than a “scientific tariff”, a concept that he glossed in the following hortatory terms:

Let us make a tariff, if that be possible—and I think it is—a scientific tariff. ... Let us make a tariff, if that be possible—and I think it is—which shall add not one farthing to the burden of any taxpayer, but which by the transference of taxation from one shoulder to another, or from the shoulders to the back, may not only produce the same amount of revenue which will always be necessary for our home expenditure, but may incidentally do something to develop and extend our trade.¹⁶¹

¹⁶⁰ J. Chamberlain at Leeds, 16 December 1903, quoted in *The Times*, 17 December 1903, p. 10 (“Mr. Chamberlain’s campaign: speech at Leeds”).

¹⁶¹ J. Chamberlain at Leeds, 16 December 1903, quoted in *The Times*, 17 December 1903, p. 10 (“Mr. Chamberlain’s campaign: speech at Leeds”).

As this passage indicates, a scientific tariff was, within the framework of Chamberlain's political rhetoric, one that had been designed in such a way that, no matter what its specific effects upon prices and production costs in different sectors of the complex British economy might be, "everyone would benefit, or at least would not be harmed" by it and, as a whole, British trade would be improved (Marrison 1996, 37):¹⁶² in more crassly political terms, it would be a tariff engineered to please all possible constituencies (Green 1995, 21 & 194). Yet the qualifier "scientific" also carried with it all the connotations traditionally associated with science as a mode of inquiry and so implied that the model tariff formulated by the commission would be the fruit of a process of investigation characterized by impartiality in approach, rigor in methodology, and accuracy in the description and analysis of the industrial and commercial phenomena being examined. Chamberlain's choice of phrase thus insinuated that the commission's investigative work would yield a new and trustworthy basis on which to erect a new tariff régime that would both strengthen the British economy and unite the Empire on the basis of shared commercial interests.

5.2. The Tariff Commission and Its Investigative Activities

Chamberlain's campaign for tariff reform had provided the impetus for the creation of the Tariff Commission (hereafter, Commission) and, as honorary president of the new organization (Tariff Commission 1904, § 1), he functioned as its symbolic leader. However, in practice, the conceptualization, implementation, and management of the Commission's investigative activities fell primarily upon the shoulders of its secretary, Hewins. An economist committed to a historicist, inductive approach to the subject and an experienced academic administrator who had resigned the directorship of the London School of Economics in order to devote himself fully to the Commission's work (Howe 2004, 919; Koots 1987, 161–174), Hewins, in consultation with Caillard, Pearson, and other colleagues, formulated a plan of inquiry that, he claimed, was "strictly impartial, practical and scientific"

¹⁶² This idea had already occurred in an earlier speech under the guise of "scientific taxation": "Now the principle of all this policy [sci., tariff reform—TMD] is that, whereas your taxation now [sci., duties under a free trade régime—TMD], whether it be on food or anything else, brings you revenue and nothing but revenue; the taxation which I propose, which will not increase your burdens, will gain for you trade, employment—al that we most want to maintain the prosperity of our industries. The one is profitless taxation, the other is scientific taxation"; J. Chamberlain at Glasgow, 6 October 1903, in Gilmour 1903, 43.

in nature.¹⁶³ Taking the tariff rates proposed by Chamberlain in his earlier campaign speeches as a baseline, Hewins defined the object of the inquiry to be the determination of

- “[t]heir probable effect on present [sci., economic—TMD] conditions”;
- “[w]hether any modifications are desirable, and, if so, what should be the nature of such modifications, having due regard to the general interests of the community”;
- “[t]he best way in which, where there are conflicting interests, those interests can be harmonized”;
- “[w]hat duties, if any should be recommended” (Tariff Commission 1907a, p. [1]; Tariff Commission 1904, § 2).

As a first step toward constructing a scientific tariff, it was necessary “to obtain a complete and impartial description of the conditions of which ... to take account in estimating the probable effect of Mr. Chamberlain’s proposals” (Tariff Commission 1904, § 3). Acknowledging the pluralistic and interdigitated nature of the British economy and well aware that tariffs would have differential effects across different industries, Hewins held that the inquiry should consist of a series of investigations of the commercial conditions obtaining in the major British trades (or, in modern parlance, industrial sectors): this would allow the Commission not only to learn how each trade was faring and what its specific requirements were with regard to tariffs, but also to identify conflicts of interest that would have to be harmonized across different industries.¹⁶⁴ Information regarding each trade was to be gathered in three different ways: reviews of the pertinent published literature would be undertaken; a survey of as many British firms as possible by means of forms of inquiry, or questionnaires, would be conducted; and representative witnesses would be invited to give testimony, *viva voce*, before the Commission.¹⁶⁵ When the information had been collected and subjected to analysis, the Commission would publish a series of reports, one on every industrial sector that it had investigated: these industrial reports would pave the way to the compilation of a Final Report, which would synthesize their conclusions and set forth the model schedules of the scientific tariff (Bennett 1981, [8]–[9]).

¹⁶³ TCP 8/2/9 B88, “The Tariff Commission. Its Methods of Inquiry. Explained by Mr. W. A. S. Hewins.” Typescript of unpublished lecture presented to the Middlesbrough Chamber of Commerce, March 22, 1904, p. 13.

¹⁶⁴ TCP 8/2/9 B88, “The Tariff Commission. Its Methods of Inquiry. Explained by Mr. W. A. S. Hewins.” Typescript of unpublished lecture presented to the Middlesbrough Chamber of Commerce, March 22, 1904, pp. 6–7.

¹⁶⁵ TCP 2/1/5, Printed Minutes of Tariff Commission’s inaugural meeting, 15 January, 1904, pp. 9–11 (“Methods of Inquiry”); see also Hewins 1929, 75–76; Marrison 1996, 119.

The tasks of inquiry that Hewins and colleagues mapped out were distributed among the different elements of the Commission as an organization, of which there were two primary ones: the Commission proper and the permanent staff supporting it. The Commission proper, which originally counted 59 members (not including Chamberlain), consisted of agriculturalists, colonial agents and other representatives of imperial interests, and, most numerous of all, businessmen from a spectrum of industries ranging from mining, iron and steel, engineering, and chemicals through food processing and various sorts of specialized manufactures (boot-making, leather-ware, glass-making, etc.) to retail distribution and shipping (Marrison 1996, 436–440; Tariff Commission 1904, § 1).¹⁶⁶ Headed by a chairman (Sir Robert Herbert until his death in 1905 and, thereafter, Caillard) and a vice-chairman (Pearson), the Commission was articulated into a General Purposes Committee, the purpose of which was “to prepare the business for each Meeting, to settle the records of transactions, and generally to carry out the decisions and directions of the Commission”, as well as occasional special committees formed to oversee investigations into particular branches of industry.¹⁶⁷ Based in London, the Commission proper met regularly to discuss such details of method as the wording of the questionnaires; to receive updates about, and comment on, the progress of the various investigations; and, perhaps most important, to hear the oral testimony of witnesses about trade conditions in the branches of industry under study (Bennett 1981, [5]). Needless to say, being a member of the Commission proper was not a fulltime commitment for the individuals who belonged to it: a number of members attended only those sessions that featured discussions pertaining

¹⁶⁶ A very rough indication of the relative weight of the different constituencies within the Commission can be gleaned from Marrison’s (1983, 151 & 157, Table 2; 1996, 61 & 67, Table 3) classification of the *primary* interests of the members, which yields 2 agriculturalists, 8 colonial agents and men with imperial connections, 47 representatives of industrial or commercial interests, and 2 men with “miscellaneous” interests: among the 47 industrialists, 7 were associated with food processing, 7 with engineering, 6 with textiles, 6 with distribution, 4 with chemicals, 3 with shipping, with all other trades having one representative. However, as Marrison (1983; 1996, 56–78) points out and documents in detail, a number of the Commission’s members had multiple business interests cutting across various industrial fields and some combined business positions with colonial connections: once one takes these *secondary* interests into account, it becomes much more difficult to assess what particular interests, if any, held particular sway among the organization’s members.

¹⁶⁷ TCP 2/1/5, Printed Minutes of Tariff Commission’s inaugural meeting, p. 5; Hewins 1929, Vol. 1, 81; Tariff Commission 1904, § 4. The special committees could, at their discretion and with the assent of the General Purposes Committee, include specialist members who were not otherwise members of the Commission. Thus, for example, both the Agricultural Committee and the Textiles Committees included a number of individuals who were not Commission members (Bennett 1981, [6]; Tariff Commission 1905a, § 2; 1906, §§ 2–7): in fact, most of the members of the Agricultural Committee were *not* members of the Commission proper.

to the industries with which they were involved and, over time, both the frequency of the meetings and attendance tended to fall off (Bennett 1981, [6]; Marrison 1996, 220–221).

While the Commission proper served as the public face of the organization, the day-to-day work of the Commission was carried out behind the scenes by a permanent staff. Occupying quarters at 7 Victoria Street, in the same building that housed the offices of the Tariff Reform League, this staff was composed, in mid-1904, of three quarterly employees—Hewins; Percy Hurd (1864–1950), a journalist who served as assistant secretary (Bennett 1981, [6]); and Kaiser, who held the post of librarian (American Society of Mechanical Engineers 1928)—as well as a pool of weekly employees—mainly “clerks, typists, indexers, and collators”—whose number varied between 14 and 16 (Marrison 1996, 128);¹⁶⁸ in short order, a full-time statistician was added to its ranks (Bennett 1981, [6]; Marrison 1996, 128, n. 42). Under Hewins’s leadership, the permanent staff was responsible for managing the considerable paperwork that supported the Commission’s activities. At the most basic level, this involved such routine matters as dealing with correspondence and preparing the agendas, minutes, and drafts of forms of inquiry and questions for *viva voce* witnesses that were sent to members prior to each meeting (Bennett 1981, [6]). However, the staff also carried out much of the Commission’s research work. It arranged for the distribution of forms of inquiry to British firms by mail and received those that were returned; it also collected transcripts of oral testimony taken down at the meetings of the Commission proper as well as pertinent published literature on the subjects of the report. All of these documents were analyzed, abstracted, indexed, and filed at the Commission’s offices; the information culled from them formed the basis for the drafts of reports as well as smaller-scale memoranda that were prepared and submitted to the Commission proper for discussion (Bennett 1981, [6]; Marrison 1996, 126). Hewins and his assistants also made arrangements for the publication and distribution of the Commission’s publications (Marrison 1996, 128–133). This activity was funded by donations and subscriptions from individuals and firms sympathetic to the protectionist cause, including members of the Commission proper: apart from Hewins’s salary, which appears to have been guaranteed by

¹⁶⁸ TCP 9/1/6, Weekly Salaries Book, entries for July–December 1904. Over the years, there was some fluctuation in the number of the weekly staff: the peak reached was 31 in late December of 1905 and early January of 1906, a time of intense work on the preparation of several reports (cf. Marrison 1996, 129, who, however, gives the number as 32). Typically, however, the number tended to hover between 13 and 17, at least in the period between 1903 and 1909, with lower totals in subsequent years.

the Tariff Reform League, none of the Commission's monies were derived from political or propaganda organizations (Bennett 1981, [4]–[5]; Marrison 1996, 49, 133–136).

Such, then, were the mission and organizational structure of the Tariff Commission. Needless to say, there was a palpable tension between the Commission's manifest allegiance to the cause of tariff reform and its leaders' insistence that the inquiries that it undertook were of an "impartial" and "scientific" nature. The former aspect of the organization's character threatened to undermine the credibility of its investigation, especially in the eyes of proponents of free trade, who did not hesitate to paint the Commission as "a tribunal starting with preconceived opinions, and pledged, beforehand, to a particular conclusion".¹⁶⁹ Hewins sought to counter such critiques by claiming that the aim of the Commission was not to adjudicate, once and for all, the relative merits of free trade *versus* protectionism, but rather, taking as a hypothesis that Chamberlain's proposals for tariffs were a plausible practical response to the effects of foreign competition upon the British economy, to determine what an optimal tariff régime would look like (Marrison 1996, 36–37). With respect to the methodological implications of adopting Chamberlain's suggested tariffs as a point of departure for the Commission's inquiry, he argued that the content of the hypothesis adopted for a given investigation did not determine the rigor with which the investigation was prosecuted or the validity of its findings: "it does not seem to me to matter very much, so long as the supposition is perfectly definite, what hypothesis you take to start with, so long as you organise the inquiry thoroughly".¹⁷⁰ Moreover, he claimed, the Commission's attitude to its inquiry was marked by a lack of any prepossession as to its ultimate outcome, a point upon which he elaborated at length in a public talk about the Commission's method of inquiry which he addressed to the Chamber of Commerce in the North Yorkshire town of Middlesbrough in late March of 1904:

The view that the Commission has consistently taken from its very first meeting is this—that we do not want people's opinions on these matters [sci., the fiscal question—TMD]. You want business facts upon which opinions may afterwards be formed if you like, but you do not want opinions. We do not want somebody to say in my opinion you should do this, that and the other; what we do want are facts relating to each particular business which when combined with other information will enable us to form an opinion. ... [T]he Tariff Commission at present, most certainly is not considering what rate of duty shall be put upon commodities. It is

¹⁶⁹ *The Standard*, 17 December 1903, p. 6 (editorial), cited in Marrison 1996, 35 at n. 55.

¹⁷⁰ TCP 8/2/9 B88, "The Tariff Commission. Its Methods of Inquiry. Explained by Mr. W. A. S. Hewins." Typescript of unpublished lecture presented to the Middlesbrough Chamber of Commerce, March 22, 1904, p. 5.

collecting information in as thorough and scientific a manner as we can devise. Whether the evidence when it is collected will point to definite recommendations I am sure I do not know at the present time and I am sure nobody knows. If you ask me whether we are going to adopt a highly protective tariff a moderate tariff or no tariff at all I do not know. I will tell you when I have got the evidence in, but I can not tell you at the present time. Therefore ... what I claim for the Commission is that it is doing its work on strictly impartial, practical and scientific lines. I think you will find that is the only way in which such a body can do its work. I claim it is a strictly scientific method.¹⁷¹

Although Hewins's insistent emphasis upon the Commission's objectivity and impartiality in this passage was crafted to make a rhetorical point and involved an element of public relations, it is likely that his statements reflected his genuine methodological aspirations for the series of investigations that his organization had undertaken.

If such was the case, the conduct of the inquiry did not match these lofty goals. For one thing, the line separating facts from opinions can be a very thin one and, as we shall presently see, a number of the questions in the forms of inquiry sent out to business concerns were phrased in such a way as to encourage respondents to coningle the two in their responses: thus, the information that was collected and utilized in the course of the inquiry was not, by any means, restricted to objective "facts" alone (Bennett 1981, [7]; Marrison 1996, 121, 126–127; Chapter 5, Section 3, below). For another, the ways in which witnesses were selected to give oral evidence before the Commission—which ranged from recruiting attendees at meetings between Hewins and local businessmen arranged by Committee members, through accepting delegates named by trade associations wishing to cooperate with the Committee, to inviting individuals on the basis of the "quality" of their replies to the questions in the forms of inquiry—tended to favor witnesses harboring protectionist views at the expense of those with a sympathy for free trade (Marrison 1996, 122–125). Furthermore, Hewins's (1929, Vol. 1, 76) claim that the Commission was "concerned ... solely with obtaining from the business community facts which would enable us to give a clear and accurate description of the conditions prevailing in every trade" tended to foreground the rôle of description and to minimize that of interpretation in the course of the inquiry. Contrary to his assertion that the initial hypothesis would not affect

¹⁷¹ TCP 8/2/9 B88, "The Tariff Commission. Its Methods of Inquiry. Explained by Mr. W. A. S. Hewins." Typescript of unpublished lecture presented to the Middlesbrough Chamber of Commerce, March 22, 1904, p. 11, 13. See also TCP 6/1/13, Hewins to Leverton Harris, 15 November 1905 (cited in Marrison 1996, 125): "[T]he Commission are alone interested in obtaining the facts with respect to each industry without regard in any way to the views which firms or witnesses may happen to hold on fiscal or other questions".

the rigor or impartiality of the investigation, the Commission's findings were, to a large extent, conditioned by a theoretical framework that decidedly tilted the scales in favor of the assumptions held by Hewins and his colleagues about the need for tariff reform (Marrison 1996, 126–127). Thus, for all the talk of scientific rigor, the Commission's investigations were by no means a dispassionate or impartial undertaking: as one recent commentator has aptly put it, “[h]ere was academic appearance without academic detachment, the spirit of enquiry without the discipline to control preconception” (p. 127). Indeed, there was, in many ways, an unmistakably propagandist element in the Commission's activities, which became more pronounced over time (pp. 136–138, 216).

At the outset of the Commission's inquiry, its protagonists had believed that the project would be dispatched in fairly short order. Hewins, for one, initially estimated that the investigation would take no more than three years to complete and, as early as April of 1905, the assistant secretary Hurd was being advised to seek a position elsewhere on the grounds that the Commission's work would soon be finished (Marrison 1996, 117–118). However, these expectations turned out to be decidedly over-optimistic, for the work ended up dragging on over a number of years and, in the end, the Commission did not achieve its goal of producing a plan for a scientific tariff.

A major factor in the Commission's failure to realize its aims was the marked change in the general political environment that took place within a few years of its foundation. Hewins and his colleagues had undertaken their inquiry in the expectation that, spurred by Chamberlain's tireless campaigning, the Liberal Unionist and Conservative coalition would soon win a popular mandate to implement tariff reform and that the Commission's model tariff would provide the blueprint for his policy. However, in the first general parliamentary elections after the Commission's work began, which were held in January of 1906 at the conclusion of a hard-fought campaign in which the issue of tariff reform held center stage, the Liberal Unionists and Conservatives suffered a crushing defeat at the hands of the Liberals and their allies, who had extolled the virtues of free trade and presented themselves as protectors of the cheap loaf (Crosby 2011, 179; Fraser 1994, 630–631). Although this electoral rebuff of Chamberlain's program moved the possibility of implementing a régime of tariff reform into a more remote future, it does not appear to have slowed the momentum of the Commission's activities, at least initially. With Chamberlain's encouragement, work on producing industry reports continued apace and Hewins harbored

hopes that the publication of a full series of reports on individual sectors of British industries would be finished by early 1907 (Marrison 1996, 194).

A more severe blow came in July of 1906, when, a few days after his seventieth birthday, Chamberlain suffered a debilitating stroke that left him partially paralyzed and unable to speak clearly. Although he would linger on for another eight years, his physical impairments made him an invalid and put an end to his career as a political leader (Crosby 2011, 182–191; Judd 1977, 263–272). Chamberlain’s activism had been a major motivating force behind the work of the Commission and his passing from the political scene appears to have taken considerable wind out of the organization’s sails. After 1906, there was a general slowing in the tempo of its activities, as the Commission proper met less and less frequently, and work on the reports began to lag (Bennett 1981, [9]–[10]). Unsurprisingly, these were also years in which the financial situation of the Commission—not particularly robust to begin with—took a turn for the worse: although it continued to receive donations from many of its original supporters, the overall amount of contributions declined markedly and the Commission found itself chronically short of funds (Marrison 1996, 216–221). In Hewins’s view, the causal link between the pecuniary difficulties now besetting the Commission and its inability to sustain its investigative work was clear; as he wrote in an account of the Commission’s history published in 1922, shortly before its absorption into the newly formed Empire Development Union:¹⁷²

[g]reat restrictions were placed upon the work of the Commission by the inadequacy of the funds at its disposal, especially after Mr. Chamberlain’s illness in 1906. From that time it may be said that in spite of every economy the Tariff Commission never had sufficient funds for the work which had to be done, and which was carried out for many years at the cost of considerable sacrifices on the part of those who were engaged in it. It is for this reason that all the information obtained by the Commission was not published (Tariff Commission 1922, 4).

The Commission’s loss of its spiritual leader and the subsequent decline in its financial resources doubtless were major setbacks to the progress of its work. They are, however, best seen as aggravating factors pressing upon a project that was, in large measure, imploding under its own internal stresses. The idea of engineering a scientific tariff proved to be difficult to sustain for technical reasons, of which the most salient one was the Commission’s lack of success in formulating adequate product classifications. In his original

¹⁷² On the Empire Development Union, in essence a rump of the Tariff Commission that was dedicated to promoting intra-imperial trade and, by 1925, had been absorbed into the Empire Industries Association, see Marrison 1996, 358–361.

plans for the Commission's work, Hewins (1929, Vol. 1, 75) had identified such classifications as a *sine qua non* for the prosecution of the project: "[t]he trades should be grouped as far as possible in the order of their organization; schedules of the commodities which will be affected should be worked out for each complete group". The members of the Commission agreed with this: as one of them, the dyestuffs manufacturer Ivan Levinstein, wrote to him in early 1904, "[w]e want a scientific tariff and we need to have as a starting point a scientific classification".¹⁷³ Yet Hewins also stipulated that, for the purposes of the Commission's work, a scientific classification would be one that graded the products by their labor content, in accordance with Chamberlain's proposed tariff régime (Marrison 1996, 30, 120). Since the schedules of imports in the Board of Trade's publications did not follow this criterion and so were insufficient for Hewins's purposes, the Commission had to develop its own classification (p. 120). The construction of detailed schedules along the lines envisioned by Hewins turned out to be a far greater challenge than he and his colleagues had anticipated. Even within the relatively restricted framework of single industries, there was considerable disagreement among the members of the Commission on the proper structure of the classifications in question (p. 119). In the case of more simply structured industries, such as iron and steel or various sectors of the textiles, it was possible to reach compromise solutions and so to hammer out provisional tariff schedules, albeit ones that signally deviated from the "scientific" criteria that the Commission had adopted as its standard (pp. 119-120; 164-167; 182-184). On the other hand, more complex industries, such as engineering, showed themselves to be intractable on this score and no attempt was made either to provide detailed product classifications or to suggest tariffs for them (pp. 120; 194-197). Despite these unpromising circumstances, Hewins still held out hope in the autumn of 1908 that a final report, albeit *sans* tariff schedules, would be issued in the following spring (p. 206). The inability of the Committee to complete its work on several of the industries it was investigating, in tandem with its diminished resources, spelled doom for the endeavor: the final report never appeared and work on the scientific tariff soon lapsed into perpetual abeyance (pp. 205-207). It is difficult to escape the impression that Hewins and the Commissioners had badly underestimated the immensity and complexity of the task that they had undertaken in support of Chamberlain's campaign.

Although the Tariff Commission fell well short of its ultimate aim of developing a scientific tariff, what it accomplished in the course of its work towards that end was not, by

¹⁷³ TCP 6/1/2, Levinstein to Hewins, 16 January 1904, quoted in Marrison 1996, 120.

any means, inconsiderable. The Commission published no fewer than seven reports on the results of its investigations into several major branches of British industry, including one on the iron and steel industry, the full version of which appeared in 1904, with a “popular, abridged” edition following in 1905;¹⁷⁴ one on various branches of the textile industry, which came out in seven parts over the course of 1905;¹⁷⁵ a substantial report on agriculture in 1906; somewhat shorter volumes on the pottery, glass, and sugar and confectionary industries, all of which were issued in 1907; and a tome on the engineering industry, which did not come out until 1909 (Bennett 1981, [14]–[15]; Marrison 1996, 453; Tariff Commission 1922, 16). It also collected and began processing data for a number of other reports that went unpublished: an eighth volume on the paper and stationary trades was publicly announced in 1907 (Tariff Commission 1907a, [4]) but never appeared in print, and work was underway on reports concerning, *inter alia*, the chemical, leather, and cement industries (Bennett 1981, [9] & [132]).¹⁷⁶ In addition to full-scale reports, the Commission issued memoranda, or shorter article-length pieces, of which 63 were published between February of 1904 and September of 1922, the bulk of which appeared prior to the outbreak of World War I in 1914 (Bennett 1981, [14]–[20]; Tariff Commission 1922, 16–18). In the Commission’s first year, its most prolific in the publication of memoranda, many were, in effect, *Vorarbeiten* for parts of the larger reports:¹⁷⁷ by the end

¹⁷⁴ On this “popular, abridged” version, which was motivated by a desire both to disseminate the Commission’s findings to workingmen, who, it was felt, would find the technical details of the full version heavy going, and to “achieve a ‘substantial sale’”, see Marrison 1996, 131. The attempt seems not to have been a success.

¹⁷⁵ The parts dealt with, in turn, cotton; wool; hosiery, lace; carpets; silk; and flax, hemp and jute. Only the first of these parts—that on cotton—constituted a report in the full sense of the word; the six subsequent parts were limited primarily to summaries of statements of evidence submitted to the Commission. An eighth part, which was to encompass a comprehensive report on the whole of the textile industry was planned but never completed (cf. Tariff Commission 1905e, half-title page, vo.).

¹⁷⁶ According to a card index prepared in conjunction with work on the final report, the tenth report was scheduled to be on the chemical industry; the eleventh, on leather; and the twelfth on cement; see TCP 5/2/21, Index to import duties proposed for tariffs, n.d. Which industry was to be treated in the ninth report is not specified.

¹⁷⁷ Of the 20 memoranda published in 1904, 18 dealt directly with themes pertinent to the first three reports published by the Commission: 9 dealt with topics pertaining to iron and steel; 5, with subjects on textile industries; and 4, with matters dealt with by the Commission’s Agricultural Committee. Many of these, such as Memoranda 5 (“Summary of evidence contained in answers to form of inquiry No. 1 issued to manufacturers”), 4 & 13 (“Statistical memorandum on the iron and steel industry of the United Kingdom” [issued in two parts]); 16 (“Statistical memorandum on some points bearing on the effect of Mr. Chamberlain’s proposals (Agricultural Committee)”; 19 (“Report on answers to the inquiry form issued by direction of the Agricultural committee”) and 20 (“Plan of the Report on textiles”), were little more than early publications of material later incorporated into the reports.

of 1905, they no longer bore a direct relation to the subjects of the reports but addressed special topics “of pressing commercial interest”, with especial emphasis on current developments in foreign tariff régimes, colonial tariff policies, their impact on British trade, and imperial preference (Tariff Commission 1907a, 3).¹⁷⁸

The Commission’s reports and memoranda were the fruits of a tremendous amount of work involving the collection, classification, and coordination of industrial and commercial information—work that Chamberlain appreciatively acknowledged in a speech given at a meeting of the Commissioners on 11 July of 1906, the final public speech that he delivered before his stroke:

[B]y the earnest and constant labour of the gentlemen present, we have secured a mass of information which, in quantity, in importance, and in its arrangement, has never been paralleled before. I do not hesitate to say that the information now in the possession of the Tariff Commission is the most valuable trade information in the United Kingdom (Chamberlain, in Hewins 1929, Vol. 1, 173; Tariff Commission 1922, 5).

This effusive passage hints at the fact that the Commission’s offices, where its papers, responses to questionnaires, and witness testimony were processed and stored, had become a depository of information on the issue of tariff reform, one to which persons interested in the subject might have recourse for their own specific purposes. Chamberlain himself was a major beneficiary of this function of the Commission, drawing upon its resources for material, primarily of a statistical nature, to incorporate into his speeches (Marrison 1996, 138). He was not alone in making use of the Commission in this way. In the years after 1906, as the mirage of a scientific tariff became ever fainter, the Commission increasingly turned its attention to the practical task of “supplying information to manufacturers, Government bodies, political groups and politicians” (Bennett 1981, [10]; cf. Marrison 1996, 137): Indeed, Hewins later characterized it as “a great bureau of

¹⁷⁸ Cf. Marrison 1996, 216, who notes that, after 1906, Hewins made it an explicit policy of the Commission to “increase its output of memoranda on specific problems related to trade policy”. Representative titles between 1905 and 1911 include: *Work of the Tariff Commission* (Memorandum 21 [1905]); *The tariff systems of Europe and America* (Memorandum 25 [1905]); *the new continental tariffs* (Memorandum 27 [1906]); *The new Canadian tariff and preferential trade within the Empire* (Memorandum 28 [1907]); *The new Australian tariff* (Memorandum 31 [1907]); *Colonial preference and imperial reciprocity* (Memorandum 35 [1908]); *Unemployment* (Memorandum 37 [1908]); *The trade relations of India, with the United Kingdom, British possessions and foreign countries* (Memorandum 38 [1908]); *Export trade in manufactures of the United Kingdom, German and the United States* (Memorandum 40 [1909]); *Preference and the new Canadian tariff arrangements with France, Germany and the United States* (Memorandum 41 [1910]); *Most-favoured-nation arrangements in relation to the proposed reciprocal trade agreement between Canada and the United States of America* (Memorandum 45 [1911]).

information” plying “a continuous stream of applicants” with data on matters pertaining to the issue of tariff reform, though he also noted, somewhat ruefully, that “the giving of such information often imposed a heavy strain upon the staff of the Commission” (Tariff Commission 1922, 4). Although pitched in exalted and doubtless hyperbolic tones, Chamberlain’s and Hewins’s remarks were very much correct in their substance: intensive information work lay at the heart of the Commission’s various endeavors. It is to this, and Kaiser’s rôle in it, that we now turn.

5.3. Information Work at the Tariff Commission and the Elaboration of Systematic Indexing

In conducting the investigations for its industry reports, the staff of the Tariff Commission gathered information from a plethora of different sources. Publications of various types formed one kind of material on which the Commission’s researchers drew. Official reports of trade statistics issued by the Board of Trade and analogous publications from foreign governments provided much of the raw data worked up into statistical tables for the Commission’s reports (Tariff Commission 1904, § 5; 1905a, § 3): in the estimation of Hewins, the foreign reports offered an important corrective to what he took to be weaknesses in the statistical tallies of their British counterparts (Tariff Commission 1907a, 2). Other kinds of government publications and “[s]cientific books of all countries” were also consulted, as were “[s]cientific and trade journals and periodicals” (Tariff Commission 1904, § 5; 1905a, § 3; 1906, § 10). Appendixes embodying abstracts of, or extracts from, articles, predominantly ones from specialized foreign periodicals, constitute visible traces of such sources in a number of the published reports (Marrison 1996, 120; cf., e.g., Tariff Commission 1904, §§ 94–123; 1905a, §§ 241–305; 1905b, §§ 2286–2301; 1905c, § 2573; 1905d, §§ 2813–2840), while the report of the Agricultural Committee, which Hewins (1929, Vol. 1, 102) described as “the most complete and elaborate of all the publications of the Tariff Commission”, includes two sections on the agricultural history in England that show signs of intensive library research, as is apparent from their copious citation of varied government documents and books on political economics and economic history (Tariff Commission 1906, §§ 12–83). The Commission took care to procure for itself those publications that it required for its work: among the line items in its budget were

“Reference Books, Newspapers and Press Cuttings”, as well as “Library Accessories”.¹⁷⁹ Although our sources are silent as to the size and scope of the resultant collection, the fact that, in 1905, the Commission was receiving “seventy newspapers, periodicals and trade journals” (Marrison 1996, 120) suggests that, at least during its institutional heyday, its holdings were not insubstantial.¹⁸⁰

Within the framework of the Commission’s investigations, consultation of published sources was viewed as an important starting point for information gathering (e.g., Tariff Commission 1905a, § 3). However, the central element of the Commission’s research program was a comprehensive survey of British businesses, which entailed the preparation, dissemination, collection, and analysis of a series of questionnaires, or, to use the Commission’s preferred idiom, forms of inquiry. Identifying its targets by means of trade directories, membership lists supplied by sympathetic trade organizations and chambers of commerce, and, if need be, intelligence gleaned through the personal connections of its members, the Commission dispatched forms of inquiry to all British industrial and commercial concerns, of which it had knowledge (Marrison 1996, 120–121). An initial questionnaire, appropriately entitled “Form No. 1”, was mailed on a massive scale at the end of January of 1904:¹⁸¹ by mid-February, no fewer than 77,200 firms had been contacted (p. 123). On the basis of the replies received to this form, additional follow-up questionnaires, designed for specific industries, were sent out to responsive firms (Bennett 1981, [78];

¹⁷⁹ TCP 9/1/1, Summary of Income and Expenditures for the Five years 1904–1908, prepared by Leake & Co., Chartered Accountants.

¹⁸⁰ One can get a general impression of some of the collection’s contents from Kaiser’s publications and allusions in archival materials. In his two books, he gives examples of index entries for items of information culled from various periodical publications identified by title, some of which came from the index files of the Tariff Commission: these included, in alphabetical order and with place of publication: *Architect* [London] (Kaiser 1908, §§ 267–268); *Chemical Trade Journal* [London] (Kaiser 1911, §§ 448–451); *Colliery Guardian* [London] (Kaiser 1908, §§ 267–268); *Contract Journal* [London] (Kaiser 1908, § 234 [press cuttings]); *Drapers Record* [London] (Kaiser 1908, §§ 267–268; 1911, § 457) *Engineer* [London] (Kaiser 1908, §§ 246–248; 267–268; 1911, §§ 470–472); *Paper Maker’s Monthly Journal* [London] (Kaiser 1911, § 458). As for reference books, TCP 8/2/4 B40, an undated 20-page typescript containing dictionary definitions of various specialized terms for silk products cites *Cassell’s Encyclopaedic* [sic] *Dictionary*, the *Century Dictionary*, the *Oxford Dictionary*, the *Encyclopaedia* [sic] *Britannica*, *Ogilvie’s* [sic] *Dictionary*, and *Webster’s Dictionary*. Can one conclude that the Commission’s library included all of these lexicographical aids? Whatever may have been the case, there can be little doubt that directories of firms and handbooks pertaining to customs duties—genres that Kaiser (1911, §§ 200–202 & 231) singled out in his writings—were among the reference books kept by the Commission.

¹⁸¹ TCP 4/33/1, Form 1: General Form of Inquiry for Manufacturers. Preliminary Questions Only. The text of this questionnaire is also printed in many of the Commission’s reports; see, e.g., Tariff Commission 1904, § 90. The cover letter accompanying the form was dated “30 January 1904”.

Hewins 1929, Vol. 1, 86);¹⁸² moreover, in May of the same year, a form prepared by the Commission's Agricultural Committee—"Form No. 5"—was distributed to agriculturalists throughout the United Kingdom.¹⁸³ In all, the Commission ultimately received responses from over 15,000 businesses and 2,103 agriculturalists, most of which were returned to the Commission's offices over the course of 1904 and early 1905 (Bennett 1981, [78]; Tariff Commission 1906, § 9; 1907, 1-2).

Hewins and the Commissioners attached great importance to the framing of the questions in the forms of inquiry and appear to have taken no small amount of pains in crafting them. According to Hewins's own description, the process for creating Form No. 1 involved a good deal of discussion and committee work: drafts of questions proposed by members of the Commission were subjected to the scrutiny of Chamberlain and a small committee (most likely, the General Purposes Committee); alterations were made to the proposals; and the new final draft was submitted to the Commission as a whole for further discussion prior to printing.¹⁸⁴ One key consideration was limiting the forms to a reasonable length so that their recipients would not shrink from filling it out: for example, in the case of Form No. 1, forty questions suggested by Commissioners were whittled down to ten by Hewins and the special committee, though one was added during the course of the final discussion at a sitting of the full Commission, yielding eleven in the final, printed version of the questionnaire (Marrison 1996, 120).¹⁸⁵ Another was to formulate the questions in such a way so as to obtain "accurate information" about "[a]ll definite facts" that had to be taken into account to assess the likely impact of a tariff régime, such as the one proposed by

¹⁸² These included Form no. 2: Form of Enquiry for Merchants; Form no. 3: Form of Inquiry for Trade Unions, Industrial Associations, etc., Form 4: Form of Inquiry for Iron and Steel Manufacturers, Form 6: Form of Inquiry for Manufacturers in the Engineering and Machinery Trades; Form 7: Form of Inquiry for Textile Manufacturers, and Form 8: Questions Supplementary to Form 1, exemplars of which may be found at TCP 4/33/1. The texts of these questionnaires were, as a rule, printed in the pertinent reports.

¹⁸³ TCP 4/33/1, Form 5: Form of Enquiry for Agriculturalists. The text of this form is reprinted in the Agricultural Committee's report; see Tariff Commission 1906, §§ 1205-1209. The cover letter accompanying the form was dated "May 1904".

¹⁸⁴ TCP 8/2/9 B88, "The Tariff Commission. Its Methods of Inquiry. Explained by Mr. W. A. S. Hewins." Typescript of unpublished lecture presented to the Middlesbrough Chamber of Commerce, March 22, 1904, p. 8-9; Marrison 1996, 120.

¹⁸⁵ Other questionnaires were less parsimonious, but not by much: the form for merchants (Form No. 2) contained sixteen questions; that for iron and steel (Form No. 4) had fifteen; the questionnaire for agriculture (Form No. 5) counted twelve; that for textile trades (Form No. 7) numbered eighteen; and one consisting of supplementary questions for manufacturers in general (Form No. 8) comprised thirteen (Tariff Commission 1905a, §§ 235-239; 1906, 1205-1209).

Chamberlain, upon British industry.¹⁸⁶ Here, however, the results of the Commission's labors were equivocal. A perusal of the questions in Form No.1 reveals that some of them asked for information of a purely factual nature, such as the nature of the business of the respondent; whether his manufactures were sold in domestic, foreign, and/or colonial markets; the average number of workers per week that his firm employed over the course of 1903; which of his products for the home market were being challenged by imported goods from abroad; and whether, to his knowledge, any of these foreign imports were being sold beyond his cost price.¹⁸⁷ Such queries could easily be answered on the basis of the respondent's knowledge about his own firm and domestic market conditions. Others, however, made heavier demands on the persons to whom they were addressed. A question such as "Have you any information leading you to conclude that ... imported articles are placed upon the British market at or below the normal cost of production in the country of origin?" not only presupposed a knowledge of industrial conditions abroad that many businessmen—particularly smaller businessmen—were unlikely to have, but in its very formulation ("... leading you to conclude ...") invited an interpretative answer, as did the query "What amount of reduction of the tariff of any country would enable you to compete successfully within that country ... ?".¹⁸⁸ In other words, the questions in Form No. 1—and those in the other forms as well—were framed in such a way as to elicit a *mélange* of statements of fact and expressions of opinion. The recipients of the forms of inquiry appear to have followed the Commission's promptings on this score, for, as one latter-day commentator has noted, "[o]n the whole firms were more willing to forward their views or impressions than hard facts" in their responses to the questionnaires (Bennett 1981, [7]).

In addition to sending out forms of inquiry, the Commission also invited businessmen and agriculturalists to submit more detailed evidence regarding their respective industries. This could take the form of written statements sent to the Commission's offices or of oral testimony presented at public hearings held by the Commission (Bennett 1981, [26]; Tariff Commission 1904, § 16; 1905a, §§ 5–6). The persons or organizations who agreed to provide such evidence were asked to prepare statements in response to questions which had been prepared by the Commission and texts of which were provided in advance to *viva*

¹⁸⁶ TCP 8/2/9 B88, "The Tariff Commission. Its Methods of Inquiry. Explained by Mr. W. A. S. Hewins." Typescript of unpublished lecture presented to the Middlesbrough Chamber of Commerce, March 22, 1904, p. 8.

¹⁸⁷ Form No. 1, Questions I–IV, reproduced in Tariff Commission 1904, § 90.

¹⁸⁸ Form No. 1, Questions V, VIII, reproduced in Tariff Commission 1904, § 90.

voce witnesses (Tariff Commission 1904, §§ 15, 89, items 19–22): as was the case with the forms of inquiry, many of these questions were phrased in a manner that invited the witnesses to air their opinions about the state of their respective industries,¹⁸⁹ the effects of foreign competition upon them,¹⁹⁰ and the likely effects of tariff reform upon their trades.¹⁹¹ For the most part, the hearings at which the witnesses gave oral testimony took place at regular sessions of the Commission in London; However, the Agricultural Committee, most of whose members did not belong to the Commission *per se*, held separate meetings to hear evidence on agricultural matters, including several in Dublin in July of 1905 for the purpose of canvassing Irish farmers (Bennett 1981, [26]). By 1907, about 400 industrialists, whose numbers included some of the Commissioners, and 147 agriculturalists had appeared before the Commission (Tariff Commission 1906, § 8; 1907, 1). In all cases, the hearings were recorded in shorthand by stenographers and transcribed into typescript; the transcripts were sent to the persons giving evidence for review and, where necessary, correction; and, once they had been reviewed and approved by the witnesses, the copies were returned to the Commission's offices for further processing (Bennett 1981, [26]; Tariff Commission 1905a, § 1907, 3).

Publications of various kinds, responses to questionnaires, and transcripts of hearings, as well as correspondence from Commissioners, firms, trade associations, and individuals not affiliated with the organization, and internally generated documents of various sorts,

¹⁸⁹ For example, witnesses from the iron and steel industry were asked questions such as “Has the rate of earning in your district and trade increased, or diminished, or altered, in any way in recent years?”, “On the whole do you consider that the state of your trade in your district has been satisfactory or otherwise?”, “To what causes do you attribute the change, if any, in the state of trade in your district?”, and “Can you explain the causes which have led to the disproportion which exists in this country and in Germany and the United States between the production of steel by the Bessemer and Open Hearth processes?” (Tariff Commission 1904, § 93, questions 10, 11, 13 & 32).

¹⁹⁰ For instance, witnesses from the cotton industry were asked “What facilities are enjoyed by foreign competitors arising from the effect of trusts, kartels, &c. or bounties (in regard to dumping, &c.)?”, “Is their system of commercial travelling superior, and if so, in what respects?”, “How far do foreign tariffs tend to the efficiency of production in foreign countries by securing their home market to foreign competitors?”, and “How far does the British policy of free imports assist foreign countries in securing a position either in the British home market or in neutral markets?” (Tariff Commission 1905a, § 240, questions 31, 32, 34, 35).

¹⁹¹ For example, among the questions addressed to witnesses representing fruit growers and market gardeners were the following: “Taking Mr. Chamberlain's proposals as a basis, what advantage, if any, do you anticipate will follow their being put into force?”, “What share of advantage do you think will accrue to the labourer? “So far as you can judge, would preferential arrangement by this country with the Colonies require you to make any changes in the character of your industry?”, and “What are the probabilities of expansion in British fruit culture and market gardening under favourable conditions?” (Tariff Commission 1906, § 485, questions 17–20). Analogous questions were asked of other categories of agriculturalists as well.

provided the informational raw material for researching and drafting the Commission's reports and memoranda. This heterogeneous body of documents required organization so that the Commission's staff could use it effectively: as Hewins put it, "it was necessary to devise a system by which all the information in the offices of the Commission could without delay be brought together under its various headings and combined with other information bearing on the same subject" (Tariff Commission 1907a, 3). The responsibility of creating and overseeing the maintenance of such a system fell to Kaiser, who, in his capacity as librarian, had both to plot out a method for the physical organization of the documents held by the Commission and to develop an indexing scheme that would reliably guide its researchers to the items of information that they needed for their analytic work.

With regards to physical organization, Kaiser followed the same principles that he had used at British Westinghouse and adopted an arrangement by documentary kind and format. Correspondence, returned forms of inquiry, transcripts of oral evidence, and press cuttings were separated out into individual series—identified mnemonically as a "C" series, an "F" series, an "E" series, and a "PC" series, respectively—which were kept in vertical files (see Figure 3, below; Bennett 1981, [26], [78]; Kaiser 1908, §§ 26, 125, 169, 223), while other forms of document, such as periodicals, pamphlets, books, unpublished notes and papers prepared by the Commission's researchers, and drafts and printed copies of questionnaires and memoranda, were each assigned to a separate series—e.g., "P" for periodicals, "D" for pamphlets, "MM" for the Commission's memoranda, and so on—and filed, as a rule, on shelves, either as free-standing volumes or in cardboard boxes (Kaiser 1908, §§ 35–36; 243, 251–252, 267–268). Within each series, documents were organized in numerical sequence, though the units being numbered varied across different documentary kinds: for example, within the "F" series, each returned form of inquiry received a separate number; within the "C" series, each dossier containing letters from a given correspondent had its own number; within the "P" series, the numbering was by periodical title, subdivided by issue; within the "PC" series, each individual article was accorded its own number; and, within the "E" series, each separate question and its answer received an individual number (Bennett 1981, [26], [78]; Kaiser 1908, §§ 169, 225, 234, 238).¹⁹² In general, the number

¹⁹² In the case of the "E" series, the adoption of individual questions and answers as the unit of enumeration reflected a standard usage of governmental reports containing transcripts of hearings at which witnesses gave oral testimony. For students of KO, the most salient example of this convention is to be found in the report and minutes of evidence of the Royal Commission into the Constitution and Government of the British Museum held in 1847–1849, at which Anthony Panizzi, at



Figure 3: Vertical files at the offices of the Tariff Commission, London (Source: Kaiser 1911, § 559B).

assigned to each unit within a given series corresponded to its place in the sequence in which comparable units had been processed at the Commission's offices: thus, the one-hundredth form of inquiry to be returned would be assigned the number "F100"; the dossier of the thousandth entity from which a piece of correspondence had been received would be given the number "C1000"; the thirty-fourth periodical to which the Commission had subscribed and of which it had received an issue would be accorded the number "P34"; the ten-thousandth unit of question and answer in the series of transcripts of oral evidence

the time, Librarian of the British Museum, successfully defended his cataloging rules against a number of critics. The minutes of evidence recording the hearings were likewise articulated into a consecutively-numbered series of questions-with-answers (Commissioners Appointed to Inquire into the Constitution and Government of the British Museum 1850, "Minutes of Evidence", *passim*).

processed by the Commission's staff would be assigned the number "E10000", and so on (for further discussion, see Chapter, 6, Section 3.1, below).¹⁹³ As a rule, documents were arranged in the files or on the shelves according to their documentary class and number (cf., e.g., Kaiser 1908, §§ 26, 125, 267–268).¹⁹⁴

In conjunction with this collection of documentary material, Kaiser developed an elaborate system of card indexes (See Figure 4, below). This system consisted, for the most part, of two types, or genres, of indexes: *registers*, or lists of names of the Commission's correspondents, respondents to the questionnaires, and witnesses, and analytical *subject indexes* (for more detailed discussion of this distinction, see Chapter 6, Section 3.4, below). The former served primarily as mechanisms for correlating the names of individuals, companies, and organizations with the numbers assigned to the documents emanating from them and, in many cases, as address lists, while the latter functioned as means for individuating and summarizing items of information within the documents and providing subject access to those items. Both registers and subject indexes could be used as finding aids, albeit in different ways: the former allowed one to locate and identify documents by the names of their sources, whereas the latter enabled one to trace items of information by the names of the subjects of which they treated.

¹⁹³ Some variation within this general pattern was possible. For example, the assignment of numbers in the F series appears to reflect further subdivision within the document class: certain ranges of numbers seem to have been reserved for forms of inquiry returned from specific types of industrial groups. The distribution has been described by Bennett (1981, [78]) in the following terms: "Numbers 1–1500 were predominantly those [sci., forms of inquiry—TMD] of Iron and Steel, Engineering and Hardware firms as these were the first sent out and received back in the office. No numbers between 1600 and 1800 were used and those from 1900–6700 are chiefly Textiles and other manufacturers—these are only rough guidelines as different types of manufacturers are scattered throughout the numbers. Only a few in the 8000's were used and none in the 7000's or 9000's; 10,000–11,000 were mainly the merchants' firms and 12,000's entirely allotted to Agriculturalists". Whether any other document class manifested a similar deviation from the general pattern of consecutive numeration cannot be ascertained on the basis of available evidence.

¹⁹⁴ There may have been some room for variation here as well. Bennett (1981, [79]) notes that the questionnaires of the F series were "finally grouped according to the report—published or unpublished—in which their information was used and the title stamped on the front page of the form". Bennett unfortunately does not specify what timeframe is indicated by the adverb "finally": from her words, it seems most likely that this subarrangement by industrial affiliation—already anticipated, to some degree, in the numbering of the documents of the series in question—did not occur until a fairly late phase of the Commission's history. One may also wonder if the arrangement of books—as opposed to staff notes on the content of books, which appear to have formed part of a "B" series in the Commission's collection—was not governed by some principle of subdivision that went beyond bare numerical enumeration by date of accession: however, our sources are silent on this point.

The card index system that Kaiser developed for the Commission employed a variety of registers. One major register listed, in alphabetical order, the names of all the persons and firms that had corresponded with the Commission, responded to its questionnaires, or communicated with it in some way: Kaiser (1908, §§ 95, 186) dubbed this the “central register”. Most registers, however, were of more limited scope. The “C” series, the “F” series, and the “E” series, for example, had corresponding registers that listed persons and firms alphabetically by name, enumerated them by the number assigned to the documents associated with them within the series in question, and classified them by trade: also associated with the “C” series, at least, was a register grouping correspondents by their geographical location.¹⁹⁵ Registers were also compiled for the Commission’s published and unpublished reports. These encompassed alphabetical lists of companies and individuals whose responses to forms of inquiry were quoted in the reports, as well as separate enumerations by the numbers assigned to them: many also included alphabetical and numerical lists of witnesses who gave oral testimony cited in the report and separate ones for persons who had sent in written evidence pertaining the subject of the report via mail, in addition to enumerations of names quoted in the body of the report.¹⁹⁶ In addition, there were geographical registers that collocated information about correspondents and respondents to the forms of inquiry by the locations of their firms.¹⁹⁷ All in all, the Commission’s researchers were well equipped to identify the sources of the documents kept within its files.

As with the registers, the Commission’s card index system featured a wide range of subject indexes. Subject cards bearing brief textual extracts or summaries were prepared for items of information from the various documentary classes (e.g., Kaiser 1908, §§ 118 [“E” series], 184 [“C” series], 235–236 [“PC” series]; 1911, §§ 450–451 [“P” series]; 476–477 [“C” series]; 479 [“PC” series]). It is uncertain whether these cards formed part of a single “central index”—that is to say, a single subject index covering the contents of all the different kinds of documents in the collection, just as a central register did with personal

¹⁹⁵ For the “C” and “F” series, see the illustrations at Kaiser 1908, §§ 49–50; 103–104, 184–186. For the “E” series, see TCP 5/1/1, Register for Evidence, n.d., a brief description of which is given in Bennett 1981, [96]. There is evidence suggesting that the “P” series had separate registers as well (see Kaiser 1908, §§ 239, 246–248): in this case, it was the name of the periodical, rather than a personal name, that featured in the alphabetical list.

¹⁹⁶ See TCP 5/1/2, Register to Reports, n.d., described in Bennett 1981, [96]–[98]. For an illustration of such a register in a card tray, see Kaiser 1908, § 110.

¹⁹⁷ See, e.g., TCP 5/4/6, Register of Irish Place Names, n.d., most likely drawn up in conjunction with the Agricultural report.

and corporate names (Kaiser 1908, §§ 112, 366, s.v. “Central Registers or Indexes”)—or whether they were distributed across a number of self-contained indexes partitioned by documentary kind.¹⁹⁸ However this may have been, a number of separate indexes were created in conjunction with work on the Committee’s industrial reports: for example, there were distinct indexes for the segments of the “E” series and “F” series corresponding to each of the major branches of industry to which the Committee devoted its reports.¹⁹⁹ As materials from the transcripts of evidence and answers to forms of inquiry were processed and draft summaries were prepared for incorporation into what would be the final published reports, subject indexes were compiled for these as well.²⁰⁰ In addition, some indexes were designed to pool together material drawn from several different documentary classes or reports in order to coordinate information on topics of particular interest to the Commission, such as recommendations for tariff rates, which were of obvious interest for an organization seeking to develop a schedule for a scientific tariff.²⁰¹

¹⁹⁸ Although there is some reason to believe that a central index did exist, the extant evidence is too ambiguous to permit a definite judgment on this score. None of the instances of subject index cards in Kaiser 1908—a book in which he presented general ideas about constituting card indexes but made extensive use of examples from the Tariff Commission to illustrate his points—identifies them as coming from a central index nor can any of the surviving exemplars of the Commission’s subject indexes be positively identified as having formed part of such a file (Bennett 1981, 98–106; 110 [in re TCP 5/5/5]). Some of Kaiser’s (1908) comments about the constitution of central indexes suggest that an index encompassing at least the information from the “C”, “P”, and “PC” series may have existed in the Commission’s offices (§ 241), but others are decidedly more non-committal (§§ 112, 227, 254). The fact that, in some cases, different documentary classes were represented in the card indexes by means of different colors is also congruent with the existence of a central index, but not probative because such color schemes could be used for other, more specialized subject indexes as well (Kaiser 1908, §§ 112, 153, 340–341; 1911, §§ 547–548, 558A & B; 559A). Similarly, the range of subjects covered in some of the illustrations of card files in Kaiser 1911 would be compatible with the wide scope of a central index (e.g., §§ 552, 556): unfortunately, neither the illustrations nor their captions specify the scope of the subject index in question.

¹⁹⁹ For examples of such segments of the “E” series, see Kaiser 1908, § 119 [card drawer from Iron and Steel subject index]; TCP 5/2/9, Subject index to the Iron and Steel Evidence, n.d.. Some of the cards in TCP 5/5/5, Oddments, n.d., appear to come from a comparable index for Cotton goods (cf. Bennett 1981, [110]). For examples from the “F” series, see TCP 5/2/7, Subject index to the Questionnaire for Hemp, Jute, and Linen, n.d.; TCP 5/2/19, Subject index to the Woollen Questionnaire, n.d.

²⁰⁰ Examples are extant for the following industries: agriculture (TCP 5/2/1, n.d.); building trades (TCP 5/2/2, n.d.); hemp, jute and linen (TCP 5/2/6, n.d.); hosiery (TCP 5/2/8, n.d.); lace (TCP 5/2/10, n.d.); leather and footwear (TCP 5/2/11, n.d.); musical instruments (TCP 5/2/12, n.d.); outfitting (TCP 5/2/13, n.d.); paper (TCP 5/2/15, n.d.); silk (TCP 5/2/16, n.d.); sugar (TCP 5/2/17, n.d.); timber (TCP 5/2/18, n.d.). A card drawer from the subject index to the silk summary is illustrated in Kaiser 1908, § 109.

²⁰¹ TCP 5/2/21, Subject index to multiple reports regarding import duties, n.d.; TCP 5/3/1, Index of proposed tariff rates, n.d.; cf. Bennett 1981, [105]–[106].



Figure 4: Card index files at the offices of the Tariff Commission, London (Source: Kaiser 1911, § 559C).²⁰²

The subject indexes in the Commission's card index file, then, comprised a variegated lot: some were apparently intended for general, long-term consultation, whereas others were created to support specific aspects of the Commission's work on its investigative

²⁰² Wilson (2011) has suggested that the short mustachioed man in frock coat and starched collar pensively inspecting the contents of one of the drawers of the Tariff Commission's card index files is none other than Kaiser himself. Although the picture does not identify the personages that it represents, the facts that Kaiser was short in physical stature—a passenger list from a ship aboard which he travelled to America in 1914 records his height as 5 feet, 4 inches—and that, as a glance at the Frontispiece to this dissertation shows, he possessed many of the broad facial characteristics—a large nose, high brow, prominent eyebrow ridges, and thick hair—exhibited by the man in the picture, render this identification highly plausible. On Kaiser's height, see USNA, Microfilm Publications T715_2388, p. 71, l. 2, col. 25; Passenger list for the S. S. St. Paul, 6 December 1914.

reports. Taken as a whole, they constituted the third of the three indexes to which Kaiser (1911, § 20) applied his method of SI after leaving Philadelphia. Interestingly, he appears to have varied the format of individual indexes in accordance with their function. Subject indexes designed for classes of materials for general consultation, such as those for the “C”, “P”, and “PC” series, and some of those connected with the initial processing of statements of evidence and questionnaires seem to have conformed, for the most part, to the protocols of SI that Kaiser outlined in his published works and that will be described in Chapter 7,²⁰³ whereas others, many of which were associated with the redaction of the Commission’s reports, tended to deviate, to a greater or lesser degree, from the norms of his method by simplifying the structure of the index terms, lumping together categories of terms that would normally have been kept distinct, or departing from the recommended file structure.²⁰⁴

In designing and implementing the Commission’s card index system, Kaiser carried out what Hewins characterized as “work of vital importance to the success of the Commission”.²⁰⁵ This importance lay in the fact that the card indexes directly supported the Commission’s research. Not only did indexing serve as the mechanism by which the “contents” of publications were “classified so far as they [bore] directly on the subject of ... inquiry” (Tariff Commission 1904, § 5); it also formed a routine part of “the methodical treatment” accorded to the forms of inquiry and statements of oral or written evidence that

²⁰³ Extant examples of indexes following the norms of SI include TCP 5/2/7, Subject index to hemp, jute, and linen, n.d. (very close to SI in its treatment of subject terms on individual cards, but not in the arrangement of cards within the file); TCP 5/2/9, Subject index to the Iron and Steel Evidence, n.d. (conformant to SI in both treatment of subject terms on individual cards and in file structure); TCP 5/2/19, Subject index to the Woollen Questionnaire, n.d. (congruent to SI in treatment of subject terms on individual cards and in file arrangement, albeit with minimal use of guide cards). A number of cards found in TCP 5/5/5, Oddments, n.d., reflect the protocols of SI, but their original arrangement is unknown. No index containing cards from the “C”, “P”, or “PC” series, which figure prominently in Kaiser’s two books, appears to have survived.

²⁰⁴ For extant examples of indexes with simplified terms, see TCP 5/2/2, Index to summary for building trades, n.d.; TCP 5/2/12, Index to summary for musical instruments. The same indexes also lumped together all index terms into a single undifferentiated list. For instances of indexes in which there is a partial differentiation of index term categories, see TCP 5/2/3, Index to evidence for cement trade, n.d.; TC 5/2/6, index to evidence for flax, hemp, and jute, n.d.; TCP 5/2/14, Index to evidence for paper trade, n.d.; for examples of divergent file structures, see TCP 5/2/5, Index to summary for engineering report, n.d.; TCP 5/2/21, Subject index to multiple reports regarding import duties, n.d.; TCP 5/3/1, Index of proposed tariff rates, n.d.. As regards these alternative file structures, it should be emphasized that, in some cases, most notably that of TCP 5/2/5, the surviving arrangement has been largely reconstructed from files that became disorganized after the Tariff Commission ceased to exist and so assuredly does not reflect the original structure in many of its details; see Bennett 1981, [95] & [101].

²⁰⁵ TC 6/1/26, W. A. S. Hewins to C. A. Pearson, 1 January, 1903 [read 1904].

it elicited for its investigations into various industries (Tariff Commission 1907a, 3). According to Hewins, forms of inquiry that had been answered and returned to the Commission's offices "were thoroughly analysed and abstracted by the use of the card system as it was specially worked out for that purpose by the [sci., Commission's—TMD] expert staff" (Tariff Commission 1922, 3).²⁰⁶ Statements of evidence were treated in a comparable manner, though the procedure was more involved. Verbatim transcripts of oral evidence were "abstracted"—that is to say, "condensed into one continuous statement" (Tariff Commission 1905b, §§ 1302–1303; 1907, 3); these shortened versions of evidence were, in turn, "submitted to the witness for his approval". Once this had been secured, the condensed texts, along with any written statements of evidence that had been submitted in lieu of oral testimony and treated in a similar manner, were "thoroughly analysed and indexed on cards" and "a summary ... based on these cards and the tabulation of the evidence" was written up for inclusion in the report (Tariff Commission 1905b, § 1303; 1907, 3). Subject indexes also appear to have been prepared for preliminary drafts of the reports themselves (Bennett 1981, [98]). The compilation of subject indexes in conjunction with specific investigations thus constituted "a vital preliminary stage in the preparation of the [r]eports" resulting from the Commission's inquiries (p. [95]).

Needless to say, the Commission's subject indexes were used for a broader range of purposes than the redaction of its reports and other publications. As mechanisms for identifying and locating items of information within the files or on the shelves of the Commission's offices, they doubtless helped sustain, over the long term, its activities as an information bureau on matters relating to tariff reform (See Section 2 of the current chapter). Their use during a somewhat more fleeting occasion provides a telling example of their perceived informational value. When, in autumn of 1905, Chamberlain sent Hewins, in his capacity as secretary of the Commission, to Canada to consult on matters of tariff reform

²⁰⁶ More specifically, when a form of inquiry was returned, it was assigned an "F-series number"; the name of the firm, its geographical location, and its industrial affiliations were recorded in card registers; and, at least in the case of the earliest reports, some of the information was tabulated in specially prepared ledger books; See Hewins 1904, 241–242; TCP 4/35/1, Ledger tabulations of responses to Form 1, 1904; TCP 8/2/9 B88, "The Tariff Commission. Its Methods of Inquiry. Explained by Mr. W. A. S. Hewins." Typescript of unpublished lecture presented to the Middlesbrough Chamber of Commerce, March 22, 1904, p. 9. The more discursive responses in the forms were copied onto cards and indexed by subject; see, e.g., TCP 5/2/7, Subject index to hemp, jute, and linen, n.d.; TCP 5/2/19, Subject index to the Wool Questionnaire, n.d.; cf. TCP 6/1/26, Hewins to Pearson, 19 February 1906, where Hewins notes, in regards to preparations for reports on engineering, ship building, and miscellaneous trades, that "[t]he evidence and forms have been abstracted ..., while summary cards of most of the evidence and forms have been prepared".

with members of a Canadian governmental commission charged with overseeing the revision of that country's tariff schedules, he came equipped with a portable card cabinet equipped to hold 12,000 cards on "practically every article [sci., commodity—TMD] & every subject which can arise in the discussions" (Hewins, cited in Fraser 1994, 622). Hewins's readiness to lug along sizeable extracts from the Commission's subject indexes as a *vademecum* across the Atlantic on his quasi-political mission underscores the degree to which he, the animating spirit of the Commission, considered them to constitute the indispensable informational infrastructure for his—and his organization's—work.

Although Kaiser was the chief architect and administrator of the Tariff Commission's extensive card index system, this did not exhaust his duties within the organization. A number of the documents upon which the Commission's staff drew for its research were written in German; given Kaiser's linguistic background and abilities, it is likely that he had a hand in preparing at least some of the (unattributed) translations and abstracts of these that made their way into the Commission's files.²⁰⁷ Moreover, as the Commission's indexing specialist, he was responsible for compiling the detailed back-of-the-book indexes that formed part of its published reports.²⁰⁸ To that end, he developed a method of book indexing complementary to his protocols for card indexing (Kaiser 1911, §§ 560–620; cf. Chapter 1, Section 5.2.5, above). Kaiser viewed back-of-the book indexing as a variant application of SI. Yet, whereas he firmly held that the construction of book indexes should be based on the same principles of SI as those that governed the construction of card indexes, he also acknowledged that there were significant differences between the two kinds of index (§§ 577–578, 591). Accordingly, he adapted some of the design features of his indexing method to fit the exigencies of back-of-the-book indexes, giving indexers some-

²⁰⁷ For examples of such translations see, e.g., TCP 8/2/1 B7 Translation/summary of O. Mantzke, *Clearance of goods in the postal, railway and shipping traffic: a textbook for accountants and commercial schools*, 1909 [translation, n.d.; filed 1910]; B8, Translation of W. Beumer, "Chamberlain's protectionist plans", published in *Die Woche*, 6 June 1905 [translation, n.d.]; B40, Translation of price list of Amalgamation of Glass Bottle Manufacturers, Berlin, 2 October 1906 [translation, n.d.].

²⁰⁸ The first report on Iron and Steel came out in late July of 1904 without an index, though one was published separately as a supplement in August of that year; see Tariff Commission 1904, vii; TCP 6/7/10, Kaiser to Messrs. Vacher & Sons, 11 August 1904; The Tariff Commission 1904. All subsequent reports were published together with their respective indexes. The indexes to the seven parts of the second report on the textile industries were designated as "interim indexes" in anticipation of a final index that was to accompany a projected eighth part and cover all the textile industries in a comprehensive manner: this, however, never materialized.

REBATE TO COUNTERACT PREFERENCE ..	549, 923
RECIPROcity	534, 649, 721, 1023,
1091, 1104, 1128, 1131, 1152, 1154, 1183	
RE-EXPORT .. 841, 847, 876, 939, 1006, 1123, 1142	
REFRIGERATORS	501, 881, 1080
REGISTRATION DUTY	704-5, 979
REGISTRATION FEES	1182
REGISTRATION LAWS	1166
REGISTRATION OF SHIPS	953
RENTS	426, 469, 492, 603,
713, 774, 1016, 1027, 1085, 1110, 1127	
REPAIRS	5, 616, 647, 671, 1087
REPETITION WORK	547, 663-4, 857
RETALIATION	45, 943, 1023,
1081, 1091, 1094, 1112, 1116, 1141, 1191-3	
Foreign Competition Checked by ..	534, 676, 551,
682, 698-9, 705, 717, 989, 1092, 1118, 1132	
Foreign Duties Reduced by ..	558, 699, 717,
925, 967-8, 1089, 1096-7, 1102, 1104,	
1114, 1121-2, 1130	

Figure 5a: Simple entries from “Rebate to counteract preference” to “Retaliation” in the back-of-the-book index to the Tariff Commission Report on the Engineering Industries (Source: Tariff Commission 1909, Index, unnumbered p. [29]).

AUSTRALIA 37-8, 63, 462, 549, 575, 576, 583, 889, 901,	
929, 970-1, 975-6, 1151	
Dumping in	630, 900, 921
Export to .. 8, 27-8, 38-9, 55-6, 78, 81-3, 84, 93,	
110, 126, 535, 613, 626, 630, 655, 668, 696,	
703, 723, 907, 910, 914, 936-7, 939, 947, 973,	
991, 1263	
Decline	508, 613, 654, 888, 913, 1149
Through Tariff	548, 892, 945, 952, 955,
970-1, 973, 990, 1003, 1152	
Foreign Competition in .. 11, 40, 116, 122, 483, 589,	
630, 692, 723, 887, 913, 918, 927, 942, 955,	
990, 1060, 1138, 1151, 1226, 1248	
From Germany .. 723, 887-9, 890-4, 898, 900-1,	
905, 911-3, 920, 929, 931, 936, 941, 943-4,	
973, 1062, 1064, 1143	
U.S.A. .. 640, 655, 669, 723, 888, 890-4, 901,	
904-5, 912-3, 918, 920-2, 925-9, 932, 936,	
943-4, 973, 1062, 1064, 1156	
In Agricultural Machinery	640, 669, 692,
925-7, 943, 1064	
Electric Machinery	888-93, 1138
Laundry Machinery	943-4
Locomotives	900-1, 1143
Mining Machinery .. 891, 929, 931-2, 990, 1156	
Pipes	898, 913, 918
Steam Gauges	912, 973
Import from	491, 756, 1259
Imports into	37-8
Manufacture in .. 112, 576, 590, 900, 927, 961-2,	
973, 1136, 1227	
Patent Laws	535-6, 1170
Preference .. 101, 535, 584, 655, 904, 912, 936, 1136,	
1139, 1147, 1151, 1221-8, 1235	

Figure 5b: Complex entry for “Australia” in the back-of-the-book index to the Tariff Commission Report on the Engineering Industries (Source: Tariff Commission 1909, Index, unnumbered p. [2]).

what greater latitude in the formulation of individual entries, the choice of main entry terms, and the articulation of subdivisions than he did in his rules for the design of card indexes (§§ 577–578, 600, 611, 619). The back-of-the-book indexes that Kaiser produced for the Commission’s reports were formidable pieces of work, providing a deep and extensive guide to the subjects covered in the reports’ texts through the medium of index entries that ran the gamut of internal complexity from the fairly simple (see Figure 5a) to the highly analytical (see Figure 5b). Although latter-day indexers might doubtless look askance at the somewhat luxuriant number of locators assigned to many of the headings—and even subheadings—in these indexes,²⁰⁹ one cannot gainsay the high level of detail that they exhibited: there can be little doubt that they proved to be valuable aids to those readers of the reports who availed themselves of them.

Kaiser’s contributions to the Commission’s endeavors went beyond indexing, for he also partook in office work related to the printing and distribution of the organization’s various publications. On the most mundane level, he oversaw the Commission’s stock of stationary supplies, procuring them as necessary and providing them to his superiors upon request.²¹⁰ He also aided the Commission’s assistant secretary, Hurd, in seeing to the circulation of meeting agendas, minutes, drafts, and other internal documents among its members and helped arrange for the distribution of its published memoranda and reports to the Commission’s members and other interested parties.²¹¹ Most notably, he, in tandem

²⁰⁹ Modern authorities on back-of-the-book indexing advise that, as a rule of thumb, a heading (or subheading) should have no more than five or seven locators following it (Knight 1979, 105; Mulvany 2005, 93; Wellisch 1996, 279–282): even a cursory glance at Figures 5a and 5b suffices to indicate that many of the (sub)headings in the Commission’s indexes went well beyond these ideal limits—and these are hardly the most extreme cases extant.

²¹⁰ See, e.g., TCP 6/7/10, Kaiser to Vacher & Sons, 24 March 1904 (order for printed card); Kaiser to Vacher & Sons, 21 April 1904 (order for printed charging slips); JK (Kaiser) in name of Secretary to Vacher & Sons, 24 February 1905 (inquiry concerning an order of paper not yet received); Kaiser to Vacher & Sons, 5 March 1905 (order for “Secretary’s Compliment” slips and notepaper with Tariff Commission letterhead); TCP 6/7/9, Kaiser to Jas. Truscott & Son, Ltd., 20 June 1905; Jas. Truscott & Son Ltd. to Kaiser, 22 June 1905 (negotiations for a purchase of envelopes); TCP 6/7/4 Kaiser to McCorquodale & Co., 14 September 1905; McCorquodale & Co. to Kaiser, 16 September 1905; McCorquodale & Co. to Kaiser, 18 September 1905; Kaiser to McCorquodale & Co., 20 September 1905 (negotiations over an order of paper); McCorquodale & Co. to Kaiser, 11 December 1905; Kaiser to McCorquodale & Co., 3 January 1906; McCorquodale & Co. to Kaiser, 4 January 1906 (negotiations over the receipt of paper files); TCP 6/1/14, Hewins to Hurd, 13 September 1907 (*post scriptum* asks that Kaiser send plain quarto envelopes to Hewins’s country house).

²¹¹ For circulation of internal documents, see, e.g., TCP 6/1/26, Kaiser to C. A. Pearson, 5 February 1904; Kaiser to J. B. Wilson, 31 March 1904; Kaiser to O’Farrell, 5 May 1904. For the distribution of finished publications, see, e.g., TCP 6/1/26, Hurd to O’Farrell, 29 November 1906; Hurd to Librarian at the Daily Mail, 18 April 1907; TCP 6/1/14, Kaiser to Hewins, 9 August 1907. For the arrangement

with Hurd, served as the Commission's liaison to the two establishments that printed its publications—Vacher and Sons, Ltd., and McCorquodale & Co., Ltd.²¹² In the course of the Commission's interactions with these firms, Kaiser appears to have dealt, at one point or another, with all the major phases of seeing a work through press: extant letters from the Commission's correspondence files show that he had a hand in negotiating contracts for the printing of the Commission's reports;²¹³ sending copy for setting into type, often with instructions as to formatting;²¹⁴ requesting proofs for examination and communicating corrections thereto;²¹⁵ and placing orders for printing publication copies.²¹⁶ He was also

of distribution of materials by a third party, see, e.g., TCP 6/7/4, Kaiser to McCorquodale & Co., 11 January 1906; 3 July 1906.

²¹² Both Vacher and Sons, Ltd., and McCorquodale and Co., Ltd., were well-established stationers, printers, publishers, and, in the case of the latter, booksellers: the former house, which was based in London, specialized in parliamentary publications, whereas the latter, which had offices in Liverpool and Glasgow as well as London, focused primarily on railway-related publications. Vacher and Sons, Ltd., printed the reports on iron and steel, textiles, and sugar and confectionary: it also produced the Commission's stationary, internal documents such as agendas and minutes, and a number of its memoranda for public consumption. McCorquodale and Co., Ltd., printed the reports on agriculture, pottery, and the glass industry, as well as some of the public memoranda. These firms only printed the Commission's reports, the publication of which was entrusted to P. S. King and Son, Ltd.; on the latter arrangement, see TC 6/7/10, Vacher & Sons to Hewins, 12 May 1904.

²¹³ TCP 6/7/4, Kaiser to McCorquodale & Co., 15 August 1905; Kaiser to McCorquodale & Co., 17 August 1905; McCorquodale & Co. to Kaiser, 22 August 1905 (Negotiations for the printing of the Agricultural report).

²¹⁴ See, e.g., TCP 6/7/4, Kaiser to McCorquodale & Co. 1 September 1905 (Submission of copy of text to three witnesses in the agricultural report); Kaiser to McCorquodale & Co., 19 October 1905 (Submission in the form of cards to Section D from agricultural report); Kaiser to McCorquodale & Co., 1 November 1905 (Submission in the form of cards of part of the text of responses to forms of inquiry for the agricultural report); Kaiser to McCorquodale & Co., 22 December 1905 (Submission of copy of text of evidence of six witnesses for the paper report); 27 December 1905 (Submission of copy of draft of pamphlet on "The Woollen industry under free trade"); 29 December 1905 (submission in the form of cards for text of responses to forms of inquiry for report on the china and pottery trade submitted to the printer); 5 January 1906 (submission in the form of cards for text of responses to forms of inquiry for the report on the glass industry); 5 July 1906; 25 July 1906; Kaiser to McCorquodale & Co.; TCP 6/7/10, Kaiser to Vacher and Sons, 31 August 1905 (Submission of summary for carpet and lace); JK (Kaiser) to Vacher and Sons, 7 September 1905 (Submission of summary for hosiery).

²¹⁵ See, e.g., TCP 6/7/4, Kaiser to McCorquodale & Co., 11 September 1905 (Submission of corrected proof for two agricultural witnesses); Kaiser to McCorquodale & Co., 17 November 1905 (Submission of galleys to Section A of agricultural report with extensive notes on corrections in formatting); Kaiser to McCorquodale & Co., 22 November 1905 (Submission of galleys to Section F from agricultural report); Kaiser to McCorquodale & Co., 24 November 1905 (Submission of galleys with corrections specified); Kaiser to McCorquodale & Co. 29 November, 1905 (Submission of galleys with correction and request of proofs of revisions for part of agricultural report); Kaiser to McCorquodale & Co., 5 July 1906 (Submission of corrected proof of first part of agricultural report); Kaiser to McCorquodale & Co., 24 September 1906 (Submission of corrected galley proof of agricultural report); TCP 6/7/10, Kaiser to Vacher and Sons, 30 August 1905 (request that proofs for WW—"Worsted and Wool"—summary be sent in form of galleys); Kaiser to Vacher and Sons, 5 September 1905 (request for copies of proofs).

entrusted with the delicate task of reviewing the bills for payment that the printers submitted to the Commission and meeting with their agents if disagreements arose or there was need of clarification of details in the invoices:²¹⁷ his analyses provided Hewins and Hurd with ammunition in their protracted, and sometimes quite contentious, epistolary disputes with the printers over the amounts charged.²¹⁸

Kaiser's work as the Commission's representative in its dealings with the printers was doubtless occasioned by the fact that its permanent staff was small in size and its internal organization, simple in structure: like its other higher-ranking members, he had to wear several hats in the course of its day-to-day operations. Nevertheless, there was a certain logic to the assignment of these duties to him, for they were complementary to his rôle as librarian and indexer. In most general terms, they had to do with documents, albeit at a different stage of their life cycle—that of creation—than those of collection, indexing, filing, storing, retrieving, and disposing most commonly associated with the work of the librarian. There were more specific reasons as well. Inasmuch as the initial copy of some sections of the reports, including, apparently, the back-of-the-book indexes, was handed to the printers in card form, it stood to reason that the person who oversaw the work on card indexes at the Commission's offices also be in close contact with the printers who had to render the

²¹⁶ See, e.g., TCP 6/7/4, Kaiser to McCorquodale & Co., 1 January 1906; Kaiser to McCorquodale & Co., 2 January 1906 (orders for a leaflet on Woollen industries and order forms thereto); Kaiser to McCorquodale & Co., 11 April 1908 (request for printing of copies of reports on pottery and glass industries); McCorquodale & Co. to Secretary of Tariff Commission, 20 July 1910; McCorquodale & Co. to Secretary of Tariff Commission (letters reporting on printing of an unidentified report arranged with Kaiser and alluding to instructions received from Kaiser regarding an insert).

²¹⁷ See, e.g., TCP 6/7/10, Kaiser, memo for Hurd in re invoice of Vacher and Sons, 17 January 1905; Vacher and Sons to Hewins, 16 March 1905, with explanation of account annotated by Kaiser in ink; Vacher and Sons to Hewins, 16 March 1905 (bis), with annotation by Kaiser regarding price of paper; TC 6/7/4, Hurd to McCorquodale & Co., 4th February 1907; McCorquodale & Co. to the Secretary of the Tariff Commission, 5th February 1907 (Payment of cheque and negotiations to set up a meeting between Kaiser and a representative of the printery). Kaiser also was called upon to check accounts for other firms with which the Commission did business; see, e.g., TC 6/7/6, Kaiser, Memo for Hurd in re invoice of Geo. Smith & Co., the firm that had overseen the mass mailings of Form of Inquiry No. 1, 8 March 1904.

²¹⁸ See, e.g., the exchange of increasingly testy letters precipitated by Kaiser's analysis of Vacher and Sons' bill of payment for the printing of the first report on iron and steel: TCP 6/7/10, Kaiser, memo for Hurd in re invoice of Vacher and Sons, 17 January 1905; Hurd (PH) in name of Secretary to Vacher and Sons, 9 February 1905; Vacher and Sons to Hewins, 16 March 1905, with explanation of account; Hurd (PH) in name of Secretary to Vacher and Sons, 21 March 1905; Vacher and Sons to Hewins, 22 March 1905; Secretary of Tariff Commission to Vacher and Sons, 19 April 1905; Vacher and Sons to Hewins, 19 April 1905. For a shorter-lived account-related *contretemps* between the Commission and Vacher and Sons occasioned by Kaiser's auditing, see TCP 6/7/10, Hurd (PH) in name of Secretary to Vacher and Sons, 27 July 1905; Vacher and Sons to Hewins, 28 July 1905.

text configured on cards into type.²¹⁹ Furthermore, Kaiser appears to have had some say in the editorial design of the reports (see, Chapter 5, Section 4, below): this in itself provided ample justification for involving him in the formal aspects of copy editing and document layout. Last but not least, he seems to have been scrupulous in monetary matters and not hesitant to haggle when need be:²²⁰ such qualities doubtless made him a useful point man in negotiations with the printers' agents.

5.4. The Appearance of Systematic Indexing in Print, 1908 and 1911

After several years of working at the Commission, Kaiser began to prepare works of his own for publication. As we saw earlier, during his time at the PCM, he had drafted a set of protocols for SI (see Chapter 3, Section 3.3, above): these early manuscripts now formed the basis of a project to produce a series of manuals on the card index system (see Chapter 1, Section 5.2.1). Although Kaiser did not record in his writings what considerations motivated him to undertake this project, two factors may well have encouraged him to do so. First, the method of filing and indexing that he had implemented at the Commission's offices was acquiring a local reputation as a model of its kind and the Commission began to receive requests from other organizations for permission to visit and inspect its filing systems:²²¹ however, diffusion of knowledge about the system and its workings was restricted largely to word of mouth and what could be communicated in the course of short, on-site demonstrations. An exposition in print of the principles upon which the Commission's card

²¹⁹ For copy on cards, see TCP 6/7/4, Kaiser to McCorquodale & Co., 19 October 1905; Kaiser to McCorquodale & Co., 1 November 1905; Kaiser to McCorquodale & Co., 29 December 1905; Kaiser to McCorquodale & Co., 5 January 1906. On using the card format as the initial copy of back-of-the-book indexes, see Kaiser 1911, §§ 589, 595–596, which doubtless reflects his own *modus operandi*. Kaiser's practice, which went against the traditional one of preparing copy of indexes for printing by pasting index slips upon paper (e.g., Wheatley 1902, 186–194, 202), seems to have met some initial resistance from the printers who set type for the Commission's indexes, as is clear from his remark that “[t]he copy of the index is best prepared on cards ..., if necessary the printer can set up quite easily from cards although he may at first not like it” (Kaiser 1911, § 589).

²²⁰ See, e.g., TCP 6/1/26, W. A. S. Hewins to C. A. Pearson, 1 January, 1903 [read 1904], in which Hewins recounts bargaining with Kaiser over the latter's salary prior to his hiring.

²²¹ See, e.g., TCP 6/1/26, Editorial offices of the *Standard* to Hewins, 28 September 1905, a letter in which an office manager asks that the secretary “let one of your people show the bearer of this note ... something of the system of filing you adopt; this would be of the greatest assistance to us in the formation of the West End offices we are about to start”. Significantly, this letter bears the penciled initials “JK”, almost certainly an indication that it was Kaiser who conducted the bearer of the letter, a certain Miss Wood, on a tour of the Commission's offices and explained its card system to her. One should note that, in 1905, the *Standard* was under the ownership of C. A. Pearson, then the vice-chairman of the Commission: one suspects that it was through channels associated with him that its editorial offices came to know of the Commission's office methods.

index system was organized would make them and their creator known yet more widely in commercial circles. Second, and more generally, although card index systems were coming into greater use within the British business community during the Edwardian years (see Chapter 1, Section 5.2.1, above), there was little by way of authoritative literature on the subject and what existed was perceived to be limited in its scope. One commentator, writing in 1908, characterized the situation so:

[i]n the main, information on the subject has only been procurable from the catalogues and the booklets (many of them excellent and informing) issued by the manufacturers of the impedimenta of the system, and there is little doubt that the majority of business men who know anything at all about the card system are indebted to these catalogues for their information. But all these publications are primarily concerned with the particular cabinet or file of the firm in whose interest they are published. From time to time articles have been published in technical journals (mostly American) by exponents of the system, dealing with its application to some particular branch of trade (*Ironmonger*, 3 October 1908, quoted in Kaiser 1911, "Some Opinions of the Press", p. [2]).²²²

To be sure, these statements were not free of exaggeration. The first few years of the 20th century had witnessed increasing discussion of card index systems in the popular business periodical literature of the United States and some of this was starting to spill over into the British milieu as well (Chapter 1, Section 5.2.1, above). Furthermore, the British literature on indexing, which had traditionally concerned itself primarily with literary indexing (e.g., Wheatley 1879, 1902; cf. Chapter 1, Section 5.2.5, above), was beginning to acknowledge, and in some cases even address, the use of card indexes in the commercial world (e.g., Clarke 1905, 152–153; Petherbridge 1904, 131–173). Nevertheless, the central point was well taken: there was no single monographic work on card indexes serving as an

²²² One may compare this with the characterization of the situation set forth by a reviewer of *Systematic Indexing* writing for a library journal in 1912: "In the first years following, not the invention, but the general use of indexing as applied to commerce, and systematic filing, the literature of the subject was meager in the extreme and consisted for the most part of manufacturers' catalogues more or less extended, but under the best circumstances limited by the naturally intentional bias, in favour of one make or one system. The second stage in the development of the literature of the subject, as distinct from the development of the subject itself, was the issue of books, generally small in size, dealing with several "makes" of furniture for manufacturers; but as the illustrations and the manufacturers were expected to pay each for his own portion of the book, this was very little removed from a combination on co-operative lines of the earlier trade catalogues. Since that stage several books have been issued dealing with the subject which has now grown to enormous dimensions, more or less independent in tone and comprehensive in scope" (Filing Systems and Indexing 1911–1912, 462). Given the date of the review, the "several books" mentioned in the last sentence of this passage may well refer to the books by Kaiser (1908), Mares (1909), and Byles ([1911]) mentioned in the following footnote: otherwise, it presents the same perception of the development of the literature as that given by the commentator writing in *Ironmonger* in 1908.

authoritative guide to their design, implementation, and maintenance.²²³ A treatise on card indexing would not only fill a gap in the literature but also establish its author as an authority on the subject. Clearly, there was no lack of incentives for Kaiser to set forth the elements of his method in print.

Kaiser (1911, § 20) wrote his first work, *The Card System at the Office* (hereafter, *The Card System*), in 1907 and, engaging one of the Tariff Commission's printers, Vacher and Sons Ltd., to carry out the printing, published it in his own name in the summer of 1908 (List of New books 1908; Railway and other notices and publications 1908).²²⁴ In this book, he presented a detailed account of the constitution and operation of a card index system with the aim of

furnish[ing] office principals with adequate means by way of explanation and illustration to enable them to work out systems suitable to their individual requirements at the office or if they have already some system in use, to help them to co-ordinate and extend it so that the whole of this office work may have one homogeneous arrangement for its basis (Kaiser 1908, § 1; cf. Chapter 1, Section 5.2.1, above).

²²³ Indeed, Kaiser's *The Card System at the Office* appears to have been the first full-scale monographic treatment of the card system in Great Britain, though it was quickly joined by the manuals of Mares (1909), Byles ([1911]), and, with greater emphasis on filing than indexing, Cope (1913). In the United States, the tradition of monographic, as compared to periodical or catalog-based, literature on the subject seems not to have been much older: the earliest general manual devoted to filing and indexing known to me is the "comprehensive of text book on business and office systematizing, vertical filing systems, filing devices, card ledger systems, profit showing system for a wholesale or manufacturing business, etc." issued as "a book of reference for progressive business men and business students" by the Grand Rapids, Michigan-based cabinetmaker-turned-manufacturer of office filing equipment, Isaac Wagemaker (1870–1923), who published it himself (Wagemaker 1907).

²²⁴ The subsequent publication history of this work deserves a brief comment, since it has bibliographic implications that have not been hitherto recognized. In January of 1910, about one and a half years after the initial appearance of the book on the market, Kaiser ceded publication rights to the other of the Commission's printers, McCorquodale & Co., Ltd. (*The English Catalogue of Books for 1910*, 1911, 145). Accordingly, one can find copies of the work bearing different imprints. The title pages of some exemplars, such as one held by the University of California libraries, do not give a publisher in their imprints but are stamped with an inkstamp bearing the legend "published by / J. KAISER / HAZELWOOD / NORTH FINCHLEY", whereas those of others, such as the copy of the British Library Lending Division, bear the imprint "PUBLISHED BY / McCORQUODALE & CO., LTD., 40 COLEMAN ST.. LONDON, E. C. / AND AT GLASGOW". The former imprint clearly indicates a copy of the original 1908 edition, while the other identifies a copy distributed by McCorquodale & Co., Ltd.. Interestingly, McCorquodale & Co. seems to have retained the publication date "1908" on the covers and/or title pages of the copies that it distributed: this explains why a number of bibliographical records for the work in WorldCat, as well as scholarly citations of the work in reference lists (e.g., Black, Muddiman, & Plant 2007, 264; Dousa 2012, 172) date the McCorquodale printings—incorrectly, it seems—to 1908. Additional bibliographical research is necessary to sort out all the details of *The Card Systems's* publishing history; at any rate McCorquodale & Co., Ltd., retained the title in its publications catalog into the 1920s (Gibson 1924, 17).

To this end, after a general introduction to the work (Chapters I–II), he treated such topics as the various implements needed to establish a card system (Chapter III); the principles behind the constitution, and basic design features of, vertical files and card indexes (Chapter IV); procedures for registering, indexing, and filing different kinds of documentary materials, including correspondence, press cuttings, periodicals, books and pamphlets, trade catalogues, and samples (Chapter V); the creation of specialized card registers—such as registers of circulars sent out by a firm, customers’ indexes, travellers’ (i.e., salesmen’s) indexes, mailing lists, and business ledgers—for business purposes (Chapter VI); and the management of a card system once it had been established (Chapters VII–VIII).

Although Kaiser briefly adumbrated the techniques of SI in *The Card System*, he reserved a full exposition of it for a second book, which was put out by Sir Isaac Pitman and Sons, Ltd., a major publisher of books on business (e.g., Isaac Pitman and Sons 1912, 1914), under the title *Systematic Indexing* in the autumn of 1911 (*The English Catalogue of Books for 1911*, 1912, 150).²²⁵ The later chapters of this book discussed the method of indexing (Kaiser 1911, Chapter V), its application to card indexes (Chapter VI), and its adaptation for back-of-the-book indexes (Chapter VII). Preceding this detailed presentation of the procedure of SI and recommendations for its practical implementation were three theoretically oriented introductory chapters that considered, in turn, the context for its use (Chapter II); the linguistic and literary presuppositions on which its mode of document analysis was based (Chapter III); and its relation to the processes of classification (Chapter IV) (Kaiser 1911, § 19). In his introduction to the book, Kaiser stated that he had drafted these three chapters after the publication of the *Card Index* and that his work on them had “made a more precise statement of the parts on indexing possible” (§ 20). To the historian interested in the development of Kaiser’s conceptualization of his indexing system, this statement is of surpassing importance, for it indicates that the theory of SI given in *Systematic Indexing* was apparently elaborated in its final form *after* he had formulated his methods in practice—

²²⁵ Here, too, it is necessary to interpose a brief bibliographical note. Sir Isaac Pitman and Sons, Ltd., were the original publishers of the book: however, in the early 1920s, the publication rights to the book were obtained by John Gibson, the sole agent for McCorquodale & Co., Ltd., in London and copies of the work were issued under his name (Gibson 1922; 1923; 1924, 17). As with the case of the *Card System*, Gibson does not appear to have updated the date in the imprint for his edition of the work and so one finds numerous examples of citations of *Systematic Indexing* that give “John Gibson” (or variants) as the publisher and “1911” as the date (e.g., Black, Muddiman, & Plant 2007, 264; Svenonius 1978, 141, reference 3; 2000, 232): here again, bibliographic representation and historical fact do not seem to coincide. Needless to say, there is scope for further investigation into the bibliographical history of the work.

that is to say, Kaiser's indexing theory was, in large measure, superimposed upon a pre-existent set of protocols for practice, though he then used the former as a framework for explaining and, in part, justifying the latter. As we shall see in Chapter 7, Section 3.4, this *ex post facto* theoretical elaboration left its imprint on one of the central features of SI: its category system.

Although Kaiser apparently conceived of, and composed, his books on his own initiative, one should not consider them in isolation from his work at the Tariff Commission, which informed them in various ways. An especially salient and revealing example of this can be found at the level of the formal presentation of text. One curious feature of Kaiser's books is that they are completely unpaginated: instead, the paragraphs of the text are consecutively numbered and it is by reference to these paragraph numbers alone that the table of contents directs the reader to the various sections of the book and the index locates the individual subjects identified in its entries.²²⁶ This eschewal of pagination in favor of paragraph numbers reflected Kaiser's firm belief that paragraphs are superior to pages as units of reference for indexing a text, a thesis in support of which he marshaled several arguments. For one thing, whereas page numbers were tied to the physical page, paragraph numbers were not; thus, the use of the latter allowed the indexer assign location references to subject entries prior to the setting up of page proof (Kaiser 1911, § 586). In addition to this pragmatic argument from indexer convenience, Kaiser maintained that the use of paragraph numbers as reference locators would improve the quality of indexing. He observed that the text of a paragraph is typically (though not inevitably) shorter than the text on a page (§ 586): the paragraph thus constituted, in his view, a more compact textual unit for the purposes of indexing. Moreover, a paragraph was a "logical subdivision of a text" whereas the page simply "lump[ed] together a quantity of words" which happened to fall on it: the former thus constituted a much more intellectually cohesive unit (§ 587).

²²⁶ Kaiser's partitioning of individual texts into a single series of continuously numbered paragraphs and his use of paragraph numbers as locators in the indexes to his own books were not, in themselves, particularly original, for it was common, though by no means universal, practice for authors of works designed to set forth a subject in a systematic manner to divide their texts in this way (albeit sometimes into two-or-three "sections" rather than single paragraphs) and to employ the paragraph, or section, numbers as locators in their index(es) (when an index was present): contemporary examples include grammars of various sorts (e.g., Allen & Greenough 1903; Sweet 1900), logic textbooks (e.g., Stock 1888, 1903), manuals of librarianship, classification, and indexing (e.g., Brown 1898; 1903; Clarke 1905; Savage 1906), and, perhaps most unusual, an epitome—in effect, a book-length abstract—of Herbert Spencer's *Synthetic Philosophy* (Collins 1889). However, such books were invariably paginated as well, whereas Kaiser rigorously excluded all pagination from his books: in other words, his innovation lay in combining the use of paragraph numbers as locators with the absolute omission of page numbers.

Because paragraphs consisted of relatively short and semantically coherent segments of text, taking them as a unit of analysis would encourage indexers to bring out in the index aspects of subjects that might go unmentioned in a page-oriented index, where the fact that a number of different aspects of a given subject occurred on a single page might lead the indexer to rest content with only a single general reference to the subject as a whole (§ 587). The result, according to Kaiser, was that “[w]ith paragraph numbers there will be more entries, the index will be larger, but it will be more serviceable” (§ 586): the user of an index referring to paragraph numbers would be directed to a relatively short textual unit, making it easier to locate the particular item of information being sought than would be the case with an index based on page numbers (cf. §§ 586, 588). For these reasons, Kaiser concluded, “[w]here the text is numbered by paragraphs the index will have a more definite character, it will show better coordination, it will give more access and do it more easily” (§ 588). Such considerations prompted him to rely on paragraph numbers for internal references, a convention appreciated by some of the books’ readers (e.g., *Stationer*, April 1910, in Kaiser 1911, “Some opinions of the press”, [6]) and deprecated by others (Brooks 1913).²²⁷

Interestingly, the earliest of the Commission’s published reports used an analogous format for their internal reference structure (Tariff Commission 1904, 1905a). Save for the vestigial use of page numbers in their front matter, they eschewed pagination, relying entirely on paragraphs. In each report, paragraphs of the main text were numbered consecutively, with those numbers serving as the points of reference in the table of contents and index. Although later reports would deviate significantly from this norm,²²⁸ it is evident

²²⁷ It is interesting to note that the idea of using paragraph numbers rather than page numbers as locators for back-of-the-book indexes has recently been revived by some writers on indexing, albeit with a different motivation than that of Kaiser—namely to foster the compilation of indexes that can be used for books published both in (paginated) paper-based and (unpaginated) electronic versions; see, e.g., Anderson 2003, 480; Stephen 2009, 77.

²²⁸ The deviation concerned precisely the nature of the unit of numbering. In the first report and the first part of the second report, reference numbers were assigned to individual paragraphs or, sometimes, clusters of two or three related paragraphs, whereas, from the second part of the second report onwards, numbers tended to be assigned to fixed page segments, with each page bearing four numbers distributed at equal intervals from one another. Thus, although the Commission’s later reports superficially resembled the earlier ones in the external appearance of their reference formatting scheme, their internal reference structure was apparently based on a wholly different unit of numbering—one that, in fact, marked a partial reversion to the principle of pagination. The reason for this shift in the unit of numbering is unknown, though the exigencies of printing may well have been a factor: it would have been easier for typesetters to have marginal paragraph numbers at fixed locations of the form than to vary them from page to page. It should also be noted that those members of the Commission’s staff who oversaw the formatting of the reports seem not to have

that the internal reference structure of the earliest reports was based on the same principles that Kaiser would later use in his own books and there can be little doubt that there was a connection between the two. Since our sources are silent regarding the Commission's original decision to adopt a paragraph-based reference scheme, it is not possible to determine whether Hewins and his colleagues adopted an idea originally proposed by Kaiser in his capacity as indexer or whether, conversely, Kaiser took over a suggestion from Hewins or some other member of the Commission's staff. Whatever the direction of influence may have been, Kaiser not only followed the principle with greater consistency in his own works than the Commission did in its publications: he also formulated an explicit rationale for the practice in print.²²⁹

It is not only in matters of formal textual presentation that one finds continuities between the practices of the Tariff Commission and Kaiser's accounts of SI and the card index system within which it was embedded. Kaiser's aim in *The Card System* and, especially, *Systematic Indexing* was to set forth, and justify, a set of protocols that could be used to construct card systems—in particular, indexes—based on a shared structural pattern but customized to fit the particular organizational contexts for which they were created (See Chapter 6, Section 3.4; Chapter 7, Section 6.2, below). Yet, as he himself averred, it is difficult to describe adequately the organization of a card index in the abstract: indeed, he declared, “it is not possible to describe adequately organisations generally, we can only describe adequately *a* particular organisation” (Kaiser 1911, § 643 [emphasis his]). Accordingly, to illustrate the various phases of SI, he drew upon examples of the various indexes that he had created. There is reason to believe that many of the examples of index items—i.e., entries for individual pieces of information—in his second book were based on materials originally drawn from the indexes that Kaiser had designed for the Bureau of Information of the PCM, the CIB, and the Publishing Department of British Westinghouse (See pp. 16, n. 6; 119, n. 109; 131, n. 128; 137, n. 135, above). Otherwise, it was the card

considered this to constitute a major change: in the later reports, they continued to refer to the numbered units as “paragraphs” (e.g., Tariff Commission 1909, “Contents”, “Tables”, §§ 462, 1198, & “Index”), despite the fact that the boundaries of paragraphs in the text and those of the numbered page-segments often failed to coincide.

²²⁹ In this regard, one may compare the disclaimer accompanying some of the “interim indexes” to the various parts of the second report, which stated that “[t]his index is intended merely to supplement the Table of Contents ...” (Tariff Commission 1905a, “Interim Index”, p. [1]), with Kaiser's (1911, § 570) later dictum that “[c]ontents [i.e., the table of contents—TMD] and index divide the work of giving access to the text between them, they always go more or less hand in hand, because they are complementary”. Cases such as this suggest, although they do not prove, that, in his books, Kaiser was simply amplifying what had originally been his ideas.

system of the Tariff Commission that served as the primary source of illustrative examples. By Kaiser's own account, "most" of the photogravure illustrations of card files, exemplars of unit and guide cards, and document files accompanying the text in *The Card System* and *Systematic Indexing*. were "taken at the offices of the Tariff Commission by courtesy of the Secretary, Mr W A S Hewins" (Kaiser 1908, "Illustrations", n. *; 1911, "Illustrations", n. *). Furthermore, his discussion of the theory and method of SI and its application in these books reflected the state of development that his thought about it had reached while working at the Commission's offices: for example, all of the concrete examples of generating index items from short textual units that he gave in *Systematic Indexing* (Kaiser 1911, §§ 448–60; cf. Chapter 7, Section 4.3) were taken from periodical articles published in December 1910—that is to say, toward the end of his sixth year of work for the Commission—, while, as we noted earlier, all of the theoretical chapters from that work were composed during his tenure there. Thus, by virtue of the examples that they gave and the general approach to indexing that they set forth, Kaiser's books were unmistakably the work of the "librarian of the Tariff Commission", as their title pages proclaimed (Kaiser 1908, t.p.; Kaiser 1911, t.p.), and contemporary readers were not incorrect in perceiving the Tariff Commission's card index system to be a major source of inspiration for the one described in Kaiser's books (e.g., *Ironmonger*, 3 October 1908, in Kaiser 1911, "Some opinions of the press", p. [2]; *Standard*, 2 October 1908, in Kaiser 1911, "Some opinions of the press", p. [1]; cf. *A Mere Librarian* 1911, § ii; Brooks 1913, 371; *Reviews* 1911, s.v. "Systematic Indexing").

Chapter 6.

Systematic Indexing (I): Institutional and Knowledge-Organizational Context

6.1. Systematic Indexing and its Context: General Considerations

The preceding three chapters have shown that between 1896, when Kaiser began his career as a librarian and indexer, and 1911, when he published his treatise on *Systematic Indexing*, he worked for four different organizations that were, in one way or another, imbricated with the world of commerce and industry: the Bureau of Information at the PCM, the CIB, the Publishing Department of British Westinghouse, and the Tariff Commission. Although each of these establishments had its own distinct organizational mission, profile, and information régime, they converged in one crucial respect regarding the latter: all of them were sites of activities that required the expeditious retrieval, coordination, and mobilization of specific items of commercial, technical, or economic information culled from a wide range of documentary sources at their disposal. Such was the general atmosphere within which Kaiser developed his understanding of knowledge organization and elaborated his own distinctive contribution to it—the method of indexing that he named SI. At this point in our narrative, the time has come to examine in greater depth the lineaments of his indexing system.

In the introduction to *Systematic Indexing*, Kaiser (1911, § 16) assured his readers that SI “is simple in its application” and that “[f]ifteen minutes demonstration would suffice to explain the main points of the whole *modus operandi*”. However, he went on to add that, “like most things”, his method of indexing is “difficult to describe in a few words”. And so it is, especially if one wants to understand the rationale of the system within its historical context. Any summary description of SI inevitably runs the risk of oversimplifying, and hence, distorting its features: nevertheless, a brief enumeration of some of the key premises underlying the system may serve as a useful initial orientation to its general *Gestalt*. Formulated in present-day terms, they may be stated as follows:

- As a rule, discrete elements of information contained in textual documents, rather than the documents themselves, are the units to which an indexing system is most appropriately applied (Dousa 2009–2010, 19–21; 2014, 307–311; Metcalfe 1957, 235–236; 1965, 47; Sales 2012, 66 & 118–119).
- A mode of organization rigorously systematic in its structure yet flexibly configurable to the individual requirements of the particular contexts in which it

might be used should serve as the framework for representing and retrieving these items of information (Dousa 2007; 2008, 245–247);

- Compound subject index terms composed of simpler index terms—what Kaiser called *statements*—constitute the mechanism by means of which discrete units of information are to be identified within documents on the basis of their specific subject content, delimited, extracted, and organized for ready retrieval (Metcalf 1959, 299; 1973, 308–309; Sales 2012, 129–130; Svenonius 1978, 137–138);
- A limited set of broad classes, or categories, to which individual index terms are assigned and syntactic rules for combining terms from different categories in accordance with a fixed citation order form the basis for creating consistently structured statements, in which the initial term serves as the main, or entry, term and the others function as subdivisions thereof (Sales 2012, 129–130; Svenonius 1978, 134–135, 137–138; 2000a, 6, 173; Vickery 1950b, 221).
- An index file should be organized according to the alphabetical order of the main, or entry, terms of statements, with cross-references made to indicate any semantic relationships obtaining between different main terms (Dousa 2009–2010, 22; Rodríguez 1984a, 167–168; Serrai 1979, 52–53; Vickery 1950a, 144; 1950b, 221).
- The card system forms the natural technological medium for the construction of indexes along the lines set forth above (Dousa 2009–2010, 21; Sales 2012, 67–68 & 98–103).

From a typological perspective, the kind of KOS resulting from the application of these tenets of design was an alphabetic-specific (see Glossary) subject index equipped with a syndetic structure (see Glossary). Each subject heading in the index took the form of a composite index term, which was constructed in a predictable manner; under each heading were entered discrete pieces of information pertaining to the subject indicated by the main term of the statement; and entries for individual items of information were recorded upon cards and filed under the appropriate heading in a card index.

Viewed in light of the development of indexing theory and practice in the first years of the 20th century, the general design of SI represented a *mélange* of the traditional and the new. Some of its structural features, such as the use of alphabetical order to organize the headings in an index, a preference for entry of indexed items under specific headings, and the provision of cross-references to signal interrelations between related subjects, were well-established elements of subject indexing applied in settings as diverse as back-of-the-book indexes (e.g., Nichols 1892a, 406, 409, § 9 & 13, 414–415, §§ 44–50; Wheatley 1876, 53–54, 56, & 71, point 2; Wheeler 1905, 467, 468, 471, 480–481; 494–495), periodical and bibliographical indexes (e.g., Clarke 1903, 67–68; 1905, 18–21; 30–33), and, within the library setting, dictionary catalogs (e.g., Cutter 1904, 17 [s.v. “Classed Catalogs”], 19 [s.v.

“Dictionary catalog”], 22–23 [s.v. “Specific Entry” & “Syndetic”], 66–67, 79–80). Others constituted novel applications of otherwise traditional aspects of indexing. For example, Kaiser’s view that specific items of information within documents should be the primary units for indexing bore some resemblance to norms of granularity characteristic of back-of-the-book indexing (e.g., Clarke 1905, 49–50; Petherbridge 1905, [xviii]); however, it found a much stronger parallel in an emergent practice within European Documentalism, whose originator and leading light, Paul Otlet, advocated, *inter multa alia*, extracting pieces of information from different documentary sources and collating them by subject within the framework of a card and/or vertical file system (See Chapter 1, Section 5.2.3, above; Chapter 7, Section 1, below). Yet other elements of SI seem to have been innovations on Kaiser’s part. Of these, the most striking was his stipulation of a set of categories with which to classify subject index terms and rules for combining terms from different categories into composite index terms. To be sure, other contemporary theorists of knowledge organization such as Otlet and the British public librarian and classification theorist James Duff Brown were exploring, each in his own way, the use of categories and citation orders as auxiliary devices for the synthesis of composite classmarks in bibliographical or bibliothecal subject classifications (Beghtol 2004a, 708–711; Grolier 1962, 18–19; Rayward 1975, 92, 94–96). Kaiser, however, appears to have been the first writer on indexing to have made these structural features the cornerstone of a verbally-based indexing system (Grolier 1962, 44; Vlasák 1967, 152–153): as we have already seen, it is this aspect of SI that has most impressed latter-day KO theoreticians (Chapter 1, Section 2, above).

The preceding sketch of the main structural features of SI allows us to characterize it as a particular kind of KOS and indicates some of its elements that have especial historical significance for the theory of KO. Yet, if we are to understand the inner articulation of the system, to appreciate the rationale for its design, and to assess its full significance for KO theory, we cannot rest content with this general description: as I have argued in the introductory chapter, we must examine in some detail how Kaiser conceptualized it and to consider the factors that conditioned his conceptualization thereof (Chapter 1, Section 2, above). Here, however, a further consideration imposes itself. Anyone who undertakes to read *The Card System at the Office* and the first two chapters of *Systematic Indexing* will quickly conclude that, in order to understand the rationale of Kaiser’s indexing system, it is not sufficient to consider it in itself as a self-contained KOS. The reason for this is not far to seek. Kaiser expected that SI would be used in a certain kind of institutional setting and that

it would form but one part—the most important one, to be sure—of a broader knowledge organization régime encompassing a scheme for the classification and retrieval of documents as well as a plan for the extraction and organization of the informational contents thereof: indeed, subject indexing, in his view, presupposed that a particular mode of organizing documents and a mechanism for retrieving them as documentary units was in place (Kaiser 1911, §§ 43–44, 295). Thus, if one is to come to grips with Kaiser’s conceptualization of SI, one must take into account not only the indexing system itself but also the broader institutional and knowledge-organizational context within which he situated it.

In light of the foregoing methodological considerations, the account of SI presented here has been partitioned into two chapters. The present chapter lays the groundwork for unpacking Kaiser’s indexing system by examining his account of the context in which it was to be used. First, we shall consider the kind of institutional setting—what he called the intelligence department or the business library—in which he envisioned that SI would be employed (Section 6.2). As we shall have occasion to see, Kaiser understood this kind of institutional unit to fulfill a distinctly informational rôle within the framework of a larger organization to which it belonged and the mission of which it was to subserve. To his mind, the alignment of the work of the intelligence department with the organization of which it formed part was of cardinal importance for its operation. In Kaiser’s view, the informational activities of the intelligence department, or business library, were ultimately predicated on the knowledge organization processes of filing and indexing. Although he attached paramount significance to indexing, he readily acknowledged that it could be carried out only in conjunction with the physical organization of documents and the provision of means of retrieving them, both of which were elements of the process of filing. Accordingly, he outlined methods for the classification of documents and for the creation of a series of card system-based mechanisms for document retrieval that he called registers. In the latter part of this chapter, we shall submit to scrutiny Kaiser’s scheme for document classification, his protocols for creating registers, and his justifications, both theoretical and practical, for them (Section 6.3). We shall also discuss how his methods related to the broader currents of knowledge organization as manifested in contemporary discourses about bibliographical classification in libraries and filing and indexing in the business realm; moreover, wherever appropriate, we shall indicate points at which his prescriptions for classification and the constitution of registers were conditioned, either positively or negatively, by the knowledge

organization practices of the particular milieu in which he worked. Perhaps the most important result of this discussion, at least from a systemic point of view, is that, contrary to the practice of most librarians and in accordance with that of a number of filing experts, Kaiser stringently separated document classification from subject indication; similarly, he distinguished sharply between the function of card registers, which, at best, provided only very partial and general indication of the informational contents of documents, and that of card indexes, the purpose of which was to provide direct and immediate access to pieces of information found within the documents of a collection. In short, SI was to serve as the primary—and, for some kinds of documents, the only—means of subject access within the ideal knowledge organization régime for an intelligence department as envisioned by Kaiser.

Once we have acquainted ourselves with the institutional and knowledge-organizational context of SI, we shall be in a position to examine Kaiser's indexing system itself. This we shall do in Chapter 7, which provides a detailed, though not comprehensive, account of the method and theory of SI. We shall begin by considering Kaiser's conceptualization of indexing as a form of "information analysis" (Dousa 2009–2010, 19; Metcalfe 1957, 223, § 840), the goal of which was to obtain a measure of control, at a highly granular level, over discrete pieces of information selectively culled from the documentary materials belonging to an intelligence department's, or business library's, collection (Section 7.1). Thence we shall turn to a discussion of the epistemological and linguistic assumptions underlying Kaiser's theoretical articulation of SI (Section 7.2). Kaiser's view of knowledge and language, we shall see, was, in general terms, empiricist in its orientation and irreducibly individualist in its tenor: observation of things in the world and inferences therefrom made within the frameworks of one's individual perspective on the world were the sources of knowledge, while written language, which he considered, as a rule, to be a woefully imprecise medium for the expression of one's ideas, provided the only visible means of communicating the contents of one's particular thoughts, however imperfectly, to one's fellows. An acute sense of the semantic lability of language, coupled with a broadly empiricist outlook, led him to take a closely text- and language-oriented approach to indexing that favored, although it did not restrict itself to, the extraction of index terms from texts being indexed. The indexing vocabulary that resulted from term extraction and allied techniques was articulated into two orthogonal classificatory schemes, one of which distributed index terms into a small

number of general categories, while the other distinguished between terms within a given category on the basis of their relative specificity.

At the center of SI lay the system of categories for index terms and the elaboration of rules to create complex index terms, or statements, by combining terms from different categories according to a few fixed citation orders. We shall pass in review Kaiser's definitions of these categories and his rationale for the syntax of the statements that he stipulated (Section 7.3). Evidence will be presented that his category system resulted from the superimposition of a theoretical account of the categories upon a practical distinction that he inherited from the indexes of the Bureau of Information at the PCM: we shall argue that the resultant system was not altogether theoretically stable, many of its limitations arising from the tension between its theoretical justification and its pragmatic origins. At any rate, statements served as the means of demarcating the contents of distinct pieces of information within a text, which were recorded as index items on unit card records. Accordingly, we shall examine Kaiser's guidelines for formulating index items, discuss the component elements of these items, and give an account of how they were recorded on index cards (Section 7.4). Individual card records, of course, were elementary units within a card index file as a whole and so we shall then turn to Kaiser's conceptualization of, and provisions for, the file structure of a card index as a whole (Section 7.5). We shall outline his method of arranging unit cards in accordance with the alphabetical order of the terms that composed the statements characterizing the subjects of the items of information that they bore and his protocols for creating the cross-references that indicated semantic relations among the main entry terms of statements, paying due attention both to the theoretical justifications that led him to adopt the measures that he did and the practical realization of the measures themselves: as we shall have occasion to observe, the constitution of individual index items and the file structure of an index alike were shaped by a delicate interplay between the syntactic structure of statements and the physical constraints of the card system apparatus that provided the material support for indexes created in accordance with the rules of SI. The chapter will close with a brief reflection upon a tension that pervaded Kaiser's account of his indexing system and the broader knowledge organization régime of which it formed the centerpiece (Section 7.6). On one hand, he chafed at the notion of universal standardization in knowledge organization and insisted that individual KOSs should always be strictly tailored to the individual needs of the particular organizations for which they were created; on the other, he encouraged consistent

adherence to a uniform plan in the construction of individual indexes. The interplay between the prescription of definite structures and the customization of those structures to accommodate individual requirements reflected Kaiser's own commitment to systematicity and individuality, two cardinal values embodied by SI. Here, too, we shall consider the biographical and historical forces that shaped these features of his indexing system, whenever the evidence is sufficient to do so.

This, then, is the general trajectory that we shall pursue in our discussion of SI. Let us commence by examining the kind of institutional framework within which Kaiser thought it would be applied.

6.2. The Institutional Context for Systematic Indexing: The Intelligence Department and Business Library

6.2.1. Historical Background: The Concept of an Intelligence Department

In *Systematic Indexing*, Kaiser (1911, §§ 23–51) situated the use of SI within a particular kind of milieu, which he called the *intelligence department*. For his early 20th-century readers, this designation would have called to mind certain notions about the kind of setting so named and the functions that it was supposed to serve. Primarily denoting the capacity for intellectual understanding and the exercise thereof, the word “intelligence” also frequently referred to “knowledge as to events, communicated by or obtained from another”; “information received or imparted”; “communicated knowledge”; “news”; or “tidings” (Murray et al., 1888–1928, Vol. 5/2, 370, 7 s.v. Intelligence; Whitney & Smith 1911, Vol. 5, 3133a, 5 s.v. “intelligence”). When used in these latter senses, it functioned as a quasi-synonym for the word “information” (Johns 1967, 54; Weller 2009, 28), often carrying the added nuance that the communications in question were contributing to awareness of recent developments in the commercial or (geo)political sphere.²³⁰ By the same token, an intelligence department was a branch of an institution dedicated to the gathering, organization, and provision of information to its members (Murray et al., 1888–1928, Vol. 5, 370, 7.d s.v. “Intelligence”, 5th citation [1888]). Perhaps the prototypical model of this

²³⁰ This, for example, was the meaning that it had in the title of Henry Sell's newspaper, *Commercial Intelligence* (See Chapter 4, Section 1, above) and in column headings of British newspapers like the *Times*, such as “Mail & Shipping Intelligence” (e.g., *Times*, 1 January 1900, p. 6), “Naval & Military Intelligence” (e.g., *Times*, 28 January 1904, p. 5), “Election Intelligence” (e.g., *Times*, 23 January 1904, p. 12), and so on. Weller and Bawden (2006, 141 & 147) and Weller (2009, 30–32; 45–46) discuss the close semantic nexus between the concepts of information, news, and intelligence in the 18th and mid- to late-19th century English contexts from which the Edwardian concept derived.

institutional type in the public imagination was the Intelligence Department of the British War Office. Growing out of a Topographical and Statistical Department established in 1857 and assuming its identity as a separate department in 1875 (Bridges 1900–1901, 344), the department had as its brief “[t]he collection and collation of all information with regard to the military defence of the Empire ...”, “[t]he accumulation of all facts that can be obtained as to the military strength and resources of foreign powers”, the preparation of maps for military purposes, and the translation of foreign documents that it or other public departments of the government received (Bridges 1900, 684). Drawing upon communications received from a wide network of informants abroad, an extensive map collection, and a well-stocked library of books pertaining to military affairs (Bridges 1900, 683; 1900–1901, 347–350), the Intelligence Department undertook the task of “collecting, classifying, and arranging” (Smith & Johnson 1895, 270, s.v. “Intelligence Department”) information pertaining to the military interests of Great Britain, which it then mobilized to keep not only the War Office but also other departments in the British government, abreast of military and geopolitical developments of state interest.

Although most frequently associated with military institutions, the intelligence department was not, by any means, restricted to such entities alone. For example, the well-known British marine insurance association, Lloyd’s, incorporated in 1871 but with roots extending back to the late 17th century, maintained an intelligence department that gathered, recorded, and disseminated, in a number of different serial publications as well as privately, information regarding various aspects of mercantile shipping (Hart 1906, 500–501; Hozier 1901, 90, 95–99; 1912, 674). In the late 1880s and 1890s, the Imperial Institute in London operated a Commercial Intelligence Department—also known as the Department of Commercial Intelligence—which, as its directors expressly acknowledged, was inspired by the Intelligence Department of the War Office (Imperial Institute 1887; *The Imperial Institute*, London 1887). As we saw in Chapter 3, Section 2, and Chapter 4, Section 1 above, this department of the Institute carried out informational activities comparable to those of the Bureau of Information at the PCM, albeit on a more modest scale and with somewhat different emphases, before being nationalized and folded into the Commercial Intelligence Branch of the Board of Trade in 1902 (Muddiman 2011, 113–115). Whereas the Imperial Institute was a semi-public institution, maintained by private subscriptions and donations from colonial governments abroad, similarly motivated intelligence departments were created as state entities in other sectors of the anglophone world. For example, in 1905, the

Australian states of South Australia and New South Wales each established its own intelligence department “to collect, collate, and disseminate information” in support of their respective “producing interests”, in particular those operating in the field of agriculture (The Editor 1907, 711): by 1907, the department in New South Wales had embarked upon a wide-ranging program of activities ranging from the collection of information about the state’s natural resources to the promotion of tourism and assisted immigration (pp. 714–715), while the South Australian one, which was attached to the Department of Agriculture, seems to have confined itself largely to the running of an agricultural library and dissemination of departmental publications (pp. 712–714).

By the early 20th century, the idea of the intelligence department had also penetrated into the realm of private business enterprise. In 1901, two managers at G. and J. Weir, Ltd., a prominent Glaswegian engineering firm, reported on the existence of such a department at their concern, which they described in the following terms:

The Intelligence Department deals with the collection of information and data required by the various departments and members of the firm; the indexing, cataloguing, and filing of technical literature, catalogues, cuttings, etc. It secures a systematic perusal of contract advertisements in the technical papers, marks and records openings for the firm’s products, and keeps a card index of parties interested or likely to be interested in them. The principals or heads of departments furnish notes of special subjects on which they desire information, and articles in current magazines or papers are marked for their perusal. ...

Suppose the firm is considering any problem, say foundry equipment, the Intelligence Department is requested to collect the articles dealing with this subject, the various yearly indexes of technical papers are gone over, and if need be a summary is prepared for the Technical Committee, or the individual member to whom the question has been remitted (Weir & Richmond, 1901, 906).

The department at Weir did not operate on a fulltime basis or have a dedicated staff, for, as the managers went on to note, its “duties ... are ... not continuous but intermittent, and are combined with other clerical duties” (p. 906); that is to say, it was not fully institutionalized as a formal division within the organization but rather existed as a subset of information-related tasks forming part of the broader spectrum of work carried out by certain members of the company’s office personnel. Even so, both the kinds of activities that it involved—the receipt, processing, and storing of various kinds of commercial and technical literature pertaining to the company’s field of action; systematic notification of the company’s managerial staff regarding items of potential interest to them in newly acquired documentary materials; a rudimentary form of market research through the scanning of

publications for certain kinds of data; and the provision of bibliographical data on subjects of current interest to the firm's management—and the rationale adduced for its existence—it was meant to serve as a means of keeping abreast of developments in areas of interest to the firm (pp. 905–906)—neatly typified many of the core features of the intelligence department as an institutional concept within the commercial and industrial sphere. After World War I, this conceptualization of the intelligence department would reemerge in the nascent discourse of British special librarianship, where, amplified and elaborated, it would enjoy a long career.²³¹

6.2.2. Kaiser's Conception of the Intelligence Department

As we have seen, the notion of an intelligence department had begun, *mutatis mutandis*, to develop a certain profile in different domains by the time that Kaiser employed it in *Systematic Indexing*. Without departing from the received acceptations in any significant way, Kaiser developed his own conception of the intelligence department, firmly planted in the discursive tradition of business organization and system (Chapter 1, Section 5.2.1, above). In his view, a significant feature of the intelligence department *qua* institutional type lay precisely in the fact that it was a department forming part of a larger organization (Kaiser 1911, § 34). Although this may seem like an elementary, almost banal, consideration, it would have important consequences for his understanding not only of the intelligence department as such but of the nature of the KOSs deployed within it. In most general terms, Kaiser understood an organization of any kind to comprise “a set of specialized systems coordinated to work collectively with the same end in view” (§ 26). In the case of business organizations, the “specialized systems” in question were the various departments into which a large-scale concern was typically divided. Now the generally

²³¹ Thus, for example, we read in a paper on special libraries and intelligence bureaux delivered at the ASLIB conference held in 1938: “*Intelligence Departments* of big industrial concerns ... have in general two distinct but closely interwoven functions. The first is to supply their own research workers, works managers, and departmental heads with the latest information available on all matters connected with their work and on request to investigate any particular subject upon which information is required. This may be called the production side of their activities. The other is to collect and collate information on new uses for the company's products and propaganda material generally and to pass it to the sales, development and publicity departments respectively” (Horn 1938, 34). Note that the first function of supplying key workers with information mirrors one of the duties carried out by the members of Weir's department, while the second, with its emphasis upon providing information for the purpose of product sales and propaganda, bears at least some analogy to the “environmental scanning” of contract advertisements carried out at Weir. Of course, unlike the latter, the later intelligence departments described in the ASLIB paper were extensive, fully dedicated divisions within their respective organizations.

accepted rationale for partitioning a business into separate departments was that they constituted useful administrative units for organizing and overseeing functionally different kinds of work in accordance with the principle of the division of labor (e.g., Barrett 1909, 44; Galloway 1910, 144–152; 1919, 3 & 17; Sparling 1906, 98, 110–112, 121–122). Each department of a factory or an office was charged with performing a specific kind of business function and, to the extent that it did so, it operated as a distinct unit unto itself within the structure of the whole. Yet, if each department within a business organization carried out its duties with a certain measure of independence, there were definite limits to its autonomy, for, as Kaiser (1911, § 33) put it,

[w]hile ... any group in its internal arrangement may work independently, that independence must in all cases be tempered by the inter-dependence between the groups, the just appreciation of which only can lead to effective concerted action by which success may be achieved. An organization represents therefore the harmonious effort of a number of parts working independently, but whose independence is subordinate to their collective harmony in the pursuance of a common object.

On this account, the work of an intelligence department, no less than that of its sister departments, was specific to itself and yet it was ultimately configured toward serving the purposes of the larger organization of which it formed part: in the current parlance of KO, it was oriented towards a particular organizational domain (e.g., Mai 2005, 606–607).

Like his contemporaries, Kaiser envisaged the intelligence department as an organizational unit devoted to the collection, organization, and provision of information (Kaiser 1911, §§ 4, 24, 36). Anticipating that some of his readers might question whether a unit engaged in clerical tasks deemed in certain quarters of the business community to constitute “unproductive labour” was worth the expense of institution and maintenance (§ 35), he set forth a justification for the existence of such a department within the organizational framework of an enterprise.²³² As might be expected, the line of argument

²³² Productive and unproductive labor were traditional categories in economic and business discourse, with the former historically taken to be the valuable kind of labor generative of wealth and profit. Although there were long-running, and quite sophisticated, debates within political economy regarding where the line between productive and unproductive labor should be drawn (for a brief overview, see, e.g., Faraday 1913), many manufacturing concerns tended to adopt, for costing purposes, the following distinction: the kinds of work that contributed *directly* to the conversion of raw materials into finished, vendible products were classed as productive labor, whereas unproductive labor encompassed forms of work that contributed only *indirectly* to the manufacture of goods (e.g., Scheaffer 1920, 317; Wilber 1907, 130). In accord with such a view, some manufacturers considered clerical work, including such activities as accounting or bookkeeping, to constitute unproductive labor (as reported in Holmes 1908, 279; cf. Mitchell 1920, 69; Wilber 1907,

that he took was uncompromisingly utilitarian in its tenor and substance. Information, Kaiser argued, is a useful resource upon which all individuals routinely draw for their own purposes in carrying out their various activities: “the philosopher, the scientist and the business man ... each applies individual energy to available information in order to attain the object each has in view” (§ 3). Positing that, in business, “the single transaction” is “[t]he unit of our activity”, he declared that any transaction “involves knowledge and enterprise” (§ 23).²³³ That is to say, a businessman engaging in business dealings must exercise his own “enterprise or individual energy” (§ 24)—what was, in the lexicon of contemporary business culture, the personal amalgam of initiative, will, persistence, and diligence necessary for success in one’s career (e.g., Marden 1907, 139–140; Mathews 1903, 79–82, 94–95; Ricker 1909, 14; Smiles 2002/1866, 190–191)—in light of the “knowledge or information” (Kaiser 1911, § 23) that he has at his disposal. Asserting that “[a]ll transactions may ultimately be reduced ... to enterprise and information” (§ 24), Kaiser claimed that both factors are indispensable to the successful prosecution of business. On one hand, he noted, “[i]t is impossible to imagine any transaction, no matter to what degree it may have been successful, which is not the outcome of enterprise or individual energy” (§ 24): after all, a businessman has to put forth personal effort to plan and carry out his professional activities. On the other, he observed, “the success of enterprise is dependent in all cases on information as a basis of operation” (§ 24; cf. § 4), for, without information, a businessman lacks the knowledge necessary to make appropriate decisions regarding his business interests. Such considerations naturally led him to the affirmation that “information is the basis of all enterprise” (§ 622) and so constitutes “a valuable commodity” (§ 6). Thus, Kaiser concluded, business organizations had a compelling reason to establish and maintain some sort of unit dedicated to the processing and provision of information: as he pointedly told his readers, “it is certain that you cannot do without it, whatever your particular organization” (§ 34; cf. § 622).

136) and tended to view it as being of secondary importance to the internal economy of a firm, with the result that such clerical units were among the most likely to be scanted or, in some cases, dispensed with, in difficult times (as reported in Farnham 1917, 395–396). This, apparently, was the view that Kaiser (1911, § 35) had in mind and sought to combat with his argument, for, as he stated in most emphatic terms, “[t]o say that the intelligence department (or any other kind of labour for that matter) is unproductive is sheer nonsense. I believe that to this unsound idea of *unproductive labour* a good deal of the lack of organisation is due” [emphases his].

²³³ Kaiser’s claim that the transaction was the basic unit of business activity was consonant with the bookkeeping postulate that “the lowest unit of commerce is the transaction: all commercial wealth and indebtedness are the result of individual transactions” (Carlill 1896, 5).

For Kaiser, then, an intelligence department formed part of a business organization—a collective entity possessing a common purpose and goals relating to its field of endeavor—and was responsible for husbanding a resource of capital importance for the work of the members of the organization and, hence, for the organization as a whole: information. “The sole aim and purpose of the intelligence department”, he proclaimed, “must be: to aid efficaciously whatever individual energy there be by giving all the information desired” (Kaiser 1911, § 36). This mission determined the nature of the tasks that he took to belong within its field of action. First of all, it had to gather documentary materials relating to “all the matters bearing on the adopted field of action” of the organization to which it belonged (§ 36). Once these materials had been obtained, it was necessary to process and organize them in such a way that they and their informational contents would be made readily available for practical use; as Kaiser put it, the department “must put them through various processes of classification, so that when reconstituted, they will yield the desired result” (§ 37). Foremost among these processes were filing and indexing. *Filing* dealt primarily with the physical organization of the documentary materials collected by the department, whether on shelves, in boxes, or in vertical files, and of the cards in the card registers created to identify these materials (Kaiser 1908, § 120; 1911, §§ 42–44);²³⁴ it was an activity oriented primarily towards the storage and retrieval of documents as whole units.²³⁵ *Indexing*, on the other hand, was “the process by which we collect and make our information accessible” (Kaiser 1911, § 5; cf. §§ 45, 51). As such, it involved the “systematic

²³⁴ Note that in *The Card System*, Kaiser (1908, § 78) defined the term “filing” in a narrow sense to refer to the physical placement of documents or cards into “their proper place” within a document or card index file (§ 78), thus distinguishing it from the acts of *recording* (i.e., assigning a call number to a given documentary item within the framework of a document classification) and *registering* (i.e., preparing card entries for a document for inclusion into card registers): these are discussed in greater detail in Sections 3.2 and 3.4 of this chapter. However, elsewhere in this work, he invested the term “filing” with a more expansive meaning to encompass not only the actual physical insertion of documents or cards into files but also the work of determining and implementing the structure of the files in question (§§ 120–144). In *Systematic Indexing*, he sometimes spoke of “filing” in the narrow sense when discussing the placement of cards into an index, but also employed it to denote the entire process of document organization: it is this latter sense that I am foregrounding here.

²³⁵ In taking the constitution and arrangement of card registers as part of the process of filing, Kaiser departed somewhat from the distinction between filing and indexing drawn by some of his contemporaries, according to whom filing was restricted to “the systematic putting away of papers, drawings, photographs or books”, while indexing involved the creation of card indexes—including what Kaiser called registers—that served as “a means for pointing out where things are to be found” or as “a guide to a file” (Flinn 1909, 116). Kaiser’s distinction between card registers and card indexes, which we already briefly encountered in our overview of the knowledge organization régime of the Tariff Commission (See Chapter 5, Section 3, esp. p. 170, above), will be discussed in greater detail in Section 3.4 of the present chapter.

analysis" (§ 17) of documentary materials into discrete pieces of information on the basis of subject content. This analysis, Kaiser emphasized, was selective in nature, for an important function of indexing was to identify and enucleate just those parts of the department's documentary materials that were of interest to the organization and its workers (See Chapter 7, Section 1, below). The items of information gleaned by analysis were to be collected and (re)arranged into a "systematic card index" (§ 47), which not only served alongside the card registers as a key to the contents of the department's documentary materials but also constituted in itself "a stock of information" (§ 49) upon which, in principle, a user could draw for research purposes without needing to have recourse to the original materials (§§ 48, 660).

Once established and sufficiently developed, an index served as the principal support for a third task that Kaiser (1911, § 48; cf. §§ 659–662) assigned to the intelligence department: *summarizing*, or the preparation of brief reports "in response to any given case of inquiry". Essentially a form of research service, summarizing involved gathering from the index (and, if need be, the documentary materials to which it pointed) the various items of information pertaining to the subject of an inquiry and synthesizing them into a summary giving "a clear and reliable exposition of the actual status quo—facts or opinions—of a given case" (§ 36; cf. § 660) of interest to the inquirer. Kaiser may well have based this notion of summarizing as a process of constructing a report from individual items of information upon his experience at the PCM, where staff researchers at the Bureau of Information had routinely utilized such a procedure in compiling customized reports for subscribers (See Chapter 3, Sections 2 & 3.3, above). Yet, the idea also would doubtless have had resonance for a wider circle of readers in the business world, for it was a variation on the general theme of upwards reporting within an organization, a practice that was becoming an increasingly frequent feature of internal communications within larger corporations in the early 20th century (Stannard 1913a-d; Yates 1989, 77 & 91–92). It was also consonant with the received notion of the duties of an intelligence department; as we saw earlier, the occasional preparation of summaries upon request had already formed part of the remit of the semi-formalized intelligence department at G. & J. Weir (See Section 2.1 of this chapter). At any rate, Kaiser attributed great informative value to the "[s]ummaries elaborated by the intelligence department", going so far as to extol them as "the sine qua non of intelligent action and of organized enterprise" (Kaiser 1911, § 662). Presented in this

light, summarizing and its products appeared as the culmination of the department's informational mission.

There was, however, a good measure of ambivalence in Kaiser's assessment of summarizing, for he did not accord it as full a rank within the workflow of the intelligence department as he did to the other activities that took place therein. In his judgment, summarizing was largely dependent upon the prior organization of the information in the index and so, in a certain sense, was derivative of the knowledge organization work that had preceded it: "if [the indexes] have been properly constituted and coordinated, summarizing is not a very difficult matter", he proclaimed (Kaiser 1911, § 49). Moreover, he held that many inquiries did not require the level of research needed to prepare a summary but could be answered simply by consultation of an individual item of information in an index: here, research work collapsed into ready reference. The upshot of these considerations was that Kaiser understood summarizing to be an "optional" activity within the workflow of the department, whereas filing and indexing were obligatory (§ 50). Thus, although Kaiser did not deny the general significance of summarizing (or, for that matter, other reference activities) to the informational mission of an intelligence department, he deemed it to be epiphenomenal to the knowledge organization activities of filing and indexing, which he took to be foundational to the department's work: the "main function" of the intelligence department, he averred, was "to organize ... information" (§ 622). Nor was this all, for among the core activities of the intelligence department, one had pride of place: "the most important part of the entire work", in Kaiser's estimation, was indexing, "for through it our information is made accessible, it is made ready for use, and this information is selected by ourselves and for our special requirements" (§ 51).

6.2.3. Kaiser's Conception of the Business Library

Such, then, were the primary contours of the intelligence department as Kaiser envisioned them. In its valorization of filing and indexing, his notion of the intelligence department paralleled the contemporary image of another kind of institutional unit that was starting to come into its own within the discourse of system and business organization in the first two decades of the 20th century: the filing department (e.g., Hudders 1916, 115–117; Leffingwell 1917, 164; Stanger 1911; Wagemaker 1907, 26, 42–43). Generally presented in office management literature as a specialized division within the central offices of a business organization, the filing department was the unit in a firm responsible for

collecting its records, classifying them, arranging them into files, storing them, and making them available to members of the firm's personnel as needed (Galloway 1919, 146–148).²³⁶ Typically, filing departments were charged with keeping documentary materials generated by a firm's business activities, such as its correspondence, including both incoming and outgoing letters, and various records pertaining to its transactions, such as orders, invoices, receipts, and estimates (Griffith 1910, 254–255; Leffingwell 1917, 165–166). Sometimes their remit was extended to cover information or data files, akin to those kept in special libraries, on subjects pertaining to the firm's sphere of interests (Galloway 1919, 146, 152–153; Hudders 1916, 136–137). Whatever the size and scope of a particular department's files, it was expected that the documents entrusted to it would be arranged in such a manner that they would be produced with dispatch upon request (The Battlefields of Business 1909, 148; Scholfield 1923, 8). Utilizing the standard office technologies of the vertical file and the card index system, the filing department thus premised its document provision services on the physical organization of the materials in its care and the elaboration of indexes as finding aids thereto (e.g., Galloway 1919, 159–169; Griffith 1910, 257–271; Leffingwell 1917, 165–178), much as Kaiser's intelligence department did with regard to information provision. Although filing departments often focused their attention on document management and appear to have undertaken research activities comparable to summarizing only rarely (for an example, see Galloway 1919, 152), those that maintained information or data files had the opportunity of developing them to a considerable degree: in such cases, one filing expert noted with a telling turn of phrase, the application of “judicious indexing, cataloging, and abstracting” could elevate the value of a file to that of “a veritable intelligence department” (Scholfield 1923, 8).

²³⁶ American writers on office organization frequently expressed the opinion that, ideally, a company should have a single centralized filing department, overseen by an expert file clerk, for handling all the firm's records on the grounds that, *ceteris paribus*, this arrangement was more efficient and cost-effective than decentralized filing, in which each department kept its own files (see, e.g., Galloway 1919, 170–172; Griffith 1910, 255; Leffingwell 1917, 164; Schulze 1913, 225–226; Warren 1921, 3–5)—a view closely matching that of Kaiser (1911, §§ 278–80) *vis-à-vis* the intelligence department. Whereas such a situation might easily obtain in the case of small firms, the situation was more complex in the case of larger, multidepartmental companies, even as the latter moved towards centralizing their operations: as Yates (1989, 62) has observed, when filing systems first came into vogue in the 1890s and early 1900s, it was often the case that individual departments developed their own filing arrangements as need arose and, for various reasons, many corporations continued to follow a decentralized model, the admonitions of experts notwithstanding. For the sake of simplicity, the ideal type of the centralized filing department has been adopted as the basis for discussion here.

The affinities between Kaiser's idea of the intelligence department and the notion of the filing department stemmed in large measure from the fact that he considered filing and indexing to be phases of "office work" (Kaiser 1908, §§ 1-3) and so related them to the domain of office organization (see Chapter 1, Section 5.2.1). Inasmuch as the intelligence department and the filing department alike were sectors of the business office specially dedicated to the storage and management of (documentary sources of) information, they were organizational sites in which these elemental forms of office work assumed paramount significance. Yet Kaiser himself did not draw parallels between the intelligence department and the filing department but rather assimilated the former to another, closely related, kind of organizational unit specializing in the provision of information within the context of the business enterprise: the company library, or, as he preferred to call it, the *business library* (Kaiser 1911, §§ 247, 663, s.v. "Business Library"). It is hardly surprising that he should have done so, for, as we saw earlier, all the positions that he held between 1896 and 1911 involved library service of one form or another (Chapter 3, Section 3.3; Chapter 4, Sections 1 & 2; Chapter 5, Section 3, above): he was thus well positioned to make the connection.

Kaiser's characterization of the business library as an organizational unit focused on its general types, the scope of the documentary materials that it collected, and its function. He held that a business library could be primarily commercial, technical, or professional in its general orientation and expected that, depending upon the particular constellation of domain(s) that were of interest to its parent organization, it would incorporate the appropriate business literature, be it commercial, technical, or professional in nature, into its collection (Kaiser 1911, §§ 248, 296, 663, "Business Literature"). Among librarians, *commercial* libraries and literature were understood to deal primarily with information pertaining to the buying and selling of goods in the market, whereas *technical* libraries and literature mainly had to do with information relating to the design, development, and manufacture of industrial products: the former thus addressed the informational needs of the merchant, the distributor, and the purchaser, whereas the latter were oriented primarily to the informational requirements of the technologist, the applied scientist, and the engineer engaged in industrial research (e.g., Headicar 1921, 261; Jast 1917, 119). *Professional* libraries and literature, on the other hand, catered to lawyers, physicians, and members of other "occupation[s] considered socially superior to a trade or handicraft" (Murray et al., 1888-1928, Vol. 7, 1427c, III.6.a, & 1428a, III.6.b s.v. "Profession"), who, to

the extent that they carried out their work for “pecuniary gain” (Kaiser 1911, § 3), were no less involved in business than the merchant or manufacturer.

Needless to say, these categories represented ideal types and frequently overlapped in practice. For example, many industrial concerns had interests that cut across the notional division between the commercial and technical spheres. Kaiser (1911 § 663, s.v. “Business Literature”), who, perhaps because of his early experiences at the PCM and CIB, tended to take the commercial phases of business as a conceptual baseline, was cognizant of this, as is apparent from his apodictically worded assertion that “[n]o business is purely commercial, there is always a technical aspect too”. The frequent conjunction of commercial and technical interests meant that a given concern might require information of both a commercial and a technical nature. Accordingly, there was no strict one-to-one correspondence between type of business library and type of business literature collected: an industrial library that was nominally commercial or technical in its general orientation might well include a mixture of commercial *and* technical literature within its holdings. The notion of a typologically mixed collection accorded well with Kaiser’s own experience at the British Westinghouse Publishing Department, where commercial and technical literature alike featured among the documentary materials that he indexed.²³⁷ It also matched the experiences of many other librarians working in industrial settings on both sides of the Atlantic: for instance, Guy E. Marion, a prominent figure in the American special library movement, who, in the early 1910s, had charge of a highly-regarded research laboratory library at the Boston-based chemical firm of Arthur E. Little, Inc., observed that “the demand in the industrial laboratory library is both for a small commercial library as well as a specialized library of technology” (Marion 1910, 401), while, a few years later, H. Vincent Garrett, the head of the technical library at Rowntree and Company’s cocoa works at York, noted that

the title of that department—Technical Library—is a misnomer: it is inadequate and misleading. “Business” rather than “Technical” Library would convey a better

²³⁷ The mixed nature of this collection is easily discernible from the items enumerated in the exemplar of the “Daily Record” illustrated in Figure 2 above, The articles there entered under the subject headings “Commercial Traveller in Disguise”, “Electric Industry, UK”, and “Siemens-Schuckert”—the second of which gave information about a new agreement between two industrial organizations and the third of which signaled the formation of a new company branch—were manifestly commercial in nature, while those found under such headings as “Air Brakes”, “Automatic Liquid Switch”, “Motor-Driven Steam Compressors”, and “Steam Turbines”—all of which dealt with descriptions of pieces of apparatus—were no less obviously technical in their emphasis.

idea of my domain, in that we deal therein with commercial as well as technical information (Garrett 1921, 369).²³⁸

Whatever the particular domain orientation of a given business library might be, Kaiser posited that, as a rule, its assemblage of documentary materials would go well beyond the collections of books that, to his mind, were the hallmark of public libraries (Kaiser 1911, § 248). In contradistinction to the public library, he stated, the business library “was not confined to books alone” but ideally encompassed “*all* reading matter used in a business, whether in manuscript, letter or book form etc” (§§ 248, point 2; 663, s.v. “Business Library” [emphasis his]). Kaiser’s view that a business library’s collection should include printed materials and unpublished sources of information alike found ready parallels in the then emergent discourse of special librarianship: as John A. Lapp, an early leader in the American special library movement pointedly put it, a good business library could not content itself with collecting “mere books” but also had to provide access to such documentary types as “chapters of books, pamphlets, figures, maps, typewritten reports, clippings, tables, cost sheets, drawings, forms, catalogs, etc.” if it was to fulfill its informational mission (Lapp 1915, 58).²³⁹ The collections of company libraries that incorporated such materials bore a palpable resemblance to the information or data files of the filing department (e.g., Hudders 1916, 117, § 547, (e) & 136, § 637, Leffingwell 1917, 164): “[t]he special library is essentially a highly developed file of information”, noted Lapp (in Hyde 1920, 602), and, indeed, in some enterprises, the library as a unit took its origins from the filing department’s information file (Black 2011, 16; Kruzas 1965, 69–70).²⁴⁰ There can be little wonder,

²³⁸ As we shall see in Chapter 8, Section 3, below (esp. pp. 740–741), Garrett was strongly influenced by Kaiser’s writings: indeed, his choice of the term “Business Library” in this passage mirrored Kaiser’s (1911, § 663, s.v. “Business Literature”) own terminological preferences. Nevertheless, his basic point that Rowntree’s technical library dealt with both commercial and technical information obviously stands on its own. For general comments on the presence of commercial information in British technical libraries considered over a broader temporal span, see Black 2007b, 152–153.

²³⁹ Comparable lists, more or less detailed, of the different kinds of sources of information collected by company libraries are frequently found in the writings of special librarians on both sides of the Atlantic in the first decades of the 20th century; for examples from the United States, see, e.g., Carr 1910; Hosmer 1913, 169–170; Josephson in *What is a Special Library?* 1912, 146; Krause in *Some Representative Business Libraries* 1917, 290; Lee 1907, 30–35; for Great Britain, see, e.g., Garrett 1925, 38; Pearce 1921, 367–368; Turner 1927, 136. General discussions of the range of documentary materials found in company libraries during the first half of the 20th century can be found in Kruzas 1965, 98–100 (company libraries in the United States); Black 2006b, 501; 2007a, 145–146 (company libraries in Great Britain). See also Black 2011, 17.

²⁴⁰ Perhaps the best-known case of a library emerging from a filing department was that of Stone and Webster, a Boston-based engineering services company that, in the opening decade of the 20th century, developed, under the guidance of the librarian George E. Lee, a special library widely

then, that the business library often took on an ambience redolent of the office; as another American librarian, Ethel M. Johnson of the Women's Educational and Industrial Union in Boston, remarked,

[a]t first sight there seems in the make-up of the business library a disproportionate amount of manuscript and pamphlet material. In some instances the entire collection may be represented by this sort of equipment. The rows of vertical files and transfer cases in which such a collection is kept, give the appearance of a business office rather than the conventional kind of library. The atmosphere, too, smacks largely of the business office (Johnson 1915, 160).

Kaiser's vision of the business library was entirely of a piece with this image. Especially noteworthy in this regard was his affirmation that "[c]orrespondence ... belongs to [the] business library" (Kaiser 1911, § 664, s.v. "Correspondence"; cf. § 248, point 2; Black 2011, 18), for, as noted earlier, the keeping of letters was a traditional preserve of the filing department. To be sure, he was hardly alone in suggesting that the company library take on the filing and indexing of correspondence (Turnbull 1903, 193) nor did library involvement in the processing of correspondence necessarily encroach on the work of the filing department: some librarians established cooperative arrangements between the library in their charge and the company's filing department, whereby letters judged to contain information especially valuable to the library's clientele were indexed by the former but filed in the latter (e.g., Barbour 1921, 169; Marion 1910, 403). Nevertheless, the fact that Kaiser (1908, § 2) also considered the handling of correspondence to be a universal feature of office work serves to underscore the degree to which the work of the business library was, in his eyes, an extension of the office work.²⁴¹

regarded as a model operation. The library began life as "a kind of extended filing department" (Kruzas 1965, 57) and its holdings, at least in its early years, were dominated by the original document file (consisting largely of typewritten reports), as the following passage from Lee (1907, 30) indicates: "One naturally expects that books and periodicals are the chief sources of information in a business library as in any other, else the term "library" were a misnomer. And yet misnomer it may in fact be when applied to this library, for the printed literature was taken on several years after the document file had been established, and in numbers there are perhaps fifteen times as many documents on file as books and periodicals combined. Hence more properly the Library is called the Filing Department of the office, where literature is kept that may be needed for the purposes of the business". In the same year that this was written, however, the library and the filing department were separated into individual units (Lee, in Hyde 1920, 603).

²⁴¹ For a later discussion of the affinities between the filing methods of the special library and the general correspondence file of the business office, addressed to an audience of British special librarians at the second annual conference of ASLIB, see Matthews 1926a.

Kaiser's inclusion of a broad range of documentary types within the ambit of the business library went hand in hand with his understanding of its function, which he characterized as follows:

[A] business library must needs include *all* reading matter used in a business, whether in manuscript, letter or book form etc, for it is essential that the information it contains, and which is useful from the standpoint of the business, should be dealt with on some uniform plan so that everything on a given subject may be available regardless of its literary form (Kaiser 1911, § 663, s.v. "Business Library", [emphasis his]).

This brief passage delineating what Kaiser immediately went on to label "the work of the business library" merits attention for two reasons. First, in its thematic movement from documents ("the reading matter used in a business, whether in manuscript, letter or book form") to the information "useful from the standpoint of the business" that they contain, it neatly encapsulates the essentially information-oriented nature of the library's function as Kaiser envisioned it. In his view, the business library, by virtue of its nature as a library, had the task of collecting and organizing documentary materials and, as we have just seen, he endorsed the inclusion of a wide variety of documentary types within its compass. Yet, in his view, the primary value of the collection lay not in the documents *qua* documentary units but in the information that they carried: as he pithily put it, "we do not want books, we want information in books" (§ 83). With regard to this latter point, Kaiser drew a sharp contrast between the business library and that bastion of traditional bibliothecal practice, the public library. In his eyes, a central limitation of the public library was that it tended to deal with its materials as documentary units defined by their bibliographical form: as a consequence, in his words, "[a] public library gives access to *books* mainly" (§ 248, point 3 [emphasis his]). A defining function of the business library, on the other hand, was to uncover and render visible to its users those elements of information contained within its collection's documents that dealt with matters pertaining to the firm's domain of interest, regardless of the documentary trappings that they assumed, a point that Kaiser drove home with the precept that "a business library must give access to *information*, its form is of secondary importance" (§ 248, point 3 [emphasis his]). In this, he gave voice to a sentiment widely held by special librarians on both sides of the Atlantic: indeed, his antithesis between the public library's provision of access to books and the business library's

provision of access to information would recur, with minor variations, elsewhere in the contemporary literature of special librarianship.²⁴²

If the primary function of a business library was to give access to information as such, it followed that the latter had to be organized in order to facilitate its identification and retrieval: in Kaiser's (1911, § 248, Point 4) words, "a business library must class information". Now Kaiser held it as axiomatic that the organization of information culled from documentary materials would differ in kind from the organization of the documents themselves. In his view, "although ... information is contained in books, it should be looked upon as quite a different material and it should be treated differently from books" (§ 83) and, accordingly, the classing of information "requires different methods" from those used to books (§ 248, Point 4). Read in light of this methodological tenet, the import of his insistence that "it is essential that the information" derived from a business library's documents "should be dealt with on some uniform plan so that everything on a given subject may be available regardless of its literary form" (§ 663, s.v. "Business Library") becomes clear. In urging the application of a "uniform plan" for collating and coordinating those elements of the informational contents of the library's documents judged to be "useful from the standpoint of the business", Kaiser had in mind nothing other than the use of the kind of analytic subject index around which the intelligence department articulated its activities (§§ 295, 663, s.v. "Business Library"). The central task of the business library, then, was, in its essence, identical to that of the intelligence department: to identify and organize discrete items of information within the documentary materials of a collection by means of an index so that they would be made readily available to those members of a business organization that might stand in need of it. In this respect, the two institutional types merged seamlessly into one.

²⁴² See, e.g., Johnson 1915, 159: "The main function of the general library is to make books available. The function of the special library is to make information available"; Garrett 1921, 369 (emphases his): "[W]hereas a general library gives access mainly to *books*, our library [sci., the technical library at the Rowntree cocoa works—TMD] gives access to *information* gleaned from divers sources". Both authors penned these statements well after *Systematic Indexing* had appeared in print and so, despite the fact that neither cited a source for the trope, it is legitimate to ask whether they drew inspiration from Kaiser's text. In the case of Garrett, there can be little question that this was indeed the case, for, as noted at p. 207, n. 238 above, he was well acquainted with Kaiser's writings and his verbal formulation—down to the use of emphases—clearly follows the latter. As regards Johnson, no definite conclusion can be reached, for it is unknown whether she had read Kaiser. Nevertheless, the close verbal parallels between her wording and his—note especially her use of the qualification "main function" with respect to the general library—make it quite plausible that he was her source as well.

6.2.4. The Unity of the Intelligence Department and Business Library in Kaiser's Thought: Some Conceptual Issues

Thus far, we have, for analytical purposes, spoken of the intelligence department and business library as if Kaiser had conceived of them as closely related but distinct kinds of organizational unit dedicated to the provision of information. In light of the foregoing discussion, however, one may well ask whether, for Kaiser, the terms “intelligence department” and “business library” were not, after all, two designations for a single kind of organizational unit, each expressing a different aspect under which it might be viewed. On such a view, the name “intelligence department” would have laid stress on the organizational embeddedness of the unit and suggested an orientation towards the provision of information, whereas the term “business library” would have foregrounded its bibliothecal rôle as the site where “the reading matter used in the business” (Kaiser 1911, § 663, “Business Library”) was stored, organized, and made available for consultation. This interpretation has considerable plausibility in light of certain patterns in Kaiser's use of these terms in *Systematic Indexing*. There, for example, he tended to discuss summarization as an information service primarily in relation to the intelligence department (§§ 48–49, 660, 662; but cf. § 257) and drew comparisons between the active informational support given by a military intelligence department to an army in the field to that which a business's intelligence department could provide for a firm (§§ 35, 49); however, he tended to speak of the business library *solely* in contexts where he was drawing contrasts between the practices of the unit so designated and those of the public library (§§ 247–249, 257) or where he was defining the term itself (§ 663, s.v. “Business Library”). Evidently, each term carried semantic overtones that made it especially appropriate in particular discursive situations and less so in others. This did not, however, preclude the application of both designations to a single kind of organizational unit, which might be considered as an intelligence department in one light and a business library in another.

There was, however, one point at which a tension between Kaiser's notions of the intelligence department and of the business library arose: the range of sources of information with respect to which the former might carry out its informational activities. Kaiser (1911, § 38 [emphases his]) held that the sources of information—or “prime materials”, as he called them—that an intelligence department might obtain “naturally fall into two classes, samples and literature; they represent one and the same thing—commodities, the one in concrete form and the other in abstract form. One *is* the commodity and the other *describes* it”: in other words, insofar as physical samples and literature—Kaiser's preferred

term for textual documents—alike could yield information about commodities, both had, in principle, a place within an intelligence department. In Kaiser’s view, each kind of prime material presented distinct advantages and disadvantages with regard to evidentiary value and ease of storage. With regard to evidentiary value, samples afforded businessmen the opportunity personally to assess the qualities of a commodity at first hand, whether “by means of experiments or without”, whereas, with literature, one was consigned to “the opinions of others”; literature, on the other hand, exposed the businessman to opinions about a given commodity from a range of different perspectives and so could lead him to insights that might not occur to him from his own inspection of the object in question (§§ 39–40). As for facility of storage and use, Kaiser held that literature—that is to say, textual records, be they bound volumes or loose sheets—was relatively compact and easy to keep in comparison to samples, which might be “bulky” and occasionally “dangerous and difficult to handle” (§ 39); moreover, he claimed, it was, on the whole, easier to build up “complete” collections of textual documents than of samples (§ 40). On balance, Kaiser considered literature to be more amenable to treatment by an intelligence department than samples. Nevertheless, he maintained, ideally both kinds of material would be taken into account in the work of the department, for the one complemented the other:

whatever advantages literature may have over samples, samples are indispensable; in cases of doubt we shall always have to fall back on them. Both together give the best result. ... [W]herever literature is handled, it is most essential that its originals—samples—should not be lost sight of and vice versa. Samples and literature must in fact be regarded as inseparable for proper research work (§ 41).

Kaiser’s conviction that commercial samples were a basic source of information about commodities and that they should supplement textual sources in business-related research doubtless owed much to his experiences at the PCM. This institution, as we have seen, mounted exhibits of samples of raw materials and manufactured products from around the world, had a laboratory for testing materials, and maintained a Bureau of Information that collected a broad range of commercial literature (Chapter 3, Section 2, above): there, the examination of samples and the consultation of textual sources were understood to be mutually reinforcing avenues to obtaining information about the kinds of goods bought and sold abroad as well as the markets where they were trucked and bartered. Moreover, within the framework of the administrative structure of the PCM at the time that Kaiser worked there, a single department—namely, the Bureau of Information—was responsible for obtaining, organizing, and keeping not only of the museum’s textual sources of information

but also of some of its sample collections, for it oversaw both the museum's commercial library and its exhibits of foreign manufactured goods (e.g., *A Commercial Museum* 1897, 1011; *Philadelphia Commercial Museum* 1897, 68–70; *The Philadelphia Museums* [1898], 12, 14). Insofar as the Bureau of Information otherwise exercised functions analogous to those that Kaiser would later attribute to the intelligence department, there is good reason to suspect that it informed his conceptualization of the latter as an organizational unit in which literature and samples alike might be kept.

Although the PCM's Bureau of Information likely was an important source of inspiration for Kaiser's assumption that samples might find a place within the scope of the intelligence department, another factor appears to have shaped his views on the matter as well—namely, the fact that many businesses kept collections of samples of their own products or those of other firms for reference purposes. It was generally recognized that samples required organization no less than did the correspondence and other documentary materials that typically populated office files: trade journals in fields as diverse as textiles (e.g., T. H. 1899), industrial chemistry (e.g., Pickel 1910), and stationary and printing (e.g., *Handy Case For Filing Samples of Paper* 1902) ran articles advising on methods and apparatus for filing samples, while writers on techniques of office filing took it as a matter of course that they would figure among the kinds of materials to which a filing system might be applied (Byles [1911], 15; Cope [1913], 52, 54, 175; Mares 1909, 75, 76, 94–95). It is unsurprising, then, that, in *The Card System*, Kaiser (1908, §§ 7, 271–274, 366, s.v. “Materials, Office Materials”) himself classed samples among “office materials” and gave a brief account of how to file them, noting that, in comparison to other documentary materials, “[t]hey are only exceptional because differ widely in size” with the result that differently-sized kinds of samples would require different modes of physical storage. Thus, it appears that his conviction that samples belonged among the prime materials of the intelligence office had a basis as much in his knowledge of a common office practice as in his personal acquaintance with the more rarefied ethos of the PCM.

Viewed from the perspective of historical hindsight, Kaiser's admission of commodity samples, alongside documentary materials of a textual nature, into the purview of the intelligence department was significant for two reasons. For one thing, it converged in an interesting way with European documentalist thought regarding the status of objects as documentary materials. In positing that, within a business context, certain kinds of physical objects, no less than textual records, could serve as useful sources of information about a

given range of commercial phenomena and so should be kept for informational purposes as an aid to research, Kaiser held a view comparable to the documentalist understanding, articulated by Otlet (1934, 217), that “material things themselves (objects) can be considered as documents when they are set up as direct, perceptible elements of studies or of evidence of a demonstration (*Les choses matérielles elles-mêmes (objets) peuvent être tenues pour documents lorsqu’elles sont érigées comme éléments sensibles, directs d’études, ou de preuves d’une démonstration*)”. Although Kaiser did not use the term “document” as such, his umbrella term “prime materials”—or “materials” for short—encompassing samples and literature alike, covered much the same ground: indeed, when, in 1914, *The Card Index* appeared in French translation, the translator chose to render the generic word “materials” as “documents”.²⁴³ No less noteworthy in this regard was Kaiser’s opinion that samples have a certain primacy *vis-à-vis* textual sources in that they constitute the very objects about which information was sought, whereas literature can only describe them, so that “in case of doubt we shall always have to fall back on them [sci., samples—TMD]” (Kaiser 1911, § 41). This view prefigured, albeit implicitly and, as it were, through a glass darkly, Briet’s (1951, 8) later contention that physical objects are “primary” documents, whereas the textual (and audiovisual) documents generated as the result of human thought and discourse about them are “secondary” or “derived” documents. Kaiser, however, was interested chiefly in the treatment of textual documents and did not pursue these matters further: formulated in a context and couched in an idiom far removed from that of the mainstream of documentalist tradition, his insights regarding the documentary nature of physical objects appear to have had no impact on subsequent discussions of the subject.²⁴⁴

Second, and of greater import here, Kaiser’s suggestion that samples might be collected within the framework of an intelligence department introduced into his notion of this organizational unit a feature that set it apart from his conception of the business library. As we have seen, a key element of his understanding of the business library was that it collected, organized, and made available the information contained in the “reading matter”—that is to say, textual documents or literature—“used in a business” (Kaiser 1911, § 663, s.v. “Business Library”). On this definition, samples of commercial products did not

²⁴³ Kaiser 1914, 366, s.v. “*Documents, Documents du Bureau*”: “*terme collectif désignant la correspondance, les échantillons et autres éléments relatifs au travail du bureau*” = Kaiser 1908, 366, s.v. “*Materials, Office Materials*”: “a collective term for correspondence, samples and other materials connected with office work”.

²⁴⁴ For a brief historical overview of the discussion within documentation regarding what kinds of materials might fall under the concept of document, see Buckland 1997.

fall within its scope, for they did not constitute reading materials as such. To be sure, not all special librarians would have concurred with this view: for instance, the aforementioned laboratory library at Arthur D. Little, Inc., included a “museum collection ... made up of a large assortment of samples acquired from various points, clients, etc., for example, fibrous materials, mineral matter, special papers, artificial silks, standardized steels and irons, paper-making chemicals, electric railway materials, etc.”, which were indexed in its card index files and displayed in glass cupboards (Marion 1910, 402; cf. Handy & Marion 1914, 99; Power 1917, 59). Yet the traditional association of the library *qua* institutional type with the custodianship of textual materials was a potent one and contemporary descriptions of special libraries suggest that, for the most part, these tended to restrict their collections to recorded information (See Section 2.3 of this chapter, above): that is to say, Kaiser’s assumption that a business library would focus on literature reflected what appears to have been a common, if often tacitly held, view among the practitioners of special librarianship of his day. At any rate, the result was clear: in principle, the intelligence department, as Kaiser conceived it, was more capacious in its holdings than the business library, for it included both samples and literature, whereas the latter dealt with literature alone.

The issue of samples, then, engendered a definitional point of cleavage between Kaiser’s conception of the intelligence department and that of the business library. Yet, this particular point of difference between the two tended to collapse in practice, for, as Kaiser (1911, § 41) acknowledged, “[t]here may be many cases where the intelligence department has nothing to do with samples, they may be attached to the laboratory etc”. This concession was significant, for thereby the collection and organization of commercial samples took on the status of a typical, but facultative, component of the intelligence department’s activities, just as summarizing was a characteristic, but not an obligatory, feature of its work (See Section 2.2 of this chapter, above). By contrast, Kaiser assumed that an intelligence department would, as a matter of course, collect and organize information derived from the textual sources at its disposal (Kaiser 1911, §§ 1–4, 9, 41). Literature, in his eyes, formed “the principal prime material from which information is drawn” (§ 623) and, thus, dealing with textual documents was no less necessary to the work of the intelligence department than it was to that of the business library. In short, whereas the intelligence department, as characterized by Kaiser in *Systematic Indexing*, might engage in a wider range of informational activities than did the business library, at least as he envisioned it, the core functions of the former were indistinguishable from those of the latter: on this view, every

intelligence department was, or included, a business library and every business library either was, or formed part of, an intelligence department.

6.2.5. The Intelligence Department and Business Library: A Summary View

In the preceding pages, we have considered the kind of setting in which Kaiser expected SI would be used. As we have noted, this milieu was firmly rooted within the realm of business organization, taking the form of a specialized unit within a company responsible for the collection, organization, storage, and provision of (sources of) information on subjects of interest to the firm in question. Drawing upon the administrative language of his day, Kaiser called such a unit an intelligence department: in according it this name, he both signaled the informational nature of its activities and underscored the fact that it was but one element within a larger institution, the purposes of which it was expected to subserve. Insofar as the sources of information gathered together within the collections of the intelligence department tended primarily to consist of documentary materials of a textual nature (“literature” or “reading matter”, as Kaiser called them) relating to commercial and/or technical subjects, he also designated this kind of unit a business library. Like many other contemporary practitioners of special librarianship, he assumed that, in its form and function, the intelligence department *qua* business library would utilize equipment and methods routinely deployed for the treatment of office papers: to a large degree, its work represented, for him, a specialized extension of the general kind of document processing work carried out within the business office at large.

As Kaiser saw it, the primary purpose of an intelligence department was to organize the materials in its holdings in such a way that it would provide ready access to (sources of) information pertaining to a given organization’s domain of interest and so of potential use to those members of the organization’s staff engaged in business-related research. To be sure, he envisaged that it might undertake research-based information services, such as the preparation of summaries, or special reports, on topics of current interest to the managers of a business concern. Yet, in Kaiser’s estimation, any such services that the department might offer to its patrons were ultimately dependent upon the organization of the (sources of) information in its collections and so the fundamental tasks of the intelligence department became, in essence, those of the business library: (1) to organize and store its documentary materials so that, if need be, they could be easily retrieved for consultation and (2) to identify, select, extract, and organize items of information embedded within the

documentary units composing these materials into a systematic card index so as to coordinate all pieces of information relating to any given subject deemed germane to the interests of the parent organization and allow rapid scanning of these without requiring recourse to the original documents themselves.

For Kaiser, then, the core activities of the intelligence department were the filing and indexing of the textual documents comprising business literature. Of these activities, he considered indexing to be the most important one, for the systematic subject index that resulted from it provided direct access to specific information at a level of high granularity, a theme that we shall address in greater detail in Chapter 7, Section 1. Viewed from this vantage point, SI obviously assumed a rôle of central importance for the functioning of the intelligence department, for it provided the method of “literary indexing” (Kaiser 1908, § 116, n. *) by which the department’s primary tool for accessing the information in its documentary sources was to be created and maintained. No less significant, at least from the perspective of the present-day KO theorist, is the fact that, in the ideal knowledge organization régime that Kaiser envisioned for the intelligence department, indexing by means of SI became the primary—indeed, in some cases, the only—mode of subject access to the informational content of documentary materials, for he sharply dissociated subject indication from the classification of documents as bibliographic units. To appreciate this point, it is necessary to consider his recommended techniques for the organization and retrieval of documentary materials, to which we now turn.

6.3. Kaiser and The Organization and Retrieval of Documentary Materials

Although Kaiser considered the creation and upkeep of a systematic subject index to be the most important activity carried out within an intelligence department, he did not neglect the broader aspects of document management that fell under the rubric of filing. As we saw earlier, he regarded filing as a basic element of general office work (See Section 2.2 of this Chapter, above) and, accordingly, in *The Card System*, he developed protocols for the organization of what he called “office materials” (Kaiser 1908, §§ 7, 366, s.v. “Materials, Office Materials”). The resultant method of filing, which Kaiser (1911, §§ 42–44, 295) assumed would find use in the intelligence department, was intended to facilitate the rapid retrieval of documents. “[M]aterials [sci., documents—TMD]”, he declared, “form our starting point and our task consists in arranging them so that any one thing may be found without delay when required” (Kaiser 1908, § 7; cf. § 120; 1911, § 8). This understanding of

the central aims of filing reflected a view commonly held by contemporary experts on office organization, such as, for example, the British author of an introductory manual on filing systems, who expressed the matter so:

A filing system that is to accomplish [its functions—TMD] with satisfaction to everybody who has occasion to use it ... must be one that enables everything filed to be consulted immediately and without any needless expenditure of time. ... [W]hatever the document or record desired to be seen or read at the moment, the system should enable it to be known, without any possibility of doubt, where the document or record is, and should enable the document or record, whatever its character may be, to be found and inspected at once. This, indeed, is a primary and fundamental requisite of an effective filing system. Every system must ultimately be judged by its capacity to provide for this one need (Cope [1913], 15–16).

The underlying motivation for taking the rapid retrieval of documents as the *telos* of filing was, of course, efficiency in the conduct of business activities. Another British commentator stated the point bluntly in a presentation on “efficient filing” delivered at the second ASLIB conference: “[t]he basis of every business is its documents, its correspondence, its data and other records. At every turn, the immediate production of papers is the sine qua non to successful negotiation—delay is a disturbing element” (Matthews 1926a, 96). With respect to filing, then, the ideals of Kaiser’s intelligence department thoroughly conformed to the ruthlessly utilitarian ethos of office efficiency.

As noted earlier, filing involved primarily the physical organization of documentary materials and, secondarily, the constitution of mechanisms for retrieving these materials (See Section 2.2 of this chapter, above).²⁴⁵ Physical organization required the construction of a scheme of document classification; the assignment of each individual document in a collection to a class within the scheme, the sequential arrangement of documents within each class; the application of a unit of notation, or call number, to each document in order to identify it and to indicate its position within the class to which it had been assigned; and, finally, the disposition of the documents in files or on shelves arranged to reflect the scheme

²⁴⁵ For the sake of completeness, it should be noted that Kaiser (1908, §§ 8, point 4, 9, 13, 37–42, 120, 145–148; 1911, § 44) also formulated guidelines for establishing a charging system so that, if documentary materials had to be temporarily removed from the files or shelves for work purposes by members of a business organization, the identities of their borrowers would be recorded and their whereabouts could be tracked: this system allowed the staff of an intelligence department or business library to keep a measure of control over the circulation of items from its holdings at any given time. Although Kaiser considered this charging system to be ancillary to filing, it played only a peripheral part in his knowledge organization régime and so falls outside of the scope of our discussion here.

of classification (Kaiser 1908, §§ 8–11, 14, 79, 81, 86, 121–122). Taken as a whole, this process established “fixed places” for the documentary materials where they were stored and where, if need be, they could be located (Kaiser 1908, § 9; 1911, §§ 44, 50). The mechanism for document retrieval, on the other hand, took the form of the card register, the purpose of which was to correlate the call number of each document with the name of the organization or person from which it emanated, the name of the trade in which the organization or person so named was engaged, the name of the geographical location in which the organization or person was situated, and so on (Kaiser 1908, § §8–9, 12, 90; 1911, § 44). Recorded upon cards that were themselves arranged according to norms that gave them their own fixed places within the card files, the correlations between names and call numbers provided the key whereby documents relating to a certain person or firm, trade, place, or other attribute of interest could be found within the holdings of an intelligence department (Kaiser 1908, §§ 126–127, 136, 366, s.v. “Fixity”; 1911, § 663, s.v. “Fixed Place”).

Having briefly adumbrated the two primary phases of filing, I shall now proceed to examine each in greater detail.

6.3.1. Kaiser’s Classificatory Template for the Physical Organization of Documentary Materials

For Kaiser (1908, § 78), the physical organization of documents had its basis in classification. It thus constituted one particular field of application for a generic activity that he deemed to be “of the greatest importance in all organization work” (Kaiser 1911, § 30). In his view, the cardinal contribution of classification to organization lay in the fact that it effected the division of a large, undifferentiated population of entities into a number of distinct groups, each of which contained only a subset of the original population: by virtue of their smaller size and scope, these groups were more amenable to management than the original population as taken as a whole would be. This he stated in emphatic terms:

Organisation may be called the science of the simultaneous control of numbers. Organisation whether small or large, is the direct consequence of numbers and the greater the numbers, the more need for organisation. Numbers compel us to organize, without some organization there can be no effective management, no effective control. ... The force of numbers is therefore at the bottom of all organisation.

Since a smaller number can be more easily controlled than a larger one, the aim of organisation obviously is to reduce the numbers to a manageable compass so as to

assure adequate control. That is done by dividing the numbers off into groups, departments, classes etc. ... These classes provide us with the foundation, the fixed points on which our organization can be built up (§§ 27–29).

In Kaiser's estimation, this managerially oriented function of classification, to which we shall henceforth refer as "the control of quantities", underlay virtually all aspects of organization activity within a business enterprise. He intimated that it was operative in the division of a large company into departments and their component units, which allowed for the distribution of "labour" into smaller and more self-contained groups (§§ 28–29, 32). Furthermore, he observed, "to-day ... the varieties and quantities of materials and goods have reached such proportions that it would be impossible to manage them without having recourse to some plan of division or classification" (Kaiser 1908, § 73). Needless to say, the same argument held for the documentary materials accumulated by an intelligence department, for, as a contemporary British expert on filing noted,

[a] large business in the modern sense means an enormously increased specialization, a division into departments, a subdivision of work. It means also an enormous multiplication of the quantity of business papers, and a multiplication of the kinds and varieties of business papers (Cope [1913], 4).

The very fact that an intelligence department dealt with numbers of documentary materials *ipso facto* mandated the use of classification in its organizing work so that it could manage them effectively.

Classification made the control of quantities possible and, in this respect, its formal, quantitative, and extensional aspects came vividly to the fore. Yet, as Kaiser recognized, if a given classification was to be serviceable, its creator had to take into account other, more qualitative factors as well. On one hand, he argued, it was necessary to attend to the nature of the entities—or "subjects", as he tended to call them²⁴⁶—being classified. "Our plan of

²⁴⁶ A terminological peculiarity of Kaiser's writing, especially marked in *Systematic Indexing*, is his expansive use of the word "subject" to refer to *any* kind of entity serving as the object of a classification: for example, he spoke of concrete objects, names, and books alike as being the "subjects" of classification (Kaiser 1911, §§ 107–108, 161). This differed markedly from the general usage of contemporary librarians writing on classification theory, who tended to reserve the term "subject" for objects of thought or discourse: as one such writer put it, "... [T]he scientist, or naturalist as he is still sometimes called, classifies objects in his laboratory or museum; he who is called upon to classify knowledge classifies subjects ... objects when spoken about or discussed, as in a book, become subjects" (Clarke 1900, 349). Kaiser sometimes used "subject" in this conventional bibliothecal sense (e.g., Kaiser 1911, §§ 185–186, 252–256) as well as in his broader, less differentiated meaning. In this chapter, I shall use "entity" to refer to objects of classification that are not "subjects" in the sense of objects of discourse, but shall leave the equivocal term "subject" intact in quotations from Kaiser's texts.

control must be based on what is given, i.e., our subjects. We compare them, we see that in some respects they are alike and in other respects they differ” (Kaiser 1911, § 116): it was by considering salient points of resemblance and difference among the entities in question that the component classes of a classification would be created.²⁴⁷ On the other, he maintained that the designer of a classification had constantly to keep in view the purpose for which it was to be used, for “[t]he object of classification is: control to effect a given purpose” (§ 105; cf. § 162).²⁴⁸ Indeed, Kaiser considered purpose to play a paramount rôle in classification design, for it provided the rule and measure for determining the “plan of control” embodied in any given classification:

A number of subjects [i.e., entities—TMD]—and all classification necessarily deals with numbers—can only be controlled effectively on a well ordered plan which takes into account the nature of the subjects and the surrounding conditions and which satisfies our purpose, but control must be regarded as subordinate to purpose, our plan of control will therefore depend on our purpose (§ 106).

On this view, the purpose of a classification ideally determined such foundational features as the choice of characteristics with respect to which classes were formed and the selection of the principles of division governing the arrangement of classes within a given scheme (§§ 117, 165): “to classify” was “to work out the order of sequence of what is given so as to satisfy a given purpose” (§ 99). Furthermore, satisfaction of purpose provided the ultimate criterion for evaluating the fitness of a given classification:

A classification must have a purpose, and it must satisfy that purpose. It will be adequate if it does, it will be inadequate if it does not (§ 194).

If our purpose is satisfied and control is effective then our classification is adequate, it is good. Whether the resultant classification is superficial or systematic need not trouble us as long as it satisfies the conditions stated (§ 106).

For Kaiser, then, the construction of a classification took as its basis both the properties of the entities being classified and the purposes for which the classification was being

²⁴⁷ In adopting this elementary tenet of classification theory, Kaiser was in accord with contemporary theorists of library classification; see, e. g., Brown 1916 [1912], 3–4; Richardson 1901, 1–2, 5–8; Sayers 1908, 82; 1912, 2–3; 1916, 28; 1926, 21–23, 62–65. His specific procedure of identifying likenesses and differences is discussed later in this section.

²⁴⁸ Note, however, that, on occasion, Kaiser (1911, § 632) attributed this very same goal to organization: “All organisation has a purpose. The object of organisation is not only to control our subjects, but to control them so as to give effect to our purpose”. The intersubstitutability of classification and organization in this context is best taken not simply as an inconsistent use of language but rather as an indication of the intimate association of the two concepts in Kaiser’s mind: without classification, there was no organization.

designed: within certain limits imposed by the former, the designer of the classification generated a set of classes articulated into a classificatory structure that would enable him to fulfill the latter (§§ 633–635). All in all, this represented a highly pragmatic approach to classification, one that placed a premium upon aligning the structure and content of any given plan of classification to its intended use.²⁴⁹

Just such a pragmatic spirit suffused Kaiser’s method of classifying documentary materials. The purpose of arraying documents in “a systematic arrangement” was that of filing in general: “to give immediate access to anything that was called for” (Kaiser 1908, § 78; see Section 3 of this chapter, above). Kaiser held that, within a business context, the classification embodied in the files or on the shelves should not be overly complex or elaborate but rather “simple, easy to understand, and easy to handle” (Kaiser 1908, § 74). To this end, he proposed that the documentary materials falling within the purview of an office or intelligence department be divided into a small number of “broad classes” on the basis of their form and character (Kaiser 1908, §§ 8, point 1, 10, 78–79; 1911, §§ 291, 663, s.v. “Broad Classes”). Examples of such classes, different configurations of which would occur in different business settings, included correspondence, press cuttings, periodicals, books, pamphlets, trade catalogs, manuscripts, notes, maps, and so on (Kaiser 1908, § 79; 1911, § 42). These broad form classes, in turn, were subdivided into what Kaiser called *individual divisions*—that is to say, the basic units of arrangement within each class (Kaiser 1908, §§ 81, 336, s.v. “Individual divisions”). The individual division varied from class to class: for example, the unit of reference for correspondence was the binder holding letters from and to an individual firm or person; that for periodicals was the periodical title; that for trade catalogs, the issuer of the catalog; and so on (§ 81). Within each class, the units forming the individual divisions were arranged in consecutive order, typically on the basis of the order in which they came into the ambit of the intelligence department (e.g., §§ 78, 169–170, 250). In many of the classes, such as correspondence or periodicals, the individual divisions were susceptible to yet further subdivision: for example, a dossier of correspondence from a firm could be partitioned into the individual letters comprising it,

²⁴⁹ Kaiser was hardly original in his recognition of the importance of purpose in informing the structure and content of a classification, for this was a basic tenet of the classificatory theory of his day, as expounded by the authors of logic textbooks (e.g., Jevons 1881, 278–280; Ryland 1900, 237, 239–240; Venn 1889, 323–324, Welton 1911, 234; 1917, 171) and library classification theorists (Brown 1916 [1912], 3; Sayers 1916, 28–29; 1926, 42–43; 66–67) alike. What differentiated him from his contemporaries in the realm of librarianship, though, was the unremitting stress that he placed upon purpose as a first principle of classification.

while a periodical title could be divided into its separate issues (§§ 11, 81–83). Nevertheless, for filing purposes, the broad form classes, in conjunction with their individual divisions constituted the primary structural elements of Kaiser’s classification of documentary materials.

In conjunction with this classificatory structure, Kaiser (1911) developed a form of notation designed to be both simple (§ 156) and expressive (§133). He recommended that each broad form class be designated by an “initial” (i.e., capital) letter or letters, assigned either arbitrarily or, preferably in his view, on the basis of some mnemonic correspondence with the name of the class (Kaiser 1908, §§ 9, 75, 79, 169, 238, 250, 261): thus, for example, “C” would indicate correspondence, “B” would designate books and pamphlets; “P” would refer to periodicals, “PC” would denote press cuttings, “T” would represent trade catalogs, and so on. Within a given class, each individual division was assigned a number on the basis of its place in the sequence of accession (§§ 8, point 2; 11, 78, 81–82, 250): for instance, the first dossier of correspondence opened would be given the designation “C1”, the second would be labeled “C2”, the third would be named “C3”, and each succeeding dossier would receive the next available number in the C class. In those form classes where the individual division could be subdivided further, the number was expanded in various ways. A given binder of correspondence might contain a number of letters, each of which was individuated by affixing its date, attached by an en-dash, to the number of the binder: for example, “C42–27IX6” designated the letter dated 27 September, 1906 in the 42nd binder of correspondence in a file (§ 82).²⁵⁰ Similarly, individual issues of a given periodical were represented by suffixing a number preceded by a decimal point to the base number of the periodical in question (§ 83): thus, “P30.35” would indicate the thirty-fifth issue of the journal designated “P30” that had been received by an intelligence department. Regarding such expansions, Kaiser stipulated that “[a]s a rule the initial and first number including decimals is sufficient for filing purposes, additional numbers only become necessary when indexing is required” (§ 83).²⁵¹ Taken together, the initial letter indicating the form class

²⁵⁰ The use of the date as the principle of individuation was correlated with the practice of sub-arranging the letters within a binder in (reverse) chronological order, with the most recent letter placed at the front (Kaiser 1908, §§ 122, 174). This was a standard practice in office filing; see, e.g., Byles [1911], 10; Hudders 1916, 58, §§ 257–259; Leneer 1904, 22.

²⁵¹ For yet other examples of expanded numbers for individual divisions and variations on the basic patterns exemplified above, see Kaiser 1908, § 11 (trade catalogs), 83 (decimal expansion for correspondence and the treatment of articles within periodical issues), 200–201 (decimal expansion of correspondence), 225 (Press cuttings), 238 (periodicals) 250 (books), 255 (variant for duplicate copies of books), 262 (alternative plan for trade catalogs).

and the number referring to the individual division, with or without expansions, composed the *call number* of a document, which functioned as its unique designator, or “name”, within the framework of the document collection to which it belonged (Kaiser 1908, §§ 11, 82, 86, 366, s.v. “Call Number”).

Kaiser envisaged this method of classification as the structural basis for the physical organization of documents in an intelligence department. Each document brought into a department’s holdings was to be apportioned to a class on the basis of its form, its position within the numerical sequence of the documents belonging to that class was to be determined, and the resultant call number was to be affixed to it, a process that he styled *recording* (Kaiser 1908, §§ 77, 86). The call number not only individuated the document but also specified the place that it was to occupy within the department’s files. With regard to the physical disposition of files, Kaiser advised that different documentary kinds be segregated into distinct series: thus, all correspondence dossiers were to be kept in a single vertical file; press cuttings, pasted on thick paper or cardboard cards, were to be stored in a separate vertical file; books and pamphlets, whether kept in vertical files or on shelves, were to form their own section; periodicals, ideally kept in boxes on shelves, had their own place; and similarly for trade catalogs and any other documentary kind in the collection (§§ 10, 175, 223, 243, 251, 264). He suggested that the cabinets used to house these separate document series could be so arranged as to follow the alphabetical order of the initial letters used to designate the classes (§ 14). The drawers of the cabinets or other receptacles holding each document series were to display labels inscribed with the initial letter denoting the class and the range of document numbers that they contained (§§ 15, 26, 79). Kaiser even recommended that these labels be color-coded so that each color correlated with the capital letter denoting a particular document type on the grounds that such redundancy in the indication of broad document classes would be a safeguard against category errors on the part of filers (§§ 15, 64, 151). Provided that these measures were implemented, the result would be an ordered set of files, each of which was composed of an ordered series of documents, within which each document had a well-defined location—a fixed place, in Kaiser’s parlance—represented in the symbolic structure of its call number (Kaiser 1911, § 43).

From an architectonic point of view, this model of document classification possessed two features that invite attention. First, its hierarchical structure was essentially a flat one, in which the universe of business literature held by an intelligence department was divided

into a single array of coordinate classes representing different forms of documentary materials (see Figure 6, below); for filing purposes, the individual divisions of each of these classes already stood at the bottom of the hierarchy, with additional subdivisions, such as letters within a correspondence dossier, simply forming component parts of a filing unit. This, of course, precluded the presence of classes bearing a generic-specific relationship to one another, for there were, in effect, only two levels in the hierarchy: the main classes and the individual units arrayed under each. In this respect, the classification formed a paradigmatic example of what some latter-day KO theorists have come to term a “constitutive structure” (Jacob, Mostafa, & Quiroga 1997, 81). In general terms, such a structure is defined as consisting of “a set of classes that may or may not be hierarchical but which, when viewed as a whole, comprise the totality of a given universe without establishing nested relationships based upon the inheritance of superordinate characteristics”; on this view, “a constitutive classificatory scheme may exist as a flat structure comprised of a set of coordinate classes that, in association, represent the totality of a particular universe without establishing any further relationships between the constituent classes” (Jacob, Mostafa, & Quiroga 1997, 81; cf. Jacob 2004a, 531–532). Such,

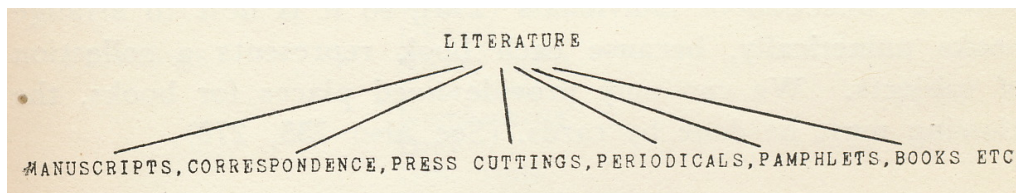


Figure 6: Kaiser’s classification of business literature (Source: Kaiser 1911, § 185).

indeed, was the case with Kaiser’s classification. Its broad classes conjointly covered the full range of documentary materials in a given collection, but the only relationship that each class bore to the others was that it represented a documentary type that, by virtue of its form, distinguished it from them: as he stated, “[i]t must be well understood that the separation into classes is limited to the unlike” (Kaiser 1908, § 80). The classes served largely as a mechanism for partitioning a given aggregate of documentary materials into groups based on distinctions of form so that documents of a certain type could be brought together and arranged in such a way as to render each filing unit within them readily locatable: in Kaiser’s (1911, § 42) words, “[o]ur purpose is not to bring our materials within a scheme of rigid classification, but rather to provide a convenient arrangement by which

they may be assigned fixed places relatively speaking". Here, again, the managerial imperative connected with the control of quantities loomed large.

The constitutive classificatory structure of Kaiser's model of document classification was closely linked to the second prominent structural feature that the scheme displayed: the numerical arrangement of the individual divisions within each document class. In recommending that these units be sequentially arranged in accordance with a number assigned to each on the basis of the order in which it first entered into a file, Kaiser drew upon a practice that was firmly anchored in the world of office work. In the late 1890s and first decade of the 1900s, a number of different methods, or "systems", were used in the business offices to organize correspondence and other business papers in vertical files. Prominent among these were the *alphabetical system*, in which correspondence dossiers were arranged by the alphabetical sequence of the names of correspondents; the *geographical system*, in which correspondence dossiers were arranged by the (alphabetically arranged) names of the locations in which correspondents were based and subarranged either by the names of further geographical subdivisions or individual correspondents; and the *subject system*, in which pieces of correspondence relating to particular subjects of interest were collected into dossiers and the latter were arranged either in the alphabetical sequence of subject names or in some classified sequence (e. g., Amberg 1918, 9-14; Belding 1905, 114-115; Griffith 1910, 264-268; Hudders 1916, 67-72; 87-99; International Correspondence Schools 1910, 299-302; Leneer 1904, 21, 22-23; Schulze 1913, 227-228, 230-232; Wagemaker 1907, 47-102, 155-156; 1908, 155-156; Wigent, Housel & Gilman 1916, 17-22; 36-47; Yates 1989, 58-59). The earliest method applied to vertical filing, however, had been the *numerical system*, in which numbers were assigned to the names of correspondents on the basis of the chronological sequence in which they had initiated correspondence with an office and the dossiers associated with the correspondents were arranged in accordance with the resultant numerical order (e.g., 27 Experts 1910, 145-146; Belding 1905, 116-121; Card System 1906, 151-152; Cope [1913], 45-57; Griffith 1910, 262-264; Hickox 1902, 59-60; Hudders 1916, 80-86; International Correspondence Schools 1910, 303-305; Leneer 1904, 22; Schulze 1913, 229-230; Wagemaker 1907, 103-127; 1908, 156; Wigent, Housel, & Gilman 1916, 23-29; Yates 1982, 17). The numerical system was precisely the one that Kaiser adopted for arranging filing units in his classification. His stated rationale for doing so was essentially threefold. First, he claimed, it made for more accurate filing by dint of the "mathematical exactness" that came

with the ordinal use of numbers (Kaiser 1908, § 63): in his words, “[t]he numerical classification in spite of its arbitrary character will always have this advantage that it ensures accuracy with the least trouble, and this is still more the case where large quantities are handled” (§ 74).²⁵² Second, because numbering documents in a single sequence within a given series was a simple process to perform, it allowed the filer to deal quickly and expeditiously “with [the] continuous daily supply” of new documents streaming into an intelligence department’s files: other methods, Kaiser (1911, § 664, s.v. “Broad Classes”) claimed, would not “cost as little in labour” as it did. Finally, unlike other filing methods, it had the virtue of allowing a person who was searching a file to pinpoint each filing unit directly by its call number: as he put it, “[t]he numerical arrangement has the great advantage that the access to each number is always direct, while in all classified files—not even excepting the alphabetical—access is more or less troublesome and takes time and care” (1908, § 122).²⁵³ In Kaiser’s view, the numerical arrangement of documents thus possessed the qualities of simplicity, accuracy, relative ease of access, and capacity to contribute to the effective control of quantities, all of which rendered it eminently useful “for business purposes” (§ 74).

Kaiser’s plan for classifying documentary materials, then, combined two structural principles—a flat hierarchy of broad classes with the numerical arrangement of the individual filing units—to create a simple template for organizing the various kinds of documents held by an intelligence department. By the time that he set out his protocols in *The Card System*, he had already put them to the test in the context of his own work in special libraries. As we saw in preceding chapters, he had used a version thereof at least as early as his tenure at the Publishing Department of British Westinghouse (Chapter 4, Section 2, above) and had applied the same techniques in organizing the extensive document files at the offices of the Tariff Commission (Chapter 5, Section 3, above); another major implementation for a technical library was yet to come (Chapter 8, Section 2.1, below). It is noteworthy that, in the years following the publication of *The Card System*, British treatises on filing and card indexing included brief expositions of methods of

²⁵² For comparable assessments of the accuracy of the numerical system, see 27 Experts 1910, 146 s.v. “Mistakes Avoided”; Leneer 1904, 22. Not all contemporary observers shared the sanguine view that the use of numbers conduced to greater accuracy in filing: some critics pointed out that it was all too easy to metathesize the numerals in a call number—e.g., to misread “1011” as “1101”, inverting, in this case, the sequence of the medial numbers—and so to misfile papers more readily than in, say, the alphabetical system of filing; see, e.g., Griffith 1910, 270–271; Page 1906a, 7573.

²⁵³ For an exposition of Kaiser’s reasons for preferring the numerical system of document filing to the alphabetical one, particularly with regard to correspondence, see Kaiser 1911, §§ 188, 293–294.

classifying office papers based on identical structural principles and utilizing similar kinds of notational devices (Byles [1911], 10–11, 14–17; Cope [1913], 51–52, 54–55; cf. Mares 1909, 74–75, 83, 85–90, 95, 97, 104–106). None of these treatises explicitly cited Kaiser or his writings and so it is unclear whether these parallels can be taken as an indication of influence on his part or whether they point to convergence among different authors writing about a widely diffused form of filing practice. At any rate, the discussion of methods of document organization comparable to that of Kaiser in the business literature on filing underscores the fact that his classification for documentary materials had its natural home in the office.

6.3.2. Kaiser and the Dissociation of Shelf Classification from Subject Indication: Practical and Theoretical Perspectives

Kaiser's guidelines for constructing a classification of documentary materials specified not only its formal structure but its content as well. Its classes were to be defined solely by the kinds of the documents being classified, while the filing units under the various classes were to be distinguished from one another either by the source from which the document emanated (in the case of, e.g., correspondence and trade publications), by the title of the serial publication of which they formed part (in the case of, e.g., periodicals), or by the individual document *qua* physical object (in the case of, e.g., books and pamphlets). Conspicuously absent from the classification was any indication of the subject content of the documents in question (Kaiser 1911, § 185). As we shall see in Sections 3.3 and 3.4 of this chapter, Kaiser reserved this latter rôle for the systematic card index(es) and, to a much more limited extent, the card register(s) associated with a document collection: in doing so, he was following standard practice for those employing the numerical system of filing (Byles [1911], 19–20; Cope [1913], 52–53). Significant for our purpose here is the fact that his ideal régime of knowledge organization for an intelligence department and business library was one in which the function of subject indication was completely divorced from the classification governing the physical organization of documentary materials (cf. Rodríguez 1984a, 164). The call number of a given document signaled its place within the files or on the shelves, but revealed nothing about its subject content.

The lack of subject indication in Kaiser's document classification sharply distinguished it from the major bibliographical classifications of his day, such as the DDC and its documentalist offspring, the UDC; Cutter's Expansive Classification (EC), and Brown's Subject Classification (SC), each of which, in its own way, divided "the universe of

knowledge” (Miksa 1992) into hierarchically ordered classes representing subjects and, making due provision for form and genre, provided a basis for arranging books by subject class: they were, as commentators did not tire pointing out, classifications of books rooted in the classification of knowledge (e.g., Cutter 1897, 87; Sayers 1915, 34; 1926a, 72, 75). Although Kaiser developed his model for document classification on the basis of norms derived from the domain of office filing, his work at the commercial library of the PCM had exposed him to various forms of subject-based classification as well: there, as we saw in Chapter 3, Section 3.2, the DDC served as the shelf classification for one section of the library’s Book Division, while the Journal Division used a homegrown subject classification for its periodicals that, interestingly enough, bore some structural resemblance to Kaiser’s own scheme.²⁵⁴ Even though the DDC had made a signally poor impression upon Kaiser (Chapter 3, Section 3.3, above), his experiences with it had doubtless sensitized him to the rationale for subject-based classification in a bibliothecal setting. Well aware of the widespread utilization of subject-based classifications in public libraries and cognizant of the fact that some of them, such as the DDC, were starting to find increasing use in offices and special libraries (Kaiser 1911, § 246; cf. Chapter 1, Section 5.2.4, above), Kaiser felt compelled to defend his form-based approach to the organization of documentary materials and to argue against the use of bibliographical classifications for that purpose in the intelligence department and business library.

6.3.2.1. Practical Considerations

Some of Kaiser’s arguments were couched in broadly practical terms. As we saw in Section 2.3 of this chapter, an intelligence department or business library typically collected a heterogeneous assortment of documentary materials, such as correspondence in binders, paper cuttings mounted in pasteboard, books, and unbound periodicals, and the physical differences among these materials required that they be stored separately. In such a situation, Kaiser held, classification by documentary form necessarily took priority over any classification by subject:

²⁵⁴ It, too, had a constitutive structure, consisting of forty-six coordinate subject classes, each of which was subdivided by periodical titles numerically arranged. The only major differences between it and Kaiser’s classification were (1) that its classes represented subjects, whereas his were defined by document type and (2) that it used numbers to indicate its broad classes, whereas his used initial letters.

we cannot ignore the form of the materials, we cannot mix our materials so that all kinds will come together under each subject. We must divide our materials into broad classes by their form ... before we can even consider the question of subjects dealt with in them (Kaiser 1911, § 291; cf. § 185).

This did not, of course, preclude the possibility that, once documents had been segregated into separate files, they could be further subdivided by subject rather than immediately arrayed in numerical order. Yet, even so, Kaiser was reluctant to admit the use of subject classifications for subarrangement on the shelf or in the file. For one thing, he maintained that a classification by subjects might not be the most appropriate mode of arrangement for certain classes of documents. In the case of correspondence, for example, he believed that, *ceteris paribus*, it was more advantageous to aggregate letters into filing units on the basis of the correspondents, or “authors”, rather than on that of their subject content (§§ 286–294). In his view, an author was a “permanent and definite” attribute of a letter, whereas “[s]ubjects have not such a definite character, there may be no definitely expressed subject at all” (§ 287): in other words, the correspondent provided a more certain basis for grouping letters into a dossier. Furthermore, Kaiser claimed, business concerns were, as a rule, interested in tracing and coordinating communications from and to correspondents (§ 289): constituting filing units on the basis of correspondents naturally served this function well. Moreover, he averred, businesses generally tended to “deal with a large number of authors” regarding a limited array of subjects rather than *vice versa* (§ 288): thus, filing by correspondents would naturally lead to fewer papers per dossier and so render search *within* a correspondence binder more efficient. For all these reasons, he found the arrangement of correspondence files by authors to be “overwhelmingly superior” to one by subjects (§ 293), especially if it was carried out on the numerical plan (§ 294).

For other classes of documents, such as books, where the use of a library classification might have seemed a more natural option, Kaiser was equally hesitant to recommend such a course of action. He counseled that, as a matter of course, it was most expedient to number individual books “consecutively as they are received” (Kaiser 1908, § 250) and shelve them accordingly. This advice, which presupposed a fairly small collection of books, was paralleled elsewhere in the literature on office filing (Hudders 1916, 146–149, esp. §§ 696, 700, 706). Yet, even in the case of “larger collections of books”, Kaiser (1908, § 250, n. *) doubted that the use of a subject classification such as the DDC would result in sufficient “gain” to the users to offset “the additional labour involved”. Indeed, he proclaimed, “elaborate library classifications” were generally “much too complicated ... for business

purposes” (§ 74) in contrast to the numerical method of filing by document type, which was simple and easier to learn and apply.

6.3.2.2. Theoretical Considerations

Kaiser also developed a fairly elaborate theoretical argument against the use of subject-based shelf classifications in the business library. Its gravamen, which he set forth in *Systematic Indexing*, rested on five points: (1) that documents—in particular, books—were physical carriers of discursive content and so ontologically biune; (2) that the discursive content which they carried was internally complex and so, in principle, not amenable to strictly logical classification; (3) that, as ontologically biune objects carrying complex discursive content, books tended to be polytopical; (4) that, as a result of the polytopicality of books, subject-based shelf arrangements were unable to collocate them with all the other books to which they were thematically related; and (5) that, accordingly, it was better to adopt a semantically neutral filing scheme like the numerical system than to use imperfect subject-based shelf arrangements (Kaiser 1911, §§ 115, 187–188). Insofar as Kaiser formulated this argument in terms of the core theoretical assumptions that underlay his conceptualization of SI and presented in it a principled, if idiosyncratic, rationale for maintaining a distinction between shelf arrangement and subject indication, we will do well to consider it in more detail.

Kaiser embedded the argument within a broader discussion of classification and its potential application within the knowledge organization régime of an intelligence department or business library. He posited that there were three kinds of entities, or “subjects” (cf. p. 220, n. 246, above), to which classification could be applied: (1) the things that served as the objects of human experience or products of human thought, or *concretes*; (2) the words denoting these objects of experience or thought, or *names*; and (3) the textual documents, typified by *books*, in which knowledge about concretes was recorded (Kaiser 1911, §§ 52–53, 107, 161; cf. § 624). This tripartite division of classifiable entities could be collapsed into a bipartite one distinguishing between *concretes* and *records* (cf. §§ 38, 663, s.v. “Concrete and Record”), a move that Kaiser described as follows:

The subjects with which classification has to deal are ... concretes, real or imaginary, and the conditions attaching to them, *in concreto*, if applied to concretes themselves; *in abstracto*, if applied to their names and records. Our subjects for classification may therefore be brought under these headings: Concretes and records about them ..., and we may take names and books as the typical forms of records (§ 107).

On this view, names and books alike are kinds of records because both are involved, in some way, in the linguistic representation of things.²⁵⁵ Yet, it is no less evident that the modality of representation differs for each: names simply designate things, whereas books (and other documents) contain text consisting of statements about things or, to put it in another way, books are vehicles for written discourse, whereas names provide the pre-discursive linguistic elements out of which discourse is constructed. Thus, despite the fact that Kaiser considered names to constitute a kind of record, he also, paradoxically enough, sometimes differentiated between names and records: as he explained in language evoking grammatical and logical concepts,

[t]he distinction ... is that of names consisting of terms [sci., nouns or noun phrases—TMD] only, and that of records consisting of something more than terms i.e. sentences; a name is in the position of the subject and records in the position of subject and predicate (§§ 663, s.v. “Concrete and Record”).

Although Kaiser expressed himself somewhat inconsistently on these matters, the distinctions that he sought to make seem clear: first, an initial differentiation between things in the world and linguistic representations thereof and, second, within the realm of linguistic representations, another between the words that name things and the documents bearing textually fixed discourse about them (See Figure 7). Although, as we shall presently see, Kaiser significantly modified the inner articulation of this schema over the course of his argument, the three types of classifiable entities that resulted from it provided the theoretical linchpin around which he articulated his understanding of the various forms that classification could take: indeed, it had implications not only for his argument against shelf classification but also, more positively, for his conceptualization of SI.

²⁵⁵ Such, at least, is the circumscription of the notion of a record in the passage under consideration. It is important to note, however, that, in one passage of his text, Kaiser (1911, § 52) drew a further distinction between *descriptive* and *facsimile* records. Descriptive records comprised texts describing concretes by means of language, whereas facsimile records were illustrations reproducing the form of concretes (§§ 68–72). On this view, a record *tout court* would have to be defined more broadly as a graphic representation of things, which would then be subdivided into two subclasses—linguistic and pictorial records—with names and books forming subdivisions of the subclass of linguistic records. Elsewhere in *Systematic Indexing*, however, Kaiser explicitly characterized the notion of “record” as being linguistic in nature (§ 663, s.v. “Concrete and Record”) and, throughout his discussion of classification, it is evident that it was descriptive records that he had in mind when speaking of records as such.

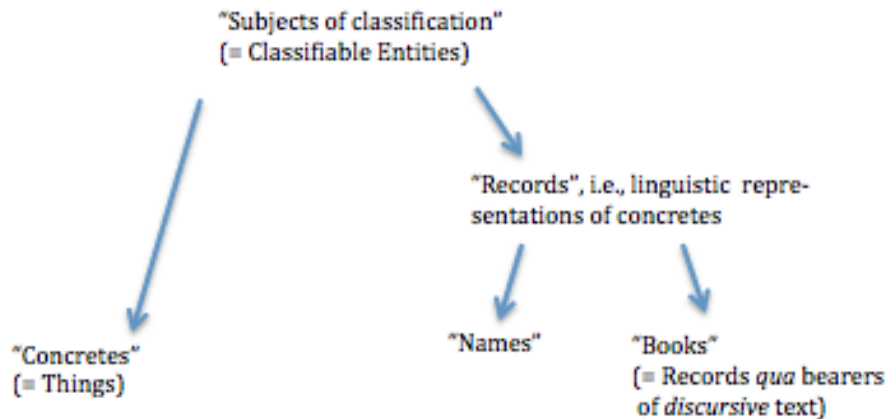


Figure 7: The universe of classifiable entities according to Kaiser 1911, § 107.

Of the three kinds of classifiable entities identified by Kaiser, he gave ontological priority to concretes, for, without them, there would be no occasion for the use of names, much less for the production of textual documents. As we saw in Section 2.4 of this chapter, he posited that, in theory at least, an intelligence department might include among its “prime materials” both samples of commodities and pieces of literature written about them. In such a case, the sample *was* the commodity “in concrete form”, whereas the literature regarding the commodity represented it “in abstract form”—that is to say, by means of discourse: samples thus constituted the “originals” against which the statements made about them in business literature ideally would be checked in the course of research (Kaiser 1911, §§ 38, 41; cf. § 193). The example of commodity samples *qua* concretes not only illustrates the priority of concretes to the linguistic representations thereof in Kaiser’s view but also highlights another important point about his conception of them as classifiable entities. Whereas he held that, in principle, concretes encompassed “real or imaginary” things alike (§§ 52, 107), in practice, he tended to speak of them primarily in terms characteristic of physical objects. Concretes, he wrote,

occupy a space, they have a form. Even in their most complex forms—for instance a battleship specifically pointed out—we know of what they are composed, there is no margin for doubt as to what is included and what is excluded. Each concrete represents something definite to handle ... (§ 108).

Although, as we shall see in Chapter 7, Section 2.1, Kaiser tempered his claim to epistemological certitude regarding the composition of concrete entities, he evidently expected them to have spatial extension and bounded structure of some sort: in this sense, physical

objects provided, appropriately enough, the norm of concreteness. For Kaiser, the fact that, by virtue of their extension and form, concretes constituted “something definite to handle” made them especially amenable to classification, for, he declared, “there is a fair chance therefore of bringing a number of concretes into a reasonably ordered sequence” (§ 108). Such a view would have come naturally to a man who had firsthand acquaintance with the workings of the PCM, where the museal section mounted classified exhibits of samples of raw materials and manufactured products (Chapter 3, Section 2, above): indeed, his experiences at that institution, where physical samples in the museum and textual documents in the Bureau of Information alike served as sources of information may well have lain at the root of the bipartite distinction between concrete objects and linguistically-based records in the first place.

Kaiser’s belief that concretes were generally well suited to classification was closely bound up with his understanding of what proper classificatory method entailed. In his view, the first steps in the process of constructing a classification were to determine its purpose (Kaiser 1911, § 162; See Section 3.1 of the current chapter) and to define as precisely as possible the universe of entities, or subjects, to be classified and name it (Kaiser 1911, § 163): he called the resulting name, which ideally encapsulated “the exact range of all the subjects of our classification taken together”, the *highest collective* (§ 164). Once the universe had been delimited in this way, the designer of a classification ideally would consider points of resemblance among the entities falling within it, and identify and enumerate the attributes they had in common (§§ 116–117; 164). Such attributes Kaiser termed *common descriptions*. Some common descriptions, he posited, would remain invariant across the entire universe: for example, if one were classifying coins used as currency in the United States in the first decade of the 21st century, all members of the universe would share in equal measure such attributes as being coins, being used as currency, or having a circular shape. Common descriptions of this sort were useless for the purposes of classification and could safely be left out of account. Most attributes, however, would display variation across the universe in question: in the case of United States coins, for instance, the common description of color would have different values—i.e., gold, silver, and copper—as would that of exchange value—i.e., one cent, five cents, ten cents, twenty-five cents, fifty cents, etc.—or mint of origin—Denver, Philadelphia, or San Francisco. In Kaiser’s parlance, the different values that a single common description could take formed

its *degrees* (§§ 116, 165): taken conjointly, the degrees of a common description constituted an array of coordinate classes.

After the common descriptions and their respective degrees had been determined, the classification-maker had to select those common descriptions that “fall[] in best with the purpose we have in view” (Kaiser 1911, § 117; cf. § 165). Each common description so chosen functioned as a *principle of division* on the basis of which the members of the universe would be distributed among the relevant array of classes. Kaiser considered “the determination of the principles of division” to be “the most important work in classification” on the grounds that “it provides the fixed points on which we can build”: in his view, “the difficulty is to find the most suitable common descriptions for a given purpose” (Kaiser 1911, § 117). In structural terms, a common description forming a principle of description constituted one level of a classificatory hierarchy and so the sequence in which these principles were applied determined the hierarchical structure of the classification (§§ 117, 165–166). The order of the degrees, or classes, within each common description serving as a principle of division was likewise to be fixed on some determinate plan, so that the successive divisions of a given universe produced a single sequence of hierarchically ordered classes (§§ 118, 167, 170).

According to Kaiser (1911, § 120), once the classes of a classification had been established, it was necessary to name them, for “[u]ntil every subject [i.e., entity or entity type—TMD] has a name—that convenient handle which enables us to manipulate it in the abstract—we cannot proceed with our work”. Each class in a classification was to be assigned a “proper name” that would henceforth serve as its linguistic representation (§§ 119–120); indeed, Kaiser asserted, “it should be regarded as an axiom in classification to give each subject its proper name and its complete name” (§ 199). Arranged in accordance to the sequence of classes stipulated by the classification, the list of such names formed its *nomenclature* (§ 121). Kaiser’s use of the term “nomenclature” is noteworthy, for, in the late 19th and early 20th centuries, this word was generally understood to refer to the stock of “names for the distinct objects or classes of objects” treated in a given science (Jevons 1881, 293; cf. Rylands 1900, 249–250; Welton 1917, 181–182) and so carried the nuance of an organized, domain-specific vocabulary consisting of rigorously defined terms. Thus, in styling the list of names denoting the subjects of a classification as a nomenclature and characterizing the names themselves as “proper names” of the entities or entity types to which they referred, Kaiser (1911, § 120) highlighted the fact that the vocabulary in

question was to be a limited and regimented one in which each element had a well-specified meaning: in other words, it bore some resemblance to what later KO theorists would call a controlled vocabulary (e.g., ANSI-NISO 2005, 5, s.v. “controlled vocabulary”; Foskett 1996, 113–114; Frické 2012, 78–80; Lancaster 2003, 19, 23; Leise 2008; Svenonius 1990, 82–83). In parallel to the nomenclature, the designer of a classification could go on to fashion a system of *notation*, which, in Kaiser’s (1911, § 121) view, provided a means of creating “shorter and more concise names” for the subjects of a classification. By virtue of their symbolic structure, these notational names indicated the place of the given entity or class within the structure of the classification as a whole: we have already seen the practical uses to which this could be put in our discussion of call numbers in Kaiser’s scheme for document classification (cf. Section 3.1 of the current chapter).

Such was the general method of classification as Kaiser conceptualized it. Applicable, in theory, to all three kinds of subjects, or classifiable entities, that he had posited, it was, in truth, primarily oriented toward the classification of concretes. One indication of this is the fact that Kaiser (1911, §§ 162–172) chose the “English coins of Edward VII of the United Kingdom” as his primary illustration of how to apply the method.²⁵⁶ He divided this conveniently limited universe on the basis of three successive principles of division—metal and color, exchange value, and year of issue—the degrees of each of which were arranged in an ordinal sequence proceeding from greater to lesser in value: this yielded the nomenclature reproduced, in simplified form, in Figure 8 below. Although the way in which Kaiser carried out the classification included at least one unorthodox maneuver—he merged the common descriptions of metal and color into a single, mixed principle of division because they had the nominally identical degrees of gold, silver, and copper (§§ 165–168)—and the final structure of the classification scheme did not entirely escape certain irregularities in the British system of coinage—the penny formed a subdivision of both silver and copper coins, the final scheme provided a reasonably well-constructed example of a simple “logical classification” (§ 192) represented by a nomenclature in which each term had a well-defined meaning that determined its place within the “logical

²⁵⁶ Although the geographical qualifications of the coins as “English” and Edward VII as being “of the United Kingdom” may seem inordinately fussy, Kaiser (1911, § 163) had good reasons for introducing them into the highest collective for this classification: the designation “Edward VII of the United Kingdom” differentiated the rotund son of Queen Victoria from all other possible Edward VIIs, whereas the specification of the coins as “English” excluded coins from the colonies and dominions of the British Empire, such as Canadian dollars and Indian rupees, which might otherwise be considered to fall under the aegis of a British monarch.

arrangement” of the vocabulary (§ 211).²⁵⁷ a nomenclature in which each term had a well-defined meaning that determined its place within the “logical arrangement” of the vocabu-

English Coins of Edward VII

<i>Gold</i>	
Five Pounds	
Two Pounds	
Sovereign	(= 1 pound)
Half Sovereign	(= ½ pound = 10 shillings)
<i>Silver</i>	
Crown	(= ¼ pound = 5 shillings)
Half Crown	(= 2.5 shillings)
Florin	(= 2 shillings)
Shilling	(= 12 pence or pennies)
Sixpence	(= ½ shilling)
Groat	(= 4 pence or pennies)
Three Pence	
Two Pence	
Penny	
<i>Copper</i>	
Penny	
Half Penny	
Farthing	(= ¼ penny)

Figure 8: Kaiser’s nomenclature of the English coins of Edward VII
(Source: Kaiser 1911, §§ 171 [simplified], 189, 208).²⁵⁸

²⁵⁷ For discussion of alternative classified arrangements of these terms, as well as Kaiser’s rather formalistic rationale for adopting an ordinal sequence in which terms for items of greater value preceded those of lesser value, see Kaiser 1911, §§ 187, 208–211. It should also be noted that Kaiser did not expect that *all* classifications of concretes would conform to the norms of logical classification as neatly as his sample collection of coins would. As he pointed out, ones that dealt with a broader universe of objects, such as classifications of displays at industrial exhibitions or classifications of commodities subject to custom tariffs, often departed from the classificatory ideal (§§ 198–201); he suggested that these deviations were to be explained by the different purposes that these classifications served.

²⁵⁸ The underlying classification included an additional level for year of issue, which has here been omitted for the sake of simplicity. The three standard units of value in the British monetary system of the period were “pounds, shillings, pence” (£ s d), of which the relative values were: 12 pence = 1 shilling and 20 shillings = 1 pound. Equivalentents in these units have been added in parentheses to those names of coins most likely to be unfamiliar to present-day readers: these values are based on those given in Kaiser 1911, § 169.

lary (§211).²⁵⁹ Needless to say, such a classification could easily be used for the physical arrangement of coins belonging to the universe that Kaiser had stipulated (§ 170).

Once one moved from the realm of concrete objects to that of discourse about them, however, matters became much less straightforward. As Kaiser (1911, §§ 118, 173–174) noted, the literature touching on a given universe of concretes generally treats its subjects from a number of different standpoints that go well beyond the conceptual boundaries of any single classification of the objects in question. Thus, as he spelled out at length, the English coins of Edward VII might figure as the subjects of a highly variegated written discourse:

Some [books—TMD] may treat exactly on our coins either singly or collectively, or in two's and three's. We may find books on gold coins, silver coins etc including ours, some will criticise their designs, their inscriptions, their sizes, the absence of additional coins, others will propose nickel coins, a decimal coinage, notes in place of some gold values, the withdrawal of some coins, different alloys, a different fineness. ... [T]here will be books on famous collectors and collections, reports of the mints etc, legislative and administrative documents etc. Some will propose a licence or tax on collections and collectors, others will predict a dearth in some coin or other.

There will be books on the various processes connected with coins, gold production, coining, milling, minting, issuing, circulation, transportation, export, withdrawals from circulation, the sanitary aspect of handling coins, sales, discoveries, melting, making into ornaments, the mechanical aspect of keeping coins, their preservation, classification, safe keeping, etc, thus introducing a great variety of considerations with which we had nothing to do in the classification of our coins.

Again in some literature our copper coins will be called bronze coins, our half-sovereigns ten shilling pieces, our groats four penny pieces, others will speak of maundy money, of higher values, of rarer kinds, of defaced coins, gilded silver or copper coins, counterfeits etc thus introducing a variety of names which are quite foreign to our original classification but which to ignore would be impossible, for it would mean ignoring a large amount of useful information (§§ 173–175).

Literature about coins consisted of documents containing statements about the members of Kaiser's universe in which the terms of reference—processes applied to, and actions

²⁵⁹ For discussion of alternative classified arrangements of these terms, as well as Kaiser's rather formalistic rationale for adopting an ordinal sequence in which terms for items of greater value preceded those of lesser value, see Kaiser 1911, §§ 187, 208–211. It should also be noted that Kaiser did not expect that *all* classifications of concretes would conform to the norms of logical classification as neatly as his sample collection of coins would. As he pointed out, ones that dealt with a broader universe of objects, such as classifications of displays at industrial exhibitions or classifications of commodities subject to custom tariffs, often departed from the classificatory ideal (§§ 198–201): he suggested that these deviations were to be explained by the different purposes that these classifications served.

accomplished with, coins; the persons and institutions handling them; policy proposals regarding the coinage of the realm; and so on—far exceeded his classificatory characterization of the coins as concrete objects having a certain color, metallic content, and exchange value. Similarly, on the level of language, the range of names used to express these new terms of reference likewise transcended the highly circumscribed limits of the classification's nomenclature. For Kaiser, the conclusion was clear: "we have to deal with an entirely new set of subjects for classification, and their classification must be considered and dealt with quite independently of our classification of coins" (§ 177). The contention that a classification of the elements of written discourse about objects will differ fundamentally from a classification of the objects themselves was consonant with a view that had already found expression in the writings of earlier commentators on library classification (e.g., Clarke 1900, 349, 355–356), albeit in somewhat different terms: they tended to distinguish between the classification of objects and the classification of knowledge rather than between the classification of objects and classification of elements of discourse. In this, Kaiser took a more language-oriented approach to knowledge organization than most of his contemporaries, a feature of his thought that we shall consider in greater detail in Chapter 7, Sections 2.2 & 2.2.3, below.

The classification of the elements of written discourse involved the two other kinds of classifiable entities that Kaiser (1911, §§ 107, 177) had posited: the names denoting the various subjects of discourse and the documents bearing the textual representations of the discourse. With regard to names, he identified two possible modes of classification: "by their meaning and by their form" (§ 178). To classify names in accordance with their meaning was, in effect, to construct a nomenclature. While Kaiser assumed that a nomenclature would accompany any classification of concretes as a matter of course, he was no less convinced that the attempt to generate a general nomenclature for the whole range of discourse surrounding any given universe of concretes was a quixotic undertaking, for the sheer heterogeneity of the subjects to which names referred could not be accommodated within a single, unitary classificatory structure. He sought to illustrate this by reference to his sample nomenclature of coins:

The nomenclature of our classification of coins gives us their names arranged by their meaning. If we endeavor to insert between these our new names, such as nickel coins, licence, decimal coinage, insurance etc we shall on trial very soon arrive at the conclusion that it is impossible to find proper places for them, nor does their meaning afford a common basis by which to divide them into classes (§ 178).

The nub of his argument becomes clearer if one considers the fact that among the “new names” were words referring to the activities or processes associated with the making or handling of coins. In Kaiser’s estimation, the attempt to unite concretes and processes into one classificatory structure divided by a single set of common descriptions was doomed to failure, for they were fundamentally incommensurable *kinds* of subjects. *A fortiori*, he dismissed the possibility that a nomenclature could accommodate terms of concretes and terms of processes within its framework:

[B]ringing names of concretes and names of processes into one sequence ... cannot be done under any conceivable circumstances. With as much reason we might take our collection of coins, replace a sovereign by the term *insurance*, a sixpence by the term *valuation* etc etc and still persist in calling this mixture of concretes and process names a collection of coins (§ 187 [emphases his]).

On the basis of considerations such as these, Kaiser concluded that “[w]e are obliged therefore to fall back on the form of the names as the only alternative, we must arrange them by the letters of which they are made up” (§ 178; cf. § 192)—that is to say, adopt an alphabetical arrangement thereof. Inasmuch as the distinction between names for concretes and those for processes played a key rôle in the design of SI, as did the use of alphabetical order for arranging subject terms into card index files, we shall defer further comment on Kaiser’s treatment of names to our discussion of his indexing system proper (see Chapter 7, Sections 2.2.3–2.2.4, 3.6, & 5.1, below): here, it is sufficient to note that, save for the special cases of nomenclatures, he held that the names used in discourse were best classified by their form rather than their semantic content.

The classification of documents as units of discourse, for which Kaiser chose books as his paradigm case, was, to a large degree, hedged by the same considerations as those applying to names. Insofar as such a classification sought to represent the discursive contents of books, it faced the same problem of subject heterogeneity as did any attempt to create a nomenclature going beyond a universe of concrete objects: “[a] logical classification of books or literature generally is in fact as impossible as with names, and for the same reasons”, claimed Kaiser (1911, § 187; cf. § 43). Accordingly, in his view, bibliographical classifications would inevitably fall short of the ideal of a classification of subject matter based on consistently applied principles of division. For example, he acidly stated that “[t]he Dewey classification is hardly properly called a *classification*”, for “the books are in reality merely collected under comprehensive headings which are chosen for convenience” (§ 253 [emphasis his]); even when its systematic subdivisions generated more specific classes, or

classes, these did not “always correspond exactly to the logical parts of a subject” (§ 254). To be sure, in the case of the DDC, the systematically recursive division of classes into ten subdivisions tended to produce class arrays deviating from the requirements of a strictly logical division—a fact that Dewey (1899, 13–14, 17–19) himself had grudgingly conceded and accepted as a price to be paid for the utility of a decimally-based classification scheme. Yet the DDC was only a particularly egregious example of what Kaiser (1911, § 187) took to be a more general phenomenon: no subject-based classification of books, in his opinion, could free itself entirely of the logical inconsistencies occasioned by the attempt to accommodate different kinds of subjects within a single scheme. Thus, he counseled, “if books *must* be classed by their contents, then the only method open” was one in which “we select such collective headings as are convenient for our purpose” and arrange them as best we can into coherent, if “loosely connected” groupings (§§ 188, 192, s.v. “Books” [emphasis his]).

As an example of what such a classification might look like, Kaiser drew up a schedule for classes under which to enter books carrying information about the English coins of Edward VII (See Figure 9). Even a cursory glance at this scheme reveals certain consistent patterns in the arrangement of the subject classes: for example, classes for concretes such as Coins, Medals, Minting Machinery, and Minerals and Ores preceded other classes within their respective arrays and subject classes invariably came before the form classes pertaining to them.²⁶⁰ However, it is no less evident that many of the main classes were subdivided in a manner that violated Kaiser’s prescribed method for constructing logical classifications: to take but one simple instance, no single principle of division underpinned the division of the main class Technology into its subsidiary classes Minerals, Ores, Chemistry, Metallurgy, and Assaying, for this array of classes included kinds of concrete objects (Minerals, Ores), departments of knowledge (Chemistry, Metallurgy), and kinds of activity (Assaying) within a single array. In drawing up a subject-based classification for books that featured the theoretically unprincipled use of division, Kaiser appears to have

²⁶⁰ For Kaiser’s rationale for placing form classes, such as “Periodicals” and “Reference Books”, after, rather than before, the subject classes proper as most bibliographical classifications of the period did, see Kaiser 1911, § 262.

Books

Numismatics

- Coins
- Medals
- Catalogues
- Price Lists
- Collections
- Counterfeits
- Preservation
- Valuation
- Designs
- Values
- Alloys
- Terminology

Mint

- Minting Machinery
- Reports
- Histories

Manufacture

- Ornaments
- Jewellery

Technology

- Minerals
- Ores
- Chemistry
- Metallurgy
- Assaying

Political Economy

- Legislation
- Administration

Periodicals

Reference Books

etc.

Figure 9: Kaiser's subject-based classification for books containing information about the English coins of Edward VII (Source: Kaiser 1911, § 191).

imitated the bibliographical classifications with which he was familiar.²⁶¹ Shelf arrangements based on classifications constructed in such a manner were, in his eyes, a decidedly “inferior” way of providing subject access (Kaiser 1911, § 188).

Kaiser found an even stronger objection to subject-based classifications in the very nature of the objects that they were designed to classify. Books and other documentary materials had extension in space and were something definite to handle. Thus, on his own criteria, they were concrete objects, a fact that he readily acknowledged with the statement that “[b]ooks by their form are concretes and as such will have to be treated as concretes” (Kaiser 1911, § 115). Yet, as a species of record, books also carried textual representations of discourse about objects in the world. They were thus far more complex things than Kaiser’s initial division of classifiable entities into concretes and records or concretes, names, and books (See Figure 7, p. 233, above) had intimated: they were *biune* entities partaking of both the concrete materiality of physical objects and the abstract nature of linguistic representation (See Figure 10, below). Here, one ran up against a problem of the one and the many. As concretes, books were single, physically bounded units. However, Kaiser held, the informational content of any given book did not possess the same degree of unity. Insofar as “literature is made of names”, he maintained, books and other documents were to be viewed as “collections of names” (Kaiser 1911, § 185; cf. Figure 10). The various names in a book’s text occurred in statements about the (kinds of) entities, or subjects, to which they referred and these statements made up the informational content of a book. A “text is a multiple of the single statement as an organization is a multiple of the single transaction”, averred Kaiser (1911, § 565), and insofar as statements of various kinds are

²⁶¹ Should one be tempted to think that Kaiser was unduly exaggerating the laxity with which the principles of division were applied in bibliographical classifications, one need only consider the treatment of coins in the 6th edition of the DDC (Dewey 1899), which was the edition that Kaiser used as a point of reference in *Systematic Indexing*. There, under the class “Banks. Money. Credit. Interest” (332) and its subdivision “Coins and Coinage. Mints” (332.4), we find the following array of coordinate classes—“Coinage Metals. Production and Value. Gold. Silver. Nickel. Copper” (332.41), “Single and Double Standard” (332.42), “International Standards” (332.43), “Monetary Congresses” (332.44), “Comparative Value of Moneys” (332.45), “Mints” (332.46), “Coinage Laws” (332.47), and “History of Mints and Coinage” (332.49)—where no single principle of division can be discerned. As for other bibliographical classifications known to Kaiser, Brown’s (1906, 166, classes L869–897) SC did not constitute an improvement with respect to the treatment of coins (classes L870–876, L880, L887, L891, L895–897, & L856 in the categorical table), while the edition of Cutter’s (1891–1893, 77) EC that he used had not yet developed its classes pertaining to “Money as a means of commerce” (Class HM), which was to be subdivisible by geography and to include classes for “Gold, silver, and paper money, Bimetallism, Credit, Foreign Exchange, Prices”.

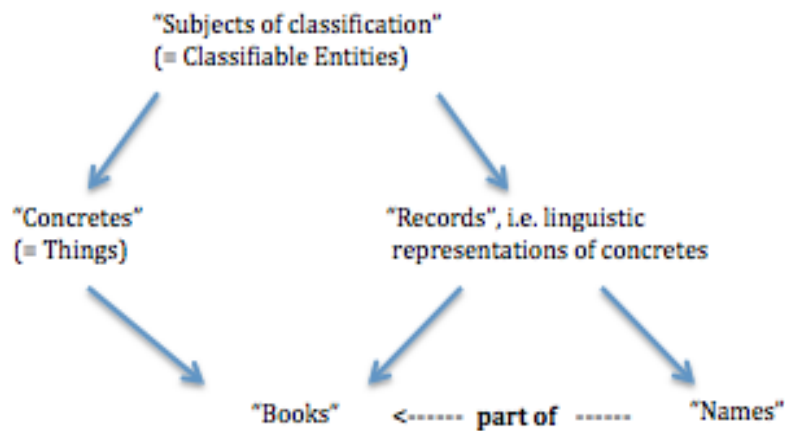


Figure 10: The biune nature of books according to Kaiser 1911, §§ 115, 185.

made in the course of book's text, "each book represents a collection of facts and opinions wrapped up in one collective term, its main subject or its title" (§ 115). Even if a book were ostensibly about a single "main subject", the statements within its text might pertain to a host of different things and processes, so that, in Kaiser's words, "each book represents a collection of subjects" (§ 188). In other words, virtually all books were polytopical to a greater or lesser degree.

The antinomy between the physical unity of the book and its inner diversity in subject content posed an obvious challenge for any subject-based shelf classification. As Kaiser (1911, § 115) noted, "[i]n trying to arrange books according to a given scheme of classification, some would partly fit into many positions, all books would fit into more than one place" on the basis of their content; yet, because of their concrete nature, they could be located in only one place on the shelves of a collection. For the purposes of physical organization, then, a book could be assigned to only one subject class. Within the framework of a shelf classification, this meant that only one aspect of a given book's subject content—typically, that which was considered to be its main subject (cf. § 188)—would be represented by its location on the shelf, while all the others would be left unexpressed: thus, some elements of information contained in the books would be collocated, whereas others would be scattered. This Kaiser took to be a fundamental weakness of bibliographical classifications such as the DDC, concerning which he wrote:

Dewey says: "Since each subject has a definite number, it follows that all books on any subject must stand together" (on the shelves).²⁶² That sounds very businesslike, but a moment's reflection will show that it is merely shutting one's eyes to the real difficulty. Because we give a book a definite number it does *not* follow that the book has a definite subject. If every book or even the majority of books were confined or could be confined to one definite subject, then we could agree with him. But books do treat of more than one subject, that is the real difficulty, and it is especially the case as soon as we get away from the ordinary run of books in the average public library. Two books treating of widely different subjects may both include the same secondary subject, they will be separated by his classification in spite of what he says, for you cannot give the same book two places on the shelves (§ 255 [emphasis his]).

In his view, the fact that subject-based classifications could not collocate on the shelves *all* the books in a collection by *all* the subjects of which they treated vitiated their effectiveness as a means of subject access. This led him to call their very use into question:

What recommendation is it to find books of a given number standing together on the shelves, when it is demonstrable from the classification that the same subject may occur in a number of places sometimes hidden away under some other subject or form? It may even so happen that there is not a single book under a given number and yet the subject of that number may be fully treated in books classed under other subjects. The question of shelf arrangement must stand or fall by the proved possibility and necessity of collecting together books on like subjects. It is *possible* only so far as books treat exclusively (or primarily) on the same subject, and it is *impossible* if all information on a given subject is required to be collected in one place. Whether it is *necessary*, that is an open question, ... but a demonstrable impossibility in the case of information would in any case tell heavily against the plea of necessity (§ 256 [emphasis]).

By contrast, he noted, one could achieve better subject collocation by means of a card catalog, for "the cards in the catalogue stand together under each subject and much more completely so than is possible with books" (§ 256). If the arrangement of entries in a card catalog provided a better collocation of books by subject than a shelf classification did, there wasn't a need for both, reasoned Kaiser: surely the former alone would suffice to direct the users of a business library to materials on subjects of interest to them.

Kaiser's views on subject-based shelf classification ran counter to the prevailing opinion of contemporary writers on bibliographical classification, who took it as axiomatic that subject classifications would—and should—form the primary basis for the physical organization of books in a library (e.g., Brown 1897, 149; 1906, 10; Hulme 1908, 29–30; 1950 [1911–1912], 3, 17; Otlet 1934, 347, § 262.443; Sayers 1926, 27–28). To be sure, these

²⁶² The quotation comes from Dewey 1899, 6.

commentators were cognizant of the problems that Kaiser raised, for questions surrounding the limits and efficacy of shelf classification had long exercised participants in the discourse of librarianship. They accepted that books were “concrete objects” (Richardson 1901, 49) or “concrete, indivisible thing[s]” (Sayers 1926, 74) and that, barring the expensive expedient of procuring multiple copies, any given book could occupy only a single position on the shelves of a given collection (e.g., Brown 1906, 10; 1916 [1912], 95; Cutter 1891–1893, 5). They also fully appreciated the fact that the contents of books are complex and that a subject-based classification of books could not indicate all the subjects treated in a single book (Richardson 1901, 46, 83–84; Sayers 1908, 85; 1915, 34–35; 1926, 72, 74; Spofford 1900, 364). Indeed, the challenges that polytopicality posed to the DDC and other bibliographical classifications had already been mooted in American library circles a quarter of a century before Kaiser discussed them (e.g., Fletcher 1886, 209–210; Perkins & Schwartz 1886, 37, point 1.2, with the reply thereto in Cutter 1886, 180–182; Schwartz 1886, 470; cf. Miksa 1974, 571–574).

The limitations of shelf classification identified by Kaiser, then, were no mystery to librarians. Nevertheless, in the view of most, the advantages of collocating books by subject on the shelf far outweighed the fact that the collocation would be inevitably incomplete. “To many readers”, noted one British librarian, “it is of the first consequence that they should be able to see and handle on short notice what books a library possesses in some definite subject” (Robinson 1898, 91). In libraries giving open access to their book-stacks, a subject-based shelf arrangement afforded the library patron precisely the opportunity “to see many books on a subject at once” (Cutter 1891–1893, 4) and so to “obtain a general view of the literature of his subject”—or at least those parts of it available in the library in question—“in a very short time” (Sayers 1926, 29). Direct perusal of books organized on the shelf also was held to aid patrons in choosing which library materials to consult: “[a] direct view of the whole allows rapid comparisons among the different works held on the same subject” so that a reader at the shelf could select “the book which responds best to the desired conditions of reading and research” (Institut International de Bibliographie 1905a, 168; cf. Lyster 1897, 331). Furthermore, there were efficiencies to be had. Subject-based shelf classification was considered to constitute “a positive and great gain to economy in bibliographical search and ... economy in the actual use by bringing the books together in space and thus saving innumerable steps on the part of the man who goes to the shelves to consult them” (Richardson 1901, 54; cf. Robinson 1898, 91): indeed, it was sometimes

characterized as a labor-saving device (e.g., Lyster 1897, 332; Richardson 1901, 54). As for its collocative limitations, these were to be remedied by the library catalog. Hedged by fewer physical constraints than the shelf, it could accommodate multiple entries for books under different subjects and so attain a more comprehensive degree of collocation (Brown 1898, 93–94; 1906, 10–11; Cole 1887, 47–48; Cutter 1891–1893, 4–5; Ifould 1902, 26; Lyster 1897, 330; Professional Literature 1912–1913, 210; Richardson 1901, 51, 83; Sayers 1926, 74–75). On this view, the shelf classification and catalog each fulfilled its own office with regard to subject access: the catalog offered fuller collocation but contained only bibliographical descriptions of the books collocated, whereas a shelf classification was necessarily coarser in its collocation but allowed one directly to examine the physical volumes that it brought together.

In the eyes of many librarians, shelf classification and catalog complemented and mutually reinforced each other: “by having your books classified on the shelves you do not impede in any way the construction or usefulness of your catalogue, you only add to its value”, one British commentator assured his readers (Robinson 1898, 91), while one of the leading American pioneers of knowledge organization observed that it was “in connection with the catalog” that shelf classification functioned as “one of the keys that unlocks the treasure-house of knowledge” (Cutter 1891–1893, 5). Kaiser roundly disagreed with such assessments, arguing that, if anything, subject-based shelf arrangement was likely to discourage use of the catalog:

In almost all research work it is essential that all available *information* on a given subject should be carefully examined, in comparatively few cases is it sufficient to refer to certain books only. Supposing we have some men at work, from habit they will of course know “just where to find the books on that subject on the shelves.” Only in case they fail to find in them what they want will they consider other resources of the library, whereas the only safe way is to find out from the card catalogue *first* what material there is available and then only go for the books. It is absolutely essential that the compiler should study first the cards to explore roughly the material *before* he touches any of it. But human nature being what it is, he cannot resist the temptation of making a short cut to the books so nicely arranged for him, even at the risk of missing the latest information available, for books soon get out of date (§ 257 [emphases his]).

Kaiser was not alone in assuming that the patrons of a library might choose to bypass its catalog in favor of direct examination of shelves organized in accordance with a bibliographical classification: for example, one contemporary public librarian working in Australia noted “many people prefer to procure what they require direct from the shelves,

rather than handle the cards in a catalogue" (Ifould 1902, 26).²⁶³ Yet, whereas this particular observer regarded such user behavior with equanimity and saw in it a point in favor of shelf classification, Kaiser took the opposite view. As the foregoing passage shows, he held that, in a business context, proper research required taking account of all the information on a given subject held by a library and that, *ceteris paribus*, a card catalog offered more complete and up-to-date information on available sources than one would gain from perusing the shelves: accordingly, if a shelf classification provided an occasion of temptation for researchers to forgo the richer information about sources contained in the catalog, then its use could only betoken "a distinct disadvantage, especially so far as business libraries are concerned" (Kaiser 1911, § 257).²⁶⁴ To be sure, Kaiser reluctantly admitted that the use of shelf classification might bring with it "some advantages", which he left unspecified: nevertheless, he was quick to declare that "I have no hesitation in saying that where there are cards the advantage of shelf arrangement does *not* outweigh its disadvantages" (§ 257 [emphasis his]).

To this negative verdict regarding subject-based shelf classification *vis-à-vis* the library catalog, Kaiser (1911, § 257) added a final piece of advice: "where numbers of men are at work it is expedient, even indispensable, to adopt safeguards which will ensure that the cards are consulted before the books are touched". Although he did not expound further on the form that such safeguards might take, the implication was clear. If one arranged the books in a business library in accordance with a classification other than a subject-based one, the card catalog alone would provide subject access to the collection: this would, in

²⁶³ See also, from a slightly later period, Bliss 1939 [1933], 157–158, who waxed lyrical on users' putative preferences of shelves to cards: "[T]he subject-catalog may be more complete, more inclusive, more analytic, more specific, and more plastic; but ... to most interests it is less satisfactory than access to the books themselves, even tho the groups in the classes are more or less incomplete. A mass of cards is so uninviting, to follow their dry details in disconnected succession is irksome, ... that the reader thrusts the tray from him and turns to consult the books, some of which at least are suffused with vivid interests. It is in consideration of this desire and need for more intimate and informative contact with the books that classification is maintained in modern libraries and access to the shelves is allowed".

²⁶⁴ It is noteworthy that, in the scenario of "research work" that Kaiser sketched out in his argument, he characterized the users eschewing consultation of the catalog in favor of direct recourse to the shelves as "men at work" who "know ... from habit ... 'just where to find the books on that subject on the shelves'" and stipulated that it was "the compiler" who should study the cards in a card catalog prior to taking recourse to the shelves and avail themselves of the latest information. If one recalls that the most regular users of the commercial library at the PCM were researchers working for the museum's Bureau of Information who were charged with compiling reports on specific commercial topics (See Chapter 3, Sections 2 & 3.3, above), one may well wonder if Kaiser wasn't drawing on memories of his experiences there. At any rate, it is apparent that he was envisioning a context of use similar to that of the PCM.

effect, compel library patrons to examine the cards for subject searches before embarking for the shelves. Here was an additional, albeit unspoken, rationale for organizing books and other documents in accordance with a non-subject-based classification scheme such as Kaiser's own.

6.3.3. Kaiser's Dissociation of Subject Indication from Document Classification: Concluding Comments

Such, then, were the theoretical objections that Kaiser raised against the use of subject-based classifications as a basis for the physical organization of documentary materials in a business library. Couched in terms more characteristic of the discourse of librarianship than that of office management, they were ultimately reducible to two interrelated claims. First, Kaiser argued, the classification of subjects of discourse would invariably fall short of the methodological ideals of logical classification that were, under favorable circumstances, realizable in classifications of concrete objects simply because discourse involved reference to a greater variety of kinds of subjects than concrete objects alone: consequently, he insisted, all subject-based shelf classifications could not but exhibit logical imperfections in their articulation of classes and could at best approximate, on a coarse scale, the relationships among subjects of discourse. Second, and more important, the fact that books were concrete objects and yet any single book might contain information about a number of different subjects made it physically impossible to bring together all information about a given subject on the shelves. More thorough subject collocation could, of course, be achieved in the card catalog; however, Kaiser warned, the very presence of a shelf classification in a library might entice its patrons to neglect the information on cards in favor of direct scanning of the shelves themselves and so lead them to overlook pertinent information on the subjects of their search. From these claims, he concluded that subject-based classifications represented an inherently flawed mode of organizing books on the shelf and, accordingly, he discouraged their use within the framework of the business library.

Kaiser's arguments against shelf classification were compounded of a curious mixture of perspicacity and tendentiousness. On one hand, his recognition of the fact that, unlike classifications of concretes, classifications of discursive records like books involve a number of different types of subjects—processes as well as objects, for example—and therefore require a different kind of classificatory strategy than the former anticipated the distinction between “classifications of phenomena” and “classifications of documents” that would,

much later, become a topic of live discussion among KO researchers (e.g., Broughton 2004, 17–19; Classification Research Group 1978, 23; Gnoli 2008a, 99–100; 2008b, 138–139; Mai 2004, 41–43). Similarly, his observation that bibliographic classifications tended not to reach the same level of logical precision as classifications of concretes prefigured, albeit inchoately, the present-day view that the hierarchical relationships in most traditional bibliographical classifications tend to have less stringently defined logical properties than those generated through the strictly applied methods of logical division (Mills 1968, 26–27; Svenonius 2000a, 151–152, 163–164). Furthermore, his keen awareness of the physical constraints that the concrete nature of books imposed upon subject collocation on the shelves, which he shared with other contemporary writers on classification, anticipated later criticisms of the “unidimensionality” of traditional bibliographical classifications such as the DDC, which, it was argued, required classifiers “to select a single relationship from all the possible relationships which any given title might have to its fellows, and to disregard the remainder” (Shera & Egan 1956, 47; Shera 1965, 99–100). All these aspects of his account of classification betokened no small insight into the subject.

For all its theoretical acuity, Kaiser’s critique of subject-based shelf classification was not free of tendentiousness. His argument that habitual users of a library would tend to bypass its catalog and rely on shelf arrangement alone for surveying its holdings on a given subject, thus depriving themselves of the fuller information provided in the former, traded on a commonly held perception of library users’ behavior and identified a genuine informational problem that could arise from exclusive reliance on shelf classification as a means of subject access, especially if one were engaged in research requiring an exhaustive review of available sources. However, to claim that this one difficulty—which, after all, represented a tendency, not an inevitability of use—offset the various advantages that might accrue from the use of subject-based classifications was to give the latter decidedly short shrift. On a more general level, Kaiser’s (1911, §§ 192, s.v. “Books”; 188) judgment that, shelf classifications were, at best, “of doubtful utility” because they did not permit full collocation of the informational content of books but compelled classifiers to “put each book under that [sci., class—TMD] heading which can claim most of it” was premised on a criterion of perfection that such classifications simply could not meet because of the nature of the objects to which they were applied. Other writers on classification were also cognizant of the incapacity of subject-based shelf arrangements to achieve perfect collocation (See Section 3.2.2 of the present chapter). Although they acknowledged this as a

limitation, they did not regard it as undermining the general usefulness of such schemes: in their eyes, the perfect was not to be the enemy of the good (enough). For Kaiser, however, the issue of imperfect collocation appears to have overridden all other considerations regarding the utility of shelf classifications and jaundiced his view towards them: the inability of such classifications to account for all the subjects in a given book prompted him to view them much as, a generation earlier, the logician W. Stanley Jevons had viewed library catalogs classified by subject—as “a logical absurdity” (Jevons 1958 [1877], 715) and, hence, as irredeemably defective. Although his uncompromisingly “perfectionist” stance on this point may well seem overly rigid, it proved to be quite consequential, for, as shall become apparent in Chapter 7, Section 1, below, it fed directly into the rationale for SI.

Kaiser’s theoretical arguments against subject-based shelf classifications were, of course, intended to dissuade his readers from adopting such schemes for use in the intelligence department and business library. In doing so, they served to clear the ground for his own preferred mode of classifying documents broadly by documentary kind, with each document class subdivided into numerically arranged filing units (See Section 3.1 of this chapter, above). We have already seen that this system of document classification, which was closely aligned with, and ultimately derived from, office filing practices, was thoroughly pragmatic in import: featuring a simple constitutive hierarchical structure, it was designed to bring together materials of the same documentary kind into broad groups and, within each group, to establish an easily ascertainable location for each document or dossier so that it could be rapidly found and retrieved. Accordingly, Kaiser laid great stress upon assigning to each filing unit a call number that uniquely identified it by the document class to which it belonged and its place in the sequence of filing units within that class. Insofar as this sequence was determined by order of accession, the physical organization of the documents or dossiers within a given file was purely mechanical and semantically neutral in its character: it did not reveal anything about the subject content of the filing units, the sources from which they emanated, or any other attribute of note save for their basic documentary form. The call numbers, then, served as indicators of the location of filing units within files arranged in a numerical order that reflected an arbitrary process of documentary accretion. This, however, was not enough. If they were to fulfill their function as notational devices for retrieval, it was necessary to correlate them with those attributes of their associated filing units by which the latter were likely to be known and, hence,

searched for by the persons making use of the intelligence office. The primary mechanism for doing this was the card register, to a consideration of which we now turn.

6.3.4. Card Registers: Kaiser's Mechanism for Document Retrieval

The need to correlate the call numbers of individual documents or dossiers with the names of the organizations, people, places, or other things that were associated with these filing units and were likely to be the attributes by which they would be searched required the preparation of records documenting the linkages between the former and the latter. These records not only permanently preserved the information about the correlations between call numbers and names, but also served as the means by which persons searching for documentary materials relating to a given (kind of) entity could ascertain the call number(s) assigned to them and so search them out in the files. Like other contemporary writers on filing and indexing (e.g., Byles [1911], 2-8; Cope [1913], 41-42; Horner 1906, 151-153; Mares 1909, 9-14), Kaiser (1908, §§ 43, 45, 51, 53, 71) considered cards of a uniform size (3 x 5 inch cards were the norm, though he noted that, for certain purposes, 4 x 6 inch, 5 x 8 inch, or even 9 x 11 ½ inch cards might be used), kept together in drawers that, in turn, were housed in specially constructed card cabinets, to be the ideal physical medium for such records. Inasmuch as the cards bearing the information about the correlations had to be organized in such a way that they could be readily consulted, it was necessary to bring them within the compass of a *card system*.

Kaiser's (1908, § 59) notion of a card system was an expansive one, encompassing both the physical apparatus used for the filing and indexing of documentary materials and the mode of arranging and managing documents and their associated card records. In his eyes, the method of document classification reviewed in Section 3.1 of this chapter and the filing cabinets and binders used to store the documentary materials, formed part of such a system no less than the equipment for storing, and methods of organizing, the card records themselves (e.g., §§ 73-74). This was not a common view among contemporary writers on filing and indexing. Although some held similarly broad conceptions of the card system (e.g., Byles [1911], 9-26, 84-94), many others understood the term more narrowly, taking it to denote "a method of keeping track of facts, figures, names, or data of any sort by means of cards of uniform size, ... arranged on edge in a tray or drawer in a ... way that will best meet the requirements" (Leneer 1904, 1, partially quoted without acknowledgement in Hudders 1916, 2, § 2; cf. Ellis 1907, 230-231; Hammond 1911, 177-186; International Correspond-

ence Schools 1910, 310–319; Petherbridge 1904, 133–137): in their view, only the cards themselves and the appliances directly associated with them constituted a card system proper, whereas the methods and apparatus pertaining to the storage and organization of the documentary materials constituted filing systems. Yet, if Kaiser (1908, § 59) construed the card system in broader terms than they did, he nevertheless fully shared their conviction that it was “[t]he set of cards” on which information was entered that formed “the basis of the entire system” and so justified its appellation.

Like other early proponents of the use of the card system in business settings, Kaiser (1908, §§ 71–72) considered it to have definite advantages over the book-based form of documentary recordkeeping that it was in the process of superseding: for instance, he noted, new card records could be easily inserted into a card file and superannuated ones withdrawn therefrom, while the cards within a file could be readily arranged in a number of different ways (cf., e.g. Byles [1911], 4–6; Ellis 1907, 231, § 265; Heaney 1904, 602; Mares 1909, 12, 14; The Board of Experts of The Business Man’s Magazine 1906, 6). In his view, the structural flexibility of card files constituted an especially valuable feature of the card system, for it enabled designers of individual systems to configure them to the specific needs of the businesses in which they were to be used. The latter point was one of cardinal importance, for Kaiser took it as an incontrovertible first principle of design that the inner articulation of a card system must reflect the particular requirements of the organization for which it was created; as he emphatically put it,

[e]ach business, each office has its individual character and individual requirements, and its individual internal organisation. Its system must do justice to this individual character. In other words: each office must devise its system in accordance with its own requirements, and it should itself be the best judge as to what these requirements are (Kaiser 1908, § 76).

He was not alone in holding such a view. Comparable opinions were voiced by other writers on office organization, who likewise recognized that each business enterprise had its own distinct organizational requirements and, accordingly, took it as given that any system for filing business documents should be adapted to the particular organizational context in which it was deployed (e.g., Amberg 1918, 7 & 14; Byles [1911], 16, 19; Cope [1913], 9–10; Hudders 1916, vi; Library Bureau 1919, 2; Wagemaker 1908, 154). Underlying this sentiment was a conception of business organizations as entities endowed with individuality, the roots of which shall be considered in greater detail in Chapter 7, Section 6.2, below. Here it is enough to note that Kaiser’s understanding of business organizations

as individual entities with their own specific informational requirements colored his thought not only about the constitution of card systems but about knowledge organization in general (cf. Kaiser 1911, §§ 7, 642): as we shall see, it had far-reaching effects upon his protocols for SI.

Within the framework of a card system, Kaiser stipulated, cards were to serve as vehicles both for recording the correlation of the class numbers of filing units with the names of (kinds of) entities to which they bore relation and for setting down additional information with regard to the latter. He distinguished two modes of using cards for these purposes, which he termed registering and indexing (Kaiser 1908, § 77). In its most elementary form, *registering* involved recording on a card the name and address of the company or person associated with a given filing unit together with its call number (§ 77); in a number of cases, though, different kinds of information might be taken down instead (§ 91). The outcome of carrying out this process on a number of documents or dossiers was a *register*, which Kaiser defined as “a set of cards arranged in any order, the information on each card being limited to the names or terms under which it is filed, together with the addresses and call numbers” (§ 366, s.v. “Registers”; cf. Kaiser 1911, § 663, s.v. “Index and Register”). *Indexing*, on the other hand, entailed “analys[ing] the contents” of documents so as to identify “the information that they contain” and recording in synoptic form such information as was deemed to be of interest on cards together with headings indicating the subject of the information and the call numbers of the documents in question (1908, §§ 77, 112). The product of such “analytical work” was an *index*, which Kaiser characterized as “a set of cards arranged in any order [*sic*],²⁶⁵ each card giving all available information (other than names and addresses) on the heading under which it is filed” (§§ 77, 366, s.v. “Indexes”; cf. Kaiser 1911, § 663, s.v. “Index and Register”).

Obviously, a major difference between registers and indexes, as Kaiser defined them, lay in the fact that the former tended to be lists of names or directories, while the latter were analytical subject indexes giving information about selected topics of interest to a business organization. This distinction mirrored one commonly encountered in contemporary discourse regarding the application of the numerical system of filing to correspondence. A feature of the numerical system that set it apart from all the other major

²⁶⁵ The proviso that the cards in an index could be “arranged in any order” is a misstatement on Kaiser’s part, for as we shall see Chapter 7, Section 5.1, the only filing order for subject term headings allowed in SI was alphabetical order. Most likely, its appearance in the definition cited here is due to an incomplete adaptation of his definition of registers quoted earlier.

methods of correspondence filing was that it required a separate card index as a key to the numbers assigned to the individual folders or binders (Belding 1905, 117; Cope [1913], 48; Hickox 1902, 59; Hudders 1916, 80, § 364; International Correspondence Schools 1910, 303; Leneer 1904, 22; Petherbridge 1904, 147–151; Wagemaker 1907, 104; Wigent, Housel, & Gilman 1916, 23–24; Wilson 1907, 122). Such an index generally took the form of an alphabetically arranged listing of the correspondents associated with the individual folders or binders; each component card gave, at a minimum, the correspondent's name, address, and file number, though additional information, such as, for example, the correspondent's telephone number or telegraphic address, could be added as well (e.g., Cope [1913], 50; Library Bureau 1896, 4). Alongside the obligatory preparation of the name index, there was the option of creating a subject index (e.g., Belding 1905, 120–121; Byles [1911], 26; Cope [1913], 52–53; Wagemaker 1907, 103 & 110), in which each card typically bore a word or phrase designating a subject of interest together with references to the letters containing information relating to it or, sometimes, with a *précis* of the information itself: here, too, it was generally assumed, the cards would be filed alphabetically. The names of correspondents and subjects were the two principal points of reference around which card indexes for correspondence files tended to be constructed: this dichotomy, which was extensible to indexes for documentary materials other than letters, such as trade catalogs (e.g., Byles [1911], 30–31; Wagemaker 1907, 118), formed part of the basis for Kaiser's general distinction between registers and indexes.

In Kaiser's view, the register and index differed not only in the kind of information that they provided but also in their respective functions. "Registers", he observed, "refer to the materials and help to locate them" (Kaiser 1908, § 111): that is to say, they served, first and foremost, as tools for retrieving documents from the files of an intelligence department (cf. §§ 8, point 3, 9, 90). The function of indexes, on the other hand, was "to bring together under the various headings all the information about the business of the office drawn from the materials filed in the office or from any other source" (§ 111): unlike registers, they did not refer primarily to documentary materials kept in the files but rather "to the information contained in these materials". Kaiser's distinction between reference to documentary materials and reference to the information contained in them takes on its full force if we recall his conceptualization of documents as *biune* entities that were, at the same time, concrete objects and bearers of abstract discursive content (See Section 3.2.2 of the current chapter). Viewed from this vantage point, registers dealt chiefly with the retrieval of

documents *qua* concrete objects demarcated as filing units, whereas indexes were oriented toward the recording of elements of discursive content embedded within, and scattered across, documents. This distinction was not, by any means, watertight: as we shall presently see, registers could, to a limited extent, indicate the nature of the contents of the documents to which they referred, while indexes provided references to the documentary *loci* from which their information had been taken (See Chapter 7, Section 4.3, below). Yet, despite such areas of overlap, Kaiser deemed registers and indexes to be fundamentally different kinds of instruments for search, the former facilitating access to documents and the latter providing access to information. Although he considered indexes to play a more important part in supporting the informational work of an intelligence department than registers (See Section 2.2 of this chapter), he fully appreciated the fact that, registering was a necessary adjunct to filing and so devoted considerable space to discussing the general design of registers in *The Card System*.

As noted earlier, Kaiser highly prized the structural elasticity of card systems. In the case of registers, this feature made it possible to organize, for the purposes of retrieval, information relating to a given body of documentary materials in multiple ways that transcended the physical organization of the materials themselves. Whereas the documents of a collection were perforce arrayed in only one order in the files or on the shelves, the associated card system could include a number of registers, each of them arranged in a different manner and so representing a distinct mode of approach to the documents in question. Kaiser (1908) repeatedly stressed this point, drawing a contrast between the relative “fixity” of documentary materials *vis-à-vis* cards and the comparative “mobility” of cards *vis-à-vis* documents (§ 366, s.v. “Fixity”):

Our files of materials are in fixed positions, they may be called for at any time so long as we know the numbers. But by means of the cards, these materials can be arranged and re-arranged in almost endless variety, we may classify them roughly or minutely, we may arrange them by the alphabet, by numbers, trades or professions, territories, we may limit ourselves to certain trades or territories only; we may index the information they contain and arrange it in any way we please (§ 72).

The materials in the files occupy fixed positions, their order is invariable, but the cards may be arranged in any way desired, we may have one or ten or twenty registers, each classifying the materials in a different way, but all giving access to the same materials (§ 90).

The use of multiple card registers thus enabled an intelligence department to draw up in an easily consultable format classifications of its documentary materials different from the one that governed their physical organization and so to provide alternative views of, and pathways to, the documents in its collection: in Kaiser's words, each register in such a setting represented the documents "in miniature form but in a different arrangement" (§ 92).²⁶⁶

The structure and content of a given card register were conjointly determined by the type of document being registered, by the kind of entities whose names were being correlated to the call numbers of the filing units, and by the principle of ordering used to determine the sequence of entries within the card file. Inasmuch as Kaiser had derived his general notion of the register from the conventions of correspondence filing, it is perhaps unsurprising that he presented this category of documents as his primary illustration for the design of different kinds of registers. We have already seen that the prototypical form of card index for numerically arranged correspondence files was an alphabetically arranged list of correspondents, be they firms or individual persons, in which each unit card recorded the name and address of the correspondent as well as the associated file number.²⁶⁷ Kaiser (1908, §91) adopted this schema as a model for an *alphabetical register* for correspondence. In his recommended system, the unit cards of the alphabetical register followed a set format (see Figure 11). The upper left-hand corner of the card bore the name of the correspondent, typewritten in capital letters: this constituted what Kaiser called the "first term" of the card, which served as the term under which the card would be filed (§§ 98, 100, 178, 366, s.v.

²⁶⁶ Kaiser was not the only writer on filing and indexing to commend card registers as mechanisms for providing different points of access to a single set of documents. For comparable contemporary discussions, see, e.g., 27 Experts 1910, 145–146; Byles [1911], 26; Card Indexing, Commercial 1918, 597; Horner 1906, 153; Mares 1909, 10, though these authors preferred to speak in terms of card indexes rather than registers.

²⁶⁷ Note that the apparently simple task of making such cards could be quite a complicated affair, for, as a rule, the correspondence of a business organization was generally carried out by certain of its representatives, most often the secretary or some other manager, who signed the letters sent on its behalf. In such cases, the correspondence dossier was made for the firm and register cards were prepared for both the firm itself and the individual(s) signing the letters sent on its behalf: the names of individual correspondents were added to the firm card and, *vice versa*, the name of the firm was added to the card(s) of the individual(s) who served as its corresponding members. If a single person acted as correspondent for several organizations, his letters were distributed among the dossiers for these organizations and the name of each organization, with its call number, was listed on his name card (See Figure 11, second card from bottom); conversely, if an intelligence department had letters which a person otherwise serving as correspondent of a firm had sent in a private capacity, a separate binder was made for these and the call number thereof written on his name card; for full discussion, see Kaiser 1908, §§ 178, 207–208; cf., also, Griffith 1910, 263–264; Petherbridge 1904, 149–151; Wigent, Housel, & Gilman 1916, 25–26.

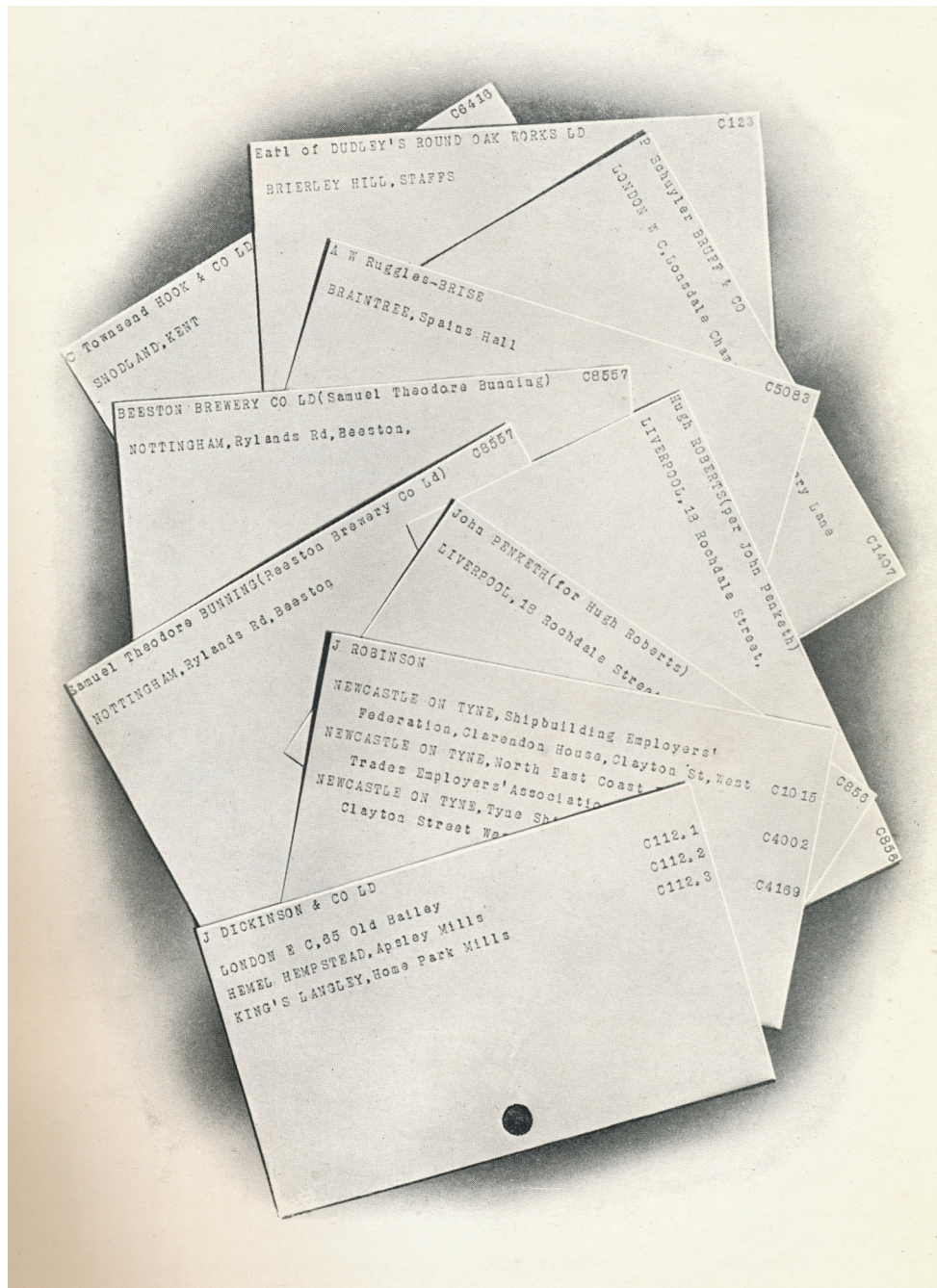


Figure 11: Sample cards from an alphabetical register for correspondence (Source: Kaiser 1908, § 103)²⁶⁸

²⁶⁸ The top eight cards follow the standard format described earlier: note that the capitalized elements in the “first terms” (i.e., correspondent names) on the upper-left hand side and the “second terms” in the main body of the card (i.e., addresses) denote the filing and sub-filing elements, respectively. The two bottommost cards represent exceptional cases deviating from the norm. The card for “J. ROBINSON” gives the name of a single individual writing as a correspondent on behalf of several organizations: hence, each organization with which he was associated is listed as well as its respective call number. The bottommost card for “J. DICKINSON & CO LD” is for a firm that maintained branches at three separate locations: here, too, each of the locations is listed, as well as

“First Term”). Inscribed beneath this and slightly indented, was the correspondent’s address: since the name of the city in which the correspondent was based could be used as a filing subdivision if there were need (§§ 98, 103 [text], 135, 178), it served as the card’s “second term” and those elements of it used for filing purposes were typewritten in capital letters as well. Finally, in the upper right-hand corner of the card stood the call number of the filing unit with which the name of the correspondent was correlated. Inscribed in a manner that foregrounded the correlation by placing both the correspondent’s name and the call number in visually prominent positions at the top of the card (§ 178), the unit cards were then filed in accordance with an elaborate system of alphabetization that took a person’s surname or the first word in a firm’s name as its base elements but, unlike most other contemporary schemes, of alphabetization, eschewed any inversion of name forms (Kaiser 1908, §§ 101, 128–135; 1911, §§ 231–240).²⁶⁹

Kaiser (1908, § 93) considered such an alphabetical register to be “indispensable” for any and every office or intelligence department: not only was it necessary “for locating the numbers of binders” kept in a correspondence file but it also could double as “an up-to-date directory of firms” that could be used for various commercial ends. Yet other kinds of registers could be applied to correspondence files as well. One was the *numerical register*. The unit cards of this form of register had the call number of a filing unit as the first term in the upper left-hand corner and the correspondent’s name and address in the body of the card: the upper right-hand corner, on the other hand, was left bare (See Figure 12, bottom); as this format indicates, the cards were filed in numerical sequence by call number, just like the correspondence binders in the files (Kaiser 1908, § 180). The numerical card register, in effect, recapitulated the numerical arrangement of the vertical file, functioning as a kind of shelf list with which to keep track of the identities of the correspondents associated with each dossier of letters. According to Kaiser, such a register was optional in certain contexts: for instance, “small offices” with diminutive correspondence files could forgo its use, though not without potential inconveniences (§ 180). However, he considered a numerical register to be “indispensable” for the offices of large companies possessing extensive correspondence files: in that setting, it would prove invaluable in cases when a dossier went

its respective call number, which, it will be noted is decimally subdivided. For further discussion, see Kaiser 1908, § 103 (Text).

²⁶⁹ See, by way of contrast, the rules for the alphabetization of names set out in Byles [1911], 35–41; Clarke 1905, 137–139; Cope [1913], 37–40; Hudders 1916, 2–3, § 13, 38–42, all of whom admitted, to a greater or lesser degree, inversion of personal and corporate names into their respective alphabetization schemes.

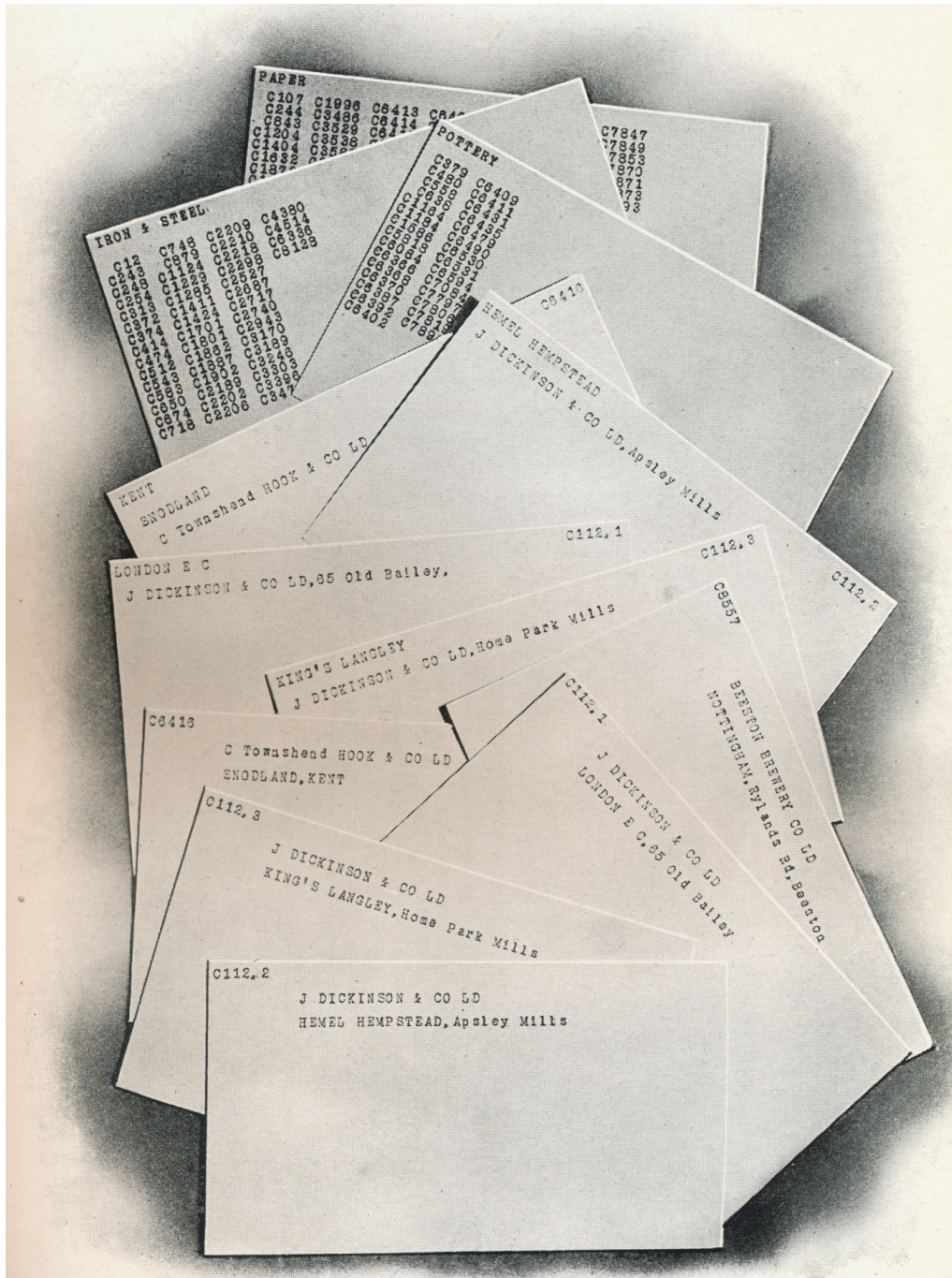


Figure 12: Sample cards from trades, territorial, and numerical registers for correspondence (Source: Kaiser 1908, § 104).²⁷⁰

²⁷⁰ The three topmost cards in this tableau derive from a trades register; the four middle ones, from a territorial register; and the bottom five, from a numerical register. Note that the unit cards in the trades register could have, in principle, taken the same format as those of the territorial register and *vice versa*; see Kaiser 1908, § 104 [Text].

missing from the files and one wanted to ascertain whose correspondence had been lost without having to go through a long alphabetical register (§ 180).

Precisely how Kaiser came by the idea of the numerical register is unknown. The concept does not seem to have had much currency in the contemporary discourse on office organization, for virtually no other writer on commercial filing and indexing from the period breathed a word about using such a form of card index:²⁷¹ indeed, one suspects that many of them would have found it needlessly redundant. Given that Kaiser (1911, § 271) was aware of the virtues of the library practice of maintaining “a shelf catalogue which serves as an index to the order of books on the shelves”, it is possible that he derived his notion of the numerical register from the library shelf list, adapting and simplifying the latter for the purpose of keeping clerical control over the interpretation of call numbers for large correspondence files.²⁷² However this may have been, this form of register provided, in his version of the card system, the most direct means of decoding the call numbers of individual dossiers.

Another kind of correspondence-related register had its basis in the classification of correspondents by their place of residence (see Figure 12 center). Kaiser (1908, § 366, s.v. “Geographical” & “Territorial”) stipulated that geographically oriented registers could be either territorial or geographical in extent: a *territorial register* was national in scope, covering places within a single country only, while a *geographical register* was international in its coverage, encompassing sites in two or more countries. The unit cards of such registers typically followed one of two formats (§ 104 [Text]). In one, the first term comprised the name of the country, county, or city in which a correspondent was based and, depending upon the geographical level that it denoted, was subject to further subdivision by smaller territorial units; the body of the card gave the name and street address of the correspondent; and the upper right-hand corner of the card bore the call number of the correspondent’s dossier. In the other, the first term consisted of the name of a geographical unit, be it country, county, or city, and the body of the card contained a numerically arranged list of the call numbers of dossiers associated with correspondents from that

²⁷¹ An exception is Hausman 1921, 25–26, § 40, who noted that a “numeric index ... may be used for reference to things that are numbered, but an alphabetical index is necessary in connection with it in order to find the special information desired” but did not specify how it might serve as a finding aid.

²⁷² For a contemporary discussion of shelf lists, their use in a library setting, and implementation on cards, see Dewey 1898, 61–62, 65–67; 1899, 20, 21–22. Dewey naturally considered the DDC as an ideal instrument for the shelf list, whereas Kaiser (1911, § 271) thought it more problematic.

location, while the upper right-hand corner of the card was empty.²⁷³ As for filing arrangement, the names of the places that served as filing terms—counties or cities in territorial registers, countries in geographical ones—were arranged in alphabetical order, as were any further subdivisions under each filing term (§§ 107–108): this followed a standard practice for the organization of geographically-based card index files (e.g., Byles [1911], 48; Griffith 1910, 112; Wagemaker 1907, 105, Fig. 2). Territorial and geographical registers served primarily to collocate filing units within a correspondence file by geographical location, a function that, Kaiser (1908, § 92) anticipated, might be of great moment in some business contexts and of minimal importance in others. Accordingly, he considered them to be an optional feature in a card system, unlike the alphabetical register, which he took to be an obligatory element in any office’s or intelligence department’s card files.

Likewise collocative in function and facultative in use was the *trades register*, which classified correspondents by their occupations or by the kinds of goods in which they trafficked. According to Kaiser (1908, § 181), such a register could cover general trades—that is to say, industries—such as “the glass trade, the timber trade, etc”, or specific kinds of commodities, such as “glass stoppers, asbestos packing, wire nails, etc”. The unit cards of trades registers typically followed the same formats as those of territorial and geographical registers (§ 104 [Text]), save for the fact that the name of an industry or type of commodity, rather than a geographical locale, served as the first term on the card and, unlike the latter, did not, as a rule, undergo further subdivision (see Figure 12, top). As was the norm for trade directories (e.g., Clarke 1905, 140–141), the filing terms were arrayed in alphabetical order. Here, as in the case of the numerical register, it is striking that other writers on the application of the card system to correspondence files did not discuss the utilization of card indexes arranged by trades or commodities. Kaiser may have well been sensitized to this specific mode of organization because of his experiences at the PCM, where an elaborate register of American businesses by trades and commodities, featuring both an alphabetic-classified and an alphabetic section, was one of the centerpieces of the Bureau of

²⁷³ The extant card files of the Tariff Commission include a fine example of a geographical register constructed along these lines. It is a register of Irish places, most likely drawn up in conjunction with the drafting of the Commission’s report on agriculture (See Chapter 5, Section 2, above), and consists of two parallel subsections: one has unit cards bearing the name of the locality as filing term and a numerical list of call numbers by correspondence in the body of the card (i.e., a “C” series), whereas the other also has the name of the locality as filing term, but has a list of call numbers by Form of Inquiry (i.e., an “F” series”) in its body. See TCP 5/4/6, Register of Irish Places, n.d.

Information (Chapter 3, Section 3.2, above), and at the Tariff Commission, where the series of research reports intended to lay the groundwork for the framing of a scientific tariff took both broad industrial sectors and the specialized trades within each as units of analysis and so required that at least some of the Commission's card registers be organized by trade (Chapter 5, Section 2 above).²⁷⁴ At any rate, trades registers allowed one to collocate the filing units in a correspondence file by the correspondent's affiliation with a certain industry or association with certain types of products: whether they were to be deployed or not in a particular office or intelligence department depended "on the nature and extent of a business" (Kaiser 1908, § 181).

These, then, were the different kinds of registers that Kaiser (1908, § 91, 177, 180–181) envisaged as the keys to a correspondence file: the alphabetical, the numerical, the geographical or territorial, and the trades-related. *Mutatis mutandis*, comparable registers could be created for other kinds of documentary materials (§ 94), such as trade catalogs, periodicals, press cuttings, or books. This, however, entailed extending the definition of the card register considerably beyond that of the prototypical directory-like list, "where each card gives but the name and address of a firm or individual" (§ 77).

Perhaps most closely aligned in substance with correspondence registers were those for trade catalogs, a genre of documentary materials frequently consulted in business contexts for information regarding goods on the market and their prices (Fletcher 1910; Horner 1906, 153; Wagemaker 1907, 117). For offices or intelligence departments that accumulated large collections thereof, Kaiser recommended three distinct kinds of registers. First, and "indispensable" in his view, was "[a]n alphabetical register of the firms whose catalogues are on file" (Kaiser 1908, § 263). The unit cards followed the regular format for alphabetical registers, with the name of the company issuing the catalog taking the position of the first term: insofar as any single catalog might deal with a number of different goods of interest to a business organization, there existed the option of enumerating these

²⁷⁴ This is borne out by surviving registers from the Tariff Commission's files. For example, two of the seven sections composing an elaborate, multipart register of the persons submitting oral or written evidence to the Commission were organized by trade or occupation, following an alphabetic-classed order. See TCP 5/1/1, Register for Evidence, n.d., [Sections II (witnesses giving oral evidence by trade) & V (witnesses giving written evidence by trade)]. Similarly, a list of manufacturers in the iron and steel industry—the subject of the Tariff Commission's first report—who had submitted Forms of Inquiry was organized by trade, with unit cards featuring such filing terms as "Sanitary Engineers", "Spiral Springs", "Steam Packing", "Surgical Needles", and "Swords", with the manufacturer's name and address given in the body of the card. See TCP 5/4/5, List of Iron & Steel Manufacturers, n.d.

commodities on the back of the card referring to it. Second, and likewise “necessary”, in Kaiser’s estimation, was a numerical register to permit one to decode catalog call numbers quickly (§ 263). Third, and “most important” of all, was a register of “the commodities given in the catalogues” (§ 263). In this kind of register, which bore close analogies to the trades register for correspondence, each unit card was devoted to a given commodity, the name of which functioned as the first term, and references were given to the call number of the catalog in which it was mentioned, expanded by the page number (§§ 262–263): arranged in alphabetical order, these cards served as a means of collocating catalogs bearing information on a given commodity of interest.

With regard to the last of the three registers for trade catalogs, Kaiser (1908, § 263) observed that a “register of commodities may be turned into an index to the catalogues, by adding on the cards all the information about prices and other conditions attaching to each article”. This statement was significant for two reasons. On one hand, it reinforced Kaiser’s distinction between registers as search tools referring to documents and indexes as search tools that referred to the informational contents of documents: a register could become an index only by incorporating into itself specific information drawn from the contents of the document. On the other, the very fact that a register of the commodities listed in trade catalogs could be converted into an index in the first place indicated that the commodities in question were being treated as if they were elements of the subject content of the catalogs in which they were listed. With regard to this latter point, it is instructive to take into account other contemporary discussions of the preparation of card indexes for trade catalogs that had been filed in numerical order. Writers on this subject tended to recommend the construction of two different kinds of card index files in association with trade catalogs: one, which enumerated the names of the firms from which they emanated, was a direct parallel to Kaiser’s alphabetical register, while the other, which listed commodities in alphabetical order, formed an analogue to his register of commodities (e.g., Byles [1911], 30–31; Fletcher 1910; Horner 1906, 153; Wagemaker 1907, 117–119, with Figs. 2–3). The second kind of file was routinely characterized as a “subject index” (Byles [1911], 31) or a card index “dealing with the subject-matter of the catalogues” (Horner 1906, 153), designations that clearly situated it within the realm of subject indexing. Although Kaiser himself did not describe the register of commodities in these terms, it quite manifestly did refer to the subject contents of trade catalogs. In this, Kaiser’s concept of the

register began to transcend the idea of a directory, or name list, and verge upon the territory of the subject index.

Also going beyond the notion of the register *qua* directory were some of the registers that Kaiser (1908, § 237; cf. § 250) recommended for use with periodical literature, or, as he defined it, “periodical publications ... issued more than once a year”. *De rigueur* was an alphabetical register “giving the names of the periodicals regularly kept on file” (§ 239). The format for its unit cards followed, in the main, that of the alphabetical registers for other classes of materials: the first term in the upper left-hand corner was constituted by the title of the periodical in question, its place of publication was recorded in the body of the card, and the corresponding call number was inscribed in the upper right-hand corner (See Figure 13, top center). However, further refinements could be made. For one thing, one could enumerate some of the principal subjects “regularly discussed” in a given periodical on the back of its title card (Kaiser’s 1908, §§ 246–248 [text]): the choice of subjects was dictated both by the contents of the periodical and by the “individual requirements” of the business organization for which the register was being prepared. Furthermore, a unit card could be prepared for each of these subjects, in which a term designating the subject served as the first term, the name and place of publication of the periodical appeared in the body of the card, and the call number assumed its wonted place in the upper right-hand corner (See Figure 13, middle): such cards could either be interfiled with the title cards in the alphabetical register or set apart in a separate alphabetical subject register (Kaiser 1908, §§ 239, 246–248 [text]). Finally, it was possible to add bibliographical data about the periodical to its title card: “[i]f desired the number of volumes, day of publication, publisher’s name etc. may be added as is done in Library cataloguing” (§§ 246–248 [text]), stipulated Kaiser. Indeed, the alphabetical register for periodicals as a whole had features consonant with those of a library catalog: most notably, it allowed for the collocation of periodical titles by subject.

In addition to the alphabetical register, Kaiser (1908, § 239) made provisions for numerical and geographical registers. The numerical register for periodicals had the same function as those for other genres of documentary materials. However, it could also double as a record of receipt of the individual issues of the periodical associated with a given call number (§ 240). To this end, Kaiser recommended the use of specially formatted cards, on the bodies of which were printed chronological tables, with rows representing years and columns, months, that served as a matrix for noting the accession of new issues of a weekly

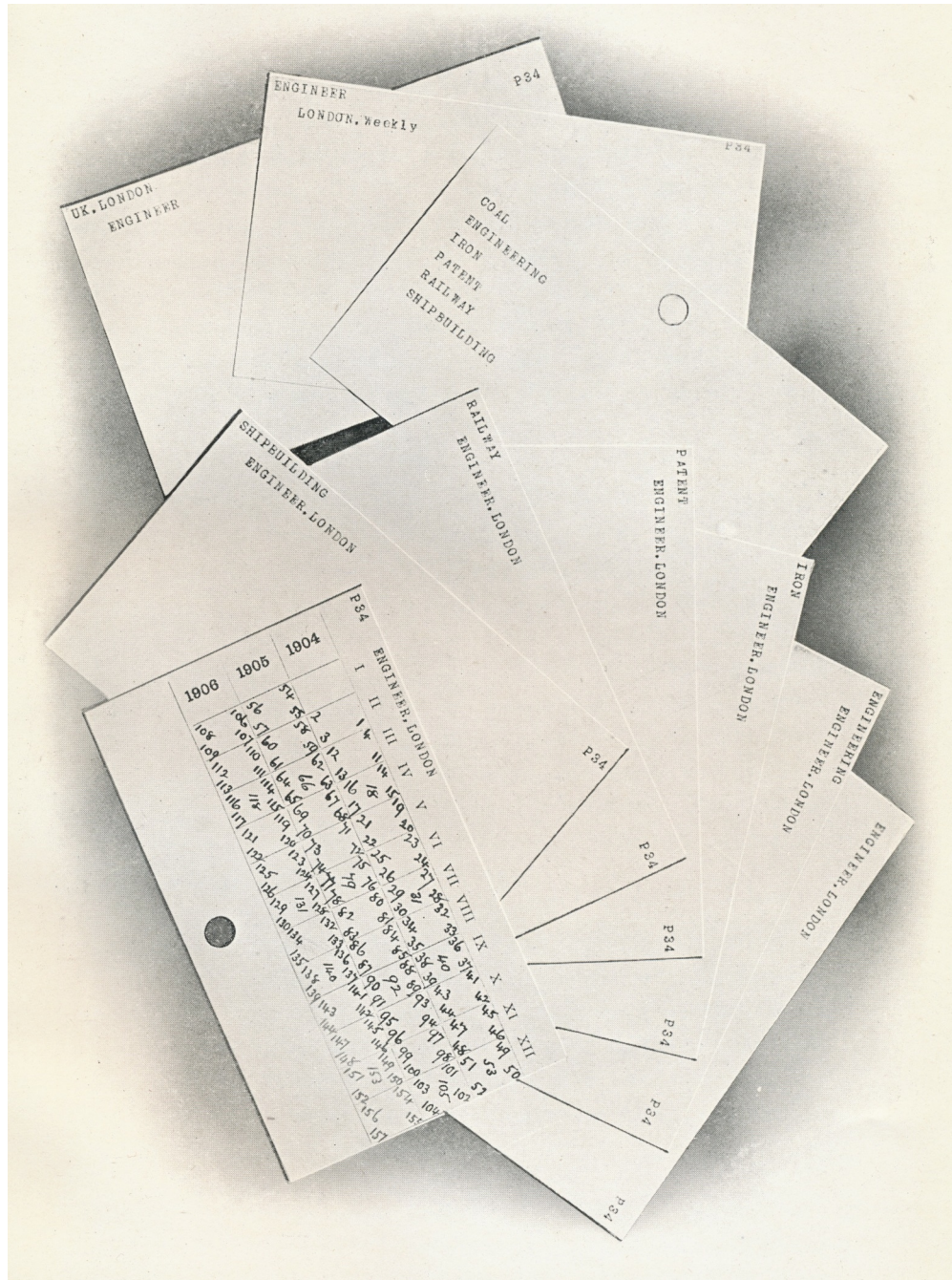


Figure 13: Sample set of various register cards for the periodical *Engineer* (Source: Kaiser 1908, §§ 246–248).²⁷⁵

²⁷⁵ Three different registers are represented in this tableau of sample cards for a single periodical. The card at top left with the legend “UK, LONDON” in its upper left-hand corner is taken from a geographical register for periodicals. The other two cards at top represent the front and back, respectively of a unit card from an alphabetical register for periodicals: the front bears the name of the periodical, “ENGINEER” as a “first term”, its place of publication, and call number, while the back gives a list of general subjects treated in this periodical. The set of six cards beneath this are subject cards, which likewise come from the alphabetical register. The specially formatted card at bottom

or monthly journal taken by an office or intelligence department (See Figure 13, bottom left). In time, this form of card, divorced from its original context in the numerical register and adjusted as to size and format, would come to be adopted in British special library circles, where it was known as the “Kaiser periodical record card” (Grenfell 1953, 31–34; Ower 1949, 228–230).

Kaiser (1908, § 239) considered the numerical register to be a requisite component of the set of registers associated with a periodical collection. Optional, on the other hand, was the use of a geographical register “showing what periodicals are received from a given locality” (§ 240; cf. Figure 13, top left). Alphabetically arranged by place of publication, such a register was to be employed in contexts where an office or intelligence department subscribed to periodicals from different countries and wanted to keep a check on the geographical distribution of its sources. Kaiser’s interest in providing for the collocation of periodical titles by geographical origins was almost certainly conditioned by his experiences at the library of the PCM and at the offices of the CIB, both of which drew heavily on foreign journals and trade papers as sources of commercial information from abroad (See Chapter 3, Section 2, esp. p. 89, n. 85, above; Chapter 4, Section 1, above): in settings such as these, a survey of the places of publications of the periodicals in one’s collection would enable one to assess how well it represented the commercial press from different areas of the world and to calibrate one’s collection accordingly.

Whereas Kaiser (1908, § 237) expected that the periodicals kept in an office or intelligence department would be kept intact, he also made provisions for registering press cuttings—i.e., articles physically excised from their original publication—derived from newspapers and journals that were not regularly received. For these, he suggested only one form of register, which was to be “arranged alphabetically by the names of papers or periodicals etc. from which cuttings are filed [sci., taken—TMD]” (§ 228). The unit card for each source periodical had its title as a first term, while the body of the card bore a chronologically ordered list of the cuttings taken thereof, each entry giving the date of publication, its “main subject”, and its call number (§§ 228, 235–236, fourth card from bottom). Although, in Kaiser’s view, such a register was “not essential” (§ 228), he maintained that it could nevertheless “very often prove useful” and this for two reasons. First, it allowed users to track down a particular press cutting if they remembered that it had been published in a

left is from the numerical register and serves to record the receipt of individual issues of the periodical in question. For discussion, see Kaiser 1908, §§ 246–248.

certain journal but had only an “imperfect recollection ... of its contents” (§ 228): in such a case, consultation of the title card for the journal in question would permit them to scan the references entered there and so to identify the article in question. Second, in collocating press cuttings by journal of origin, the register made it possible to survey “from which papers the largest number of cuttings is drawn” (§ 228)—information that could be leveraged to make decisions whether to take out subscriptions to newspapers or journals from which large numbers of cuttings were derived. Otherwise, Kaiser did not recommend the creation of any other registers for press cuttings: apparently, he felt that there was no need for establishing a numerical register for this class of materials, while he reserved collocation by subjects for an index proper (§§ 226–227).

As for books and pamphlets, Kaiser (1908, § 253) envisaged only two forms of register, an alphabetical and a numerical one. The alphabetical register, which, like its counterparts for other document classes, he deemed to be “indispensable” (§ 253), was to be organized primarily by the titles of books and secondarily, by the names of authors and by subjects. The “main card” for each book was the title card, in which the book’s title served as the first term (§ 253). Kaiser did not specify whether the body of this card was to give imprint information as well as the author’s name; most likely, the latter element was obligatory while the former was facultative, as was the case with title cards for periodicals. At any rate, he recommended that the back of each title card include a list of “all the terms ... under which a card referring to the same book has been filed” (Kaiser 1908, § 253)—that is to say, the name of the author and terms denoting the book’s main subjects. This entailed, of course, that separate cards had been prepared for the author and the subjects, which were to be interfiled with the title cards. The result was, in effect, a highly simplified form of dictionary catalog, with main entry by title and added entries by author and subject, albeit without any syndetic structure. Here, Kaiser’s background in library work shone through. Firmly convinced that “the card catalogue (dictionary catalogue) serves as a key to the books in a given library” (Kaiser 1911, § 252; cf. § 82), he adopted its general structure as a model for an alphabetical register of books in a business setting; he was not, however, the only writer on commercial filing and indexing to do so (Barker 1904, 317; Hudders 1916, 148–149, §§ 702–705). As for the numerical register, Kaiser (1908, § 253) held that, in contrast to its alphabetical counterpart, it “is not always necessary”, though he was quick to add that “this will entirely depend on the requirements of each office”. Although he did not explicitly state under what conditions such a register became necessary, it is likely that the

size of the book collection was the determining factor, as was the case with correspondence files: the larger a collection of books was, the more compelling the rationale became for making a numerical register of its contents.

Such were the primary kinds of registers that, in Kaiser's view, might find a place within a business office's or intelligence department's card system. Of course, the various principles of arrangement that he set forth—alphabetical by names, numerical, territorial or geographical, trades-based, commodities-based, and so on—were not limited to the specific document classes discussed in the preceding paragraphs but could be applied, as circumstances required, to other sorts of materials as well, whether these be textual in nature or not.²⁷⁶ Similarly, he did not anticipate that all of these types of registers would find use in all contexts: the kinds of documentary materials forming part of a given business's document collection and the "individual requirements" of the organization in question would determine which particular constellation of registers its intelligence department would incorporate into its card system (Kaiser 1908, §§ 92, 176).

Although Kaiser (1908, §§ 12, 14, 90) assumed that, as a rule, a card system would include multiple registers corresponding to its different document types, he also held that it was possible to attain a measure of unity amidst this diversity. We have already seen that, with regards to correspondence, he deemed the alphabetical register to be the one truly "indispensable" form of register; by and large, the same held true for other document classes as well (Kaiser 1908, §§ 14, 94). Given that, at a minimum, an alphabetical register was required for each class of documents within a collection, Kaiser suggested that, in many business settings, it would be advantageous to merge the registers of several different document classes into a single *central register* (§§ 95, 336, s.v. "Central Registers or Indexes"). The nucleus of such a register would be the alphabetical register to the correspondence file, to which would be added information that would have otherwise been entered into the alphabetical registers of other document classes (§§ 263, 273). One obvious

²⁷⁶ One example of the utilization of these modes of organization to create registers for a type of textual document not covered in Kaiser's writings was the Tariff Commission's register of witnesses submitting oral or written evidence, which formed its "E" series (See Chapter 5, Section 3, esp. p. 168, above): the transcripts of oral evidence and the manuscripts of written evidence formed two groups within that series, each of which was provided with the following kinds of registers: an alphabetical register by name of witness, a numerical register, and an alphabetical register of witnesses by trade; see TCP 5/1/1, Register of witnesses, n.d.. As for non-textual documentary objects, Kaiser (1908, § 273) suggested that collections of commodity samples might be furnished an alphabetical register by name of manufacturer, a numerical register, and "[a] subject register ... arranged similarly to the register of commodities for the T [sci., Trade Catalogue—TMD] class".

advantage of such an arrangement was that it brought together within one place in the card files information about documents pertaining to a single firm or individual that might be scattered across the different document files. Thus, for example, if an intelligence department held a dossier of correspondence with a given firm and trade catalogs issued by the same enterprise, and a researcher wanted to peruse all documents pertaining to that firm, he needed to consult only one register—the central register—to ascertain the relevant call numbers for both types of documents instead of having to search in two separate registers—the alphabetical correspondence register and the alphabetical trade catalog register—to find them. For Kaiser, however, the primary boon afforded by a central register lay in the fact that it led to efficiencies in management of the card files. Not only did it constitute “a great saving in cards and labour” but it also rendered the updating of card records more effective and consistent (§§ 95, 177): if a given company changed its name, address, or some other defining attribute, an intelligence department needed to revise the relevant card records in only one register, rather than having to do so in several different ones, a situation in which it was all too easy to overlook one or the other of the registers in question and so to introduce inconsistencies into one’s card files.

Kaiser outlined two different methods for implementing a central register on cards. In one, a single card was prepared for each firm or individual in accordance with the format prescribed for an alphabetical correspondence file and the call numbers of all the filing units from the different document files pertaining to it were listed in its upper right-hand corner (Kaiser 1908, §§ 96, 177). In the other, a separate card was made out for each distinct filing unit associated with the firm or individual: in such a case, Kaiser observed, one had the option of differentiating the cards representing filing units from different document classes by using differently colored cards, with each color representing a different document class (§ 96). Although the latter method allowed users familiar with the color coding scheme to gain a rapid visual impression of the range of document types associated with a given company or person within a collection, it also required the preparation of a greater number of cards and so increased the size of the register as a whole: for this reason, Kaiser considered the former method to be, “on the whole”, better suited to office work (§ 96).

Another, unspoken rationale for adopting the one-card-per-firm method was that, by cutting down the physical bulk of the card file in question, it created space for augmenting the central register in various ways. One could make entries not only for correspondents

but also for all organizations and persons mentioned in the correspondence as well, whether these were correspondents in their own right or not (Kaiser 1908, § 178). Cards bearing the telegraphic addresses of the correspondents could be interfiled with the others in a central register, provided that they were not too numerous (§ 285). If a business enterprise was involved in “circularising”—that is to say, the mass mailing of printed matter such as catalogs, advertisement sheets, and so on, card records detailing which publications were sent to a firm or individual and what the responses of the recipients were could be incorporated into the central register, which thus took on the function as a mailing list (§§ 292, 306). Through the addition of features such as these, which were not directly connected with “the requirements of the vertical file”, the central register attained the status of a “general office register for firms or persons being in some way connected with the office and its business” (§ 177; cf. § 93).

Kaiser’s notion of the central register manifested, at the level of the card system, an impulse towards centralization in the name of efficiency that generally pervaded the discourse of office management of his period (See p. 204, n. 236, above). At the same time, it threw into sharp relief certain aspects of his conceptualization of registers. For one thing, insofar as the central register was an extended and enriched form of an alphabetical correspondence register, it clearly reflected the primacy of the name list, or directory, in Kaiser’s understanding of the register as such, even though many of the specific registers that he outlined, such as those for periodicals and books, clearly diverged from this template in their form and content. Moreover, the various augmentations of the central register suggested by Kaiser betokened a tendency on his part to overlay the core retrieval function that he attributed to registers with that of providing information about the firms or individuals whose names they listed. To be sure, other kinds of registers also had a dual informational and retrieval rôle and, in some of them, the former seems to have predominated: for instance, the geographical register for periodicals served primarily as a means of surveying the distribution of the places of publication of the journals that an intelligence department received, even though its cards also gave the call numbers of the publications in question so that a user could trace their location in the files if he or she desired to do so. Yet the central register, perhaps more than the others, tended to decouple the informational function from that of document retrieval: one could, in principle, look up a firm’s telegraphic address or a record of its responses to circular mailings therein without intending to consult the associated documentary materials.

Kaiser's account of the central register, then, pointed towards a multimodal use of registers both as tools for retrieval and as sources of certain kinds of what might be called directory information. This, however, should not obscure the fact that, within the régime of knowledge organization that he envisioned for the office and intelligence department, facilitation of document retrieval remained the primary *raison d'être* for registers, whatever particular form they might take. In correlating the names of firms, persons, and publication titles with the call numbers of the documents corresponding to them, alphabetical and numerical registers rendered it possible to find specific filing units within a given collection of documentary materials. Other kinds of registers—in particular, geographical, trades, and commodities registers—enabled the collocation, on cards at least, of the filing units within a given document class that pertained to a certain place, a certain occupation or industry, or a certain kind of commercial good. Furthermore, some types of registers, such as the alphabetical registers for books and periodicals supported both directed searches for individual filing units by title and the collocation of groups of filing units by subject.

These last examples also serve as a reminder that, despite Kaiser's penchant for presenting the correspondence register as the primary model for registers *tout court*, the various registers that he described were, in truth, a heterogeneous lot, the designs of which derived from various professional traditions: whereas the alphabetical correspondence register and the alphabetical and commodities-related ones for trade catalogs followed standard office practice, those for books and periodicals clearly owed much to library praxis. In this respect, Kaiser's designs for registers reflected his own hybrid professional background. At any rate, the registers of an intelligence department, as he envisaged them, were the primary mechanism by which the documents (or sets of documents) filed in its collections might be identified and found. Yet, with the exception of registers for commodities associated with trade catalogs and, to a lesser extent, the alphabetical registers for books, pamphlets, and periodicals, they did not provide detailed access to the informational contents of the documents to which they provided references. This function fell to the systematic subject index, the construction and maintenance of which, as Kaiser believed, constituted the most important work of the intelligence department (See Section 2.2 of the present chapter). Such an index was to be created through the method of SI, a consideration of which forms the substance of the following chapter.

Chapter 7. Systematic Indexing (II): Theory and Method

7.1. Systematic Indexing as Information Analysis and Control

In the previous chapter, we outlined Kaiser's protocols for managing the documents collected and kept in a business enterprise's office, intelligence department, or library. We have seen that his preferred mode of organizing documents for arrangement in the vertical file or on the shelf was to classify them by documentary kind, so that a collection was divided into a single array of broad document classes, each of which was subdivided into a series of individual filing units arranged in numerical order on the basis of accession—a simple form of classification ultimately derived from the practice of correspondence filing (See Chapter 6, Section 3.1, above). We have also seen that the primary mechanism for retrieving documents organized in such a manner was a series of card files, or registers, consisting of unit cards on which the call numbers denoting the position of individual documents or dossiers within the vertical file cabinets or on the shelves were correlated with the names of the organizations or persons from which or whom they emanated, the names of the places where these organizations or persons were located, the trades in which they were involved, the titles of the documents in question, or, in some cases, the names of the subjects about which they provided information (See Chapter, 6, Section 3.3, above). Arranged in various ways on the basis of the documentary kinds with which they were associated, these card files constituted nothing less than a series of piecemeal alternative classifications to the one instantiated in the physical arrangement of the documents in a collection: taken in the aggregate, they offered multiple avenues to locating documents, either singly or in certain collocative groups.

Inasmuch as the classification of documentary materials prescribed by Kaiser partitioned a physical collection into a series of document files and imposed a definite order on the individual items composing each file, it formed a foundation for the classificatory "control of quantities" (See Chapter 6, Section 3.1, above) *vis-à-vis* the documents housed in a business's intelligence department. The registers, each of which comprised an ordered series of card records that virtually reorganized the documents within a collection in accordance with a key attribute (or several key attributes) by which users might search for them, enriched and extended this control: as Kaiser (1908, § 90) succinctly put it, "the files and the card registers work hand in hand, one supplies the numbers and the other the

names, trades, localities, etc.” Yet, two important limitations ultimately hedged the control that these two phases of filing afforded over the documentary sources of information to which they were applied. First, within the framework of physical file and card register alike, each individual document (or, in the case of correspondence, each individual dossier of documents) was treated as a unitary object forming a single documentary whole. This was, of course, necessary in the case of the physical files, since each document *qua* concrete object could occupy only a single place therein (See Chapter 6, Section 3.2.2, above); as for the registers, insofar as their primary function was to help (col)locate documents for the purpose of retrieval, their card records also tended to refer to documents as unitary wholes. Second, taken together, Kaiser’s document classification and the card registers accompanying it imparted fairly limited information to users about the subject content of documents. As we have seen, the document classification decoupled shelf arrangement from subject access altogether (See Chapter 6, Section 3.2, above): although Kaiser appears to have adopted it largely on practical grounds, he was opposed to subject-based shelf classifications as a matter of principle and developed, in some detail, theoretical arguments against their use in the context of business libraries (See Chapter 6, Section 3.2.2, above). Some card registers, especially those associated with the correspondence file, likewise provided little or no indication of the informational contents of documents, while others, in particular those for books, pamphlets, and periodicals, did signal the subject matter of such publications, but only at the level of the main subjects of documentary units, be these periodical titles or individual books or pamphlets (See Chapter 6, Section 3.4, above). In short, the classificatory control of quantities that Kaiser’s document classification and system of card registers provided was almost entirely restricted to documentary units *qua* concrete objects and, with regard to these, gave only the most general indication of their informational content.

For Kaiser (1911, § 44), both the assignment of documents to “fixed places” within a collection’s files and the constitution and maintenance of card registers for retrieving them were important, indeed necessary, elements in the work of an intelligence department or business library, for they assured efficient access to the documentary “prime materials” (Chapter 6, Section 2.4, above) from which information was to be drawn. Yet, shelf classification and card registers alone were insufficient fully to support the work of the department, for, inasmuch as they were designed to deal with filing units as documentary wholes and offered only high-level coverage of subject matter, they lacked the granularity of detail

needed to provide guidance to the informational contents of these materials. This was no small matter, for, as we have seen, Kaiser understood documents to be the bearers of complex discursive content featuring a number of subsidiary, as well as primary, subjects (Chapter 6, Section 3.2.2, above): because any one document might contain many pieces of information about several different subjects, the problem of control of quantities was arguably even more acute for information than it was for documents. Furthermore, insofar as the mission of the intelligence department was to “giv[e] all the information desired” (Kaiser 1911, § 36) on subjects of interest to the members of the business organization that it served, it was imperative that any elements of a given document’s informational content that touched upon these subjects be identified and recorded in such a way that they could be made readily accessible to users and, no less crucially, that information on the same subject distributed across different documents in a collection be collated so that it could be readily consulted (See Chapter 6, Section 2.3 above). Given the large amount of potentially useful information contained within, and scattered among, the documentary units found in the files of any given intelligence department, Kaiser (1911, § 9) argued, “we must put forth our most systematic efforts in order to control it, for so long as it remains uncontrolled, no proper use can be made of it”.

In Kaiser’s view, then, an intelligence department required a means for establishing control over the informational content of documents. One possibility was to make use of bibliographical tools available on the market, namely, the “variety of published indexes, catalogues and bibliographies to periodical and other literature” (Kaiser 1911, § 6) that had been proliferating increasingly in the final decades of the 19th, and the first years of the 20th, century (cf. Clapp 1954, 511–514; Miksa 2009, 351). Kaiser, however, dismissed this option for three interlocking reasons. First of all, he considered published indexes to be too generic in their orientation and content to satisfy in full the informational needs of specific business organizations. He formulated this argument in the following terms:

1 Every individual moves in a sphere of his own and covers individual ground such as a printed index cannot touch.

2 Printed indexes although they give usable information, cannot go sufficiently into details, they must study above all the common requirements of a number of subscribers sufficiently large to assure their existence and continuance (apart from the question of advertising).

Thus our individual interests point to specialisation and concentration in our particular field, those of the printed indexes to generalization in order to cover the field more or less of a large number of individuals or businesses, which two interests are irreconcilable (Kaiser 1911, § 6).

As he had done in discussing the card system, Kaiser took as his point of departure the principle that any and every given business organization possessed its own distinctive individual character and that any mechanism that its intelligence office used to provide access to information had to be conformed to its particular interests and needs (See Chapter 6, Sections 2.2 & 3.4, above). This led him to conclude that, because periodical indexes and indexing periodicals, whether general or domain-specific in their coverage, were compiled to cater to the “common requirements” of a number of different users, they were simply not in a position to cover all aspects of the specific, indeed idiosyncratic, interests of any single user. This was not to deny them all utility, for Kaiser acknowledged that such indexes could serve as sources of “usable information”: inasmuch as they included entries on broad swathes of subjects, at least some of these were likely to point to sources of information relevant to one’s business interests. Nevertheless, he held that published periodical indexes intended for multiple users would, *by their very nature* as general publications serving collective ends, fall short of meeting in full the particular informational requirements of individual business organizations. Underlying this schematically presented argument was a broader contrast that Kaiser drew between KOSs designed for use across different institutions and KOSs designed for use at a single institution. This opposition helped inform his rationale for discouraging the adoption of the DDC in the business library: not only did its shelf arrangement fail to achieve complete collocation by subject (See Chapter 6, Section 3.2.2, above) but it was a standard classification intended for universal use, the contents of which might not fit the specific needs of a business library (Kaiser 1911, §§ 243–249, 267–268). In both indexing and classification, then, Kaiser held that systems oriented toward individual, the customized, and the specific were to be preferred over ones tending toward the collective, the standard, and the general: insofar as published indexes belonged to the latter side of the spectrum, they had a general strike against them.

Kaiser’s second reason for discouraging the use of published periodical indexes and catalogs concerned the restricted range of documentary materials covered by these bibliographic aids. As we saw earlier, he envisioned that an intelligence department or business library would collect a wide variety of sources of information, encompassing both published materials such as books, periodicals, and trade catalogs, and unpublished

documents such as correspondence and manuscripts (Chapter 6, Section 2.3). In accordance with this assumption, he stipulated that an ideal index “must not be limited to printed literature, but to satisfy our requirements, it must include correspondence and all other material for which we may have occasion to call at any time” (Kaiser 1911, § 15). However, as a rule, printed indexes and catalogs dealt with periodicals or books and so were “necessarily ... confined to published information” (§ 7). Thus, if one were to depend upon such indexes alone for subject access to one’s documents, one would leave much of one’s stock of information unaccounted for. As Kaiser rhetorically put it:

What is to become of our correspondence, which at times contains information infinitely more valuable than that appearing in print? What of the telephone message or the memorandum of a conversation?²⁷⁷ Clearly it is impossible to ignore such a large part of our information (§ 11).

Here, then, was one concrete consequence of the generic nature of published indexes and bibliographies: they provided information about published documents that were, in principle (if not in fact), available to all interested members of the reading public but offered no help in tracing the contents of the unpublished sources of information held by an individual intelligence department and business library.

The third, and arguably weightiest, reason that Kaiser advanced against reliance on published bibliographical aids as subject access tools pertained to what he perceived to be the insufficient granularity with which they treated the informational contents of documents. The fundamental problem, in his view, was that, much like the registers in his system, standard bibliographical tools restricted themselves to dealing with documents as bibliographical wholes. Conflating periodical indexes and book catalogs under the broader rubric of “published indexes”, he characterized them as follows: “[t]he technique of available indexes in print may be summed up in this: they give entries under titles, authors and catchwords of books and in case of periodical literature of articles” (Kaiser 1911, § 10). That is to say, *books* and *articles* were the “unit[s] of registration” (Hulme 1950 [1911–1912], 10) that were entered into catalogs and indexes, whether by the title of the work in question, its author, or its catchword, which, as we saw earlier, was Kaiser’s pejorative appellation for subject terms (See Chapter 3, Section 3.3, above). Yet, he continued,

it is obvious that even an article in a newspaper duly provided with title, author and catchword may treat on a subject or subjects entirely foreign to the indication at its

²⁷⁷ Kaiser (1908, § 164) considered written records of telephone messages and conversations to fall within the class of correspondence and expected that they would be treated as such.

head, or should it so happen that the title indicates the main subject, which is by no means always the case, subsidiary subjects are almost always drawn into an argument, and these in themselves may be the subject of our inquiry, but they are nowhere accounted for (Kaiser 1911, § 10).

If one sets aside the remark that an article's title frequently does not represent its subject content—a bibliographical truism recognized by contemporary writers on library cataloging (e.g., Cutter 1904, 71, § 172) and periodical indexing (e.g., Clarke 1905, 11–12, 24–25, 29) alike, the burden of Kaiser's contention is clear: whereas a bibliographical unit, such as a newspaper article, would be entered under what was deemed to be its main subject in a periodical index, it might also contain information on other, secondary subjects that would not be indicated in the index because their treatment was considered too brief or insignificant within the framework of the article to merit a separate entry. As Kaiser (1911, § 10) saw it, the limitation of subject entry primarily to entry by the main subject of an article as a whole meant that, as a rule, “printed indexes leave the contents [sci., of the article in question—TMD] almost entirely untouched”: this, in his view, severely compromised their capacity to give access to the information contained by the documents to which they referred.

Analogous considerations applied to library catalogs, where, as a rule, subject entry entailed entering books under “their main subjects of information” (Clarke 1905, 9). Although it was generally expected that a monographic book would be entered under one subject (cf. Cutter 1904, 23, s.v. “Subject entry”; Quinn 1899, 70–71, 76–77, 79), there was some scope for variation. For one thing, entries under two or more subjects could be made for works judged to be polytopical (cf. Cutter 1904, 75–77, Rules 176–178, with Miksa 1983a, 143–145; Parsons 1903, [15]; Quinn 1899, 77, 79). Furthermore, books containing multiple works between their covers, such as, for example, collections of essays, could be treated within a catalog by means of analytical entry, wherein each individual essay, or chapter, of the book was treated as a single bibliographic unit, just as individual articles were in periodical indexes (Cutter 1904, 13, s.v. “Analysis”, 82–83, § 194; Fletcher 1895, 62–63; Hulme 1950 [1911–1912], 10–11; Parsons 1903, [15]–[16]; Quinn 1899, 101–105). Analysis could, in principle, be carried out to an even more granular level than the individual essay or chapter; nevertheless, librarians tended to draw a firm line at that point on the grounds that further analysis would be impracticable and, as a rule, continued to consider the monographic book to be the rule and measure of subject entry (Hulme 1902, 318–320; 1950 [1911–1912], 10, 15, with Lee 1976, 103–104; Olding 1969, 9; Richardson

1901, 51–52). Ultimately, whether a catalog entry was monographic or analytical in scope, the bibliographic unit in question was registered under what was, or were, perceived to be its primary subject(s).

In Kaiser's view, the practice of restricting the subject characterization of books or their component articles to the primary subject(s) whereof they treated meant that most of their informational content went unrepresented within the context of the catalog and so was effectively hidden from its users. He forcefully illustrated this point by invoking the example of a chemistry textbook, which, in most catalogs or bibliographies, would be entered under *chemistry* or a similar subject term:

I have a text book on chemistry of some 300 pages. On one page there is a footnote of some six or seven lines explaining what a *system* is. Supposing we require information on system, this footnote may be extremely useful, perhaps more useful than pages from some other book, but how are we to get at it? It is *wrapped up* in *chemistry*, it is lost unless accidentally found (Kaiser 1911, § 84 [emphases his]).

In presenting this scenario, Kaiser placed his thumb on the scale, for he obviously had in mind a degree of detail far more minute than any of his contemporaries expected a library catalog to pursue. Nevertheless, the element of exaggeration served to underscore his basic message: "the method of the book catalogue" (§ 84), according to which bibliographical units were entered under their principal subjects, gave, at best, a coarse indication of their subject content and so provided incomplete access to the information that they conveyed. This lack of granularity, Kaiser claimed, had consequences for the collocative capacity of the catalog:

If we consult the catalogue of a public library, we may find entries under *electricity* for instance, i.e. we are referred to books on electricity generally. But there may be many books on physics, engineering, traction, therapeutics, chemistry, motors etc which no doubt all treat to some extent on electricity, yet we cannot find entries for them in the catalogue under electricity. Even if we find references to cognate subjects in some catalogues, they are too vague to be of much use (§ 12 [emphasis his]).

Insofar as library catalogs identified only the main subject(s) of books and not their secondary ones, they could achieve only partial subject collocation: whereas a single subject term (*in casu*, "electricity") would have entered under it all the books in which the subject in question had been judged to be the primary one, it would omit all those volumes in which the subject had occurred as a subsidiary topic (*in casu*, books containing matter information on electricity entered under "physics", "engineering", "traction", "motors", etc.). Thus, in

consulting a catalog to search for sources on a given subject, users would obtain only a very partial picture of the items in a library's holdings containing information about the subject in question. Kaiser's argument here was founded on assumptions identical to those that animated his critique of subject-based shelf classifications. Every book or article constituted a single bibliographical unit and yet its discursive contents were multifaceted, encompassing a number of different subjects: to the extent that a catalog limited its characterization of the contents of individual bibliographic units to those that featured prominently in them as main subjects, it, no less than a shelf arrangement, would fail to collocate *all* the books containing information on any given subject (See Chapter 6, Section 3.2.2, above). Although not subject to the same physical constraints as shelf classifications, library catalogs and their congeners, periodical indexes, nevertheless still took the bibliographical unit, be it the book or the article, as their primary point of reference: accordingly, the level of subject access that they offered was still too general to provide for the degree of detail that Kaiser envisioned.

Considering publicly available bibliographical tools to be too generic in their general orientation, too limited in their documentary coverage, and insufficiently detailed in their level of subject access to function adequately as mechanisms for controlling the informational contents of documentary materials in an intelligence department, Kaiser (1911, § 7 [emphasis his]; cf. § 15) believed that business organizations would best serve their own interests by developing their own tools for this purpose: as he told his readers, "no purchasable article can supply our individual wants so far as a key to our stock of information is concerned. We shall *always* be mainly dependent in this direction upon our own efforts to meet our own situation". The particular form of information access mechanism that, in his estimation, an intelligence department should create for itself was "a systematic card index" (see Chapter 6, Section 2.2, above). We have already seen that, in outlining the contours of a card system, Kaiser distinguished indexes from registers in terms of function: the latter were used primarily to locate documents within a collection, while the former rendered available information within documents (See Chapter 6, Section 3.4, above). He drew an analogous contrast between the index and the catalog, declaring that "[a] catalogue is an instrument of search for books or articles as a whole", whereas "an index is an instrument of search for specific information, irrespective of the form of

literature embodying it” (Kaiser 1911, § 12; cf. §§ 13, 85).²⁷⁸ Unlike “the so-called indexes of commercial and technical literature”, which, in Kaiser’s view, were equivalent to “catalogues of books and articles”, an index, properly understood, did not restrict its scope to any particular kind of documentary material nor did it confine itself to characterizing bibliographic units “as a whole” (§ 12): rather, it indicated the presence of particular elements of information—“specific information”—within whatever documents might belong to the collection of an intelligence department. In this way, it transcended the limitations that Kaiser perceived as hedging the catalog and other kinds of standard bibliographical tools of his time.

In differentiating the index from the catalog and register, Kaiser drew upon another, more basic contrast—that between documents, be they books or some other form of textual record, and information. This latter distinction fundamentally shaped his conceptualization of how an index was to be constituted. We have already seen that he understood books and other documents to be concrete objects bearing discursive content (See Chapter 6, Section 3.2.2, above): in other words, they were physical carriers of recorded information. Kaiser believed that, in principle, the information recorded in documents could be decoupled from its documentary trappings and reconfigured in such a way that it would be more accessible to the users of an intelligence department or business library (See Chapter 6, Section 2.3, end). Thus, he argued,

for business purposes we must try to dissociate information from literature, we do not want books, we want information, and although this information is contained in books, it should be looked upon as quite a different material and must be treated differently from books. Information taken away from literature can be organised more compactly, more homogeneously, As long as we have the information required we can get on quite well without any books at all (Kaiser 1911, § 83).

On this view, textual information was embedded within a documentary matrix. To separate out the various items of information contained within individual documents, it was necessary submit the latter to a process of analysis, which Kaiser defined, in general terms, as a “resolving into constituent parts or elements” (§ 296). Once the discrete elements of information contained within documents had been individuated, extracted, and recorded on

²⁷⁸ This definition of the index would have a curious afterlife in the American literature of filing and indexing. Hudders (1916, 9, § 39) quoted it *verbatim* (albeit with one variant in punctuation) but attributed it to the “New York State Library Bulletin No. 3, page 7”, a reference that I have unfortunately been unable to trace. This definition, apparently taken over from Hudders since it was accompanied by the same citation, recurred in other textbooks and articles in the early 1920s; see Hausman 1921, 1, § 2; Swanton 1922, 469.

cards, it was necessary to rearticulate them into a new arrangement for, Kaiser maintained, “to be accessible and to be handled intelligently it [sci., information—TMD] must be classed, isolated items must be connected, brought into relationship, so that we shall be able to report fully on any subject required” (§ 47). A card index file thus served as a site for the collocation of pieces of information at a highly granular level.

The creation of a systematic card index, then, was ultimately predicated on “a method of systematic analysis of literature” by which, in Kaiser’s (1911, §§ 17, 16) words, “[w]e ... take literature to pieces and re-arrange the pieces systematically to answer best our object in view”. “The whole operation of making an index”, he declared, could be “conveniently divided into two parts” (§ 295):

1. Analysis of the information given with a view to reconstituting it and then classing it on a uniform plan applicable to all the information to be incorporated in the index;
2. Arrangement of the indexed information in accordance with the uniform plan provided by I.

Kaiser (1908, §§ 77, 113–115, 182; 1911, §§ 47, 295) regarded the initial, analytic stage of this two-step process as indexing proper, while the subsequent stage of arranging the “indexed information” was more akin to filing in the strict sense of the term (1908, §§ 77, 116, 183): in other words, indexing generated entries for individual items of information on cards, while the arrangement of these entries set them in relation to one another.²⁷⁹ As

²⁷⁹ One recent commentator has presented the following account of Kaiser’s view of indexing as a two-stage process: “He [sci., Kaiser—TMD] defined this process [sci., indexing—TMD] as consisting of two steps: subject analysis and the application of a subject language. The first step was to “take literature to pieces”—that is, to analyze it into kernels or nuclei of normalized information. The second step was to rearrange or synthesize these nuclei into subject descriptions in accordance with prescribed rules” (Svenonius 2000a, 174; cf. 1978, 135 & 138). Although this redescription of Kaiser’s method captures the basic sequence of analysis and synthesis underlying the two phases of index-making that he set forth, it also takes considerable liberties in its interpretation. The characterization of the two phases of indexing as “subject analysis” and “the application of a subject language” corresponds more closely to a two-step model of indexing as conceptual analysis and translation into a subject language familiar from the late 20th-century and early 21st-century literature on indexing (e.g., Frohmann 1990, 82; Lancaster 2003, 9; Mai 2001, 592; Riaz 1989, 19, 21) than to Kaiser’s own conceptualization of the process: as we shall presently see, in his eyes, the application of what might anachronistically be called a “subject language” formed part and parcel of the first step (analysis), while, by “arrangement of the indexed information”, he meant the sequencing of cards within a card file, an activity that did involve reference to a “subject language” but occurred only after the formulation of “subject descriptions” had already taken place. In short, the redescription retrojects current theoretical norms and concepts into Kaiser’s notion of index-making as a two-step process, a move that conforms the latter to current indexing theory but only at the cost of shifting its contours from those of Kaiser’s own formulation. More faithful to Kaiser’s own division between analysis and (re)arrangement is the discussion in Sales 2012, 128.

Kaiser (1911, §§ 295, 369) underscored for his readers, a single “uniform plan”—the foundation of which, as we shall presently see, was his system of categories—underpinned indexing and arrangement alike, with the result that these two phases of index-making were, in practice, “inseparable”: the former constituted “the method of systematic indexing” (SI) in the strict sense of the term while the latter was its most fundamental application (§ 628). The application of SI, Kaiser stated, yielded “indexes [that] give an analytical statement of the information, for it has been cut up into pieces, specific facts or opinions, and rearranged in a more suitable form” for rapid consultation (§ 48). Carrying the level of analysis down to the level of “specific facts or opinions” and organizing a card file at such a high degree of granularity would allow for “almost mathematical exactness ... in the manipulation and coordination of our information” (§ 16), he assured his readers. Furthermore, the collation of pieces of information pertaining to the same subject within a card file would allow for “the systematic control of large quantities of ... information” (§ 625). The use of SI to construct such card indexes, argued Kaiser, would prove valuable to an intelligence department, and its parent business organization, as a whole, since “it gives greater facilities for research work generally, it helps to make this work more thorough” (§ 17), especially in summarizing, or the compilation of reports (See Chapter 6, Section 2.2, above).

In most general terms, SI represented a highly granular form of indexing that later commentators variously dubbed “analytical indexing” (Holmstrom 1940, 188; 1951, 31) or “information analysis” (Dousa 2009–2010, 19; Metcalfe 1957, 223, § 840), the chief *differentia* of which was the provision of access to individual pieces of information within bibliographical units. At its limits, the depth of analysis involved in SI extended to isolating “specific facts or opinions” (Kaiser 1911, § 48), thus attaining a granularity comparable to that of back-of-the-book indexing, which, according to contemporary authorities on the subject, sought to indicate each significant “item of information”, be it a “fact” or an “expression of opinion”, forming part of the “minute structure” of a book (Clarke 1905, 49–50; Petherbridge 1904, [xix], 40). Kaiser (1911, §§ 572, 577, 627) fully acknowledged the affinities between SI and back-of-the-book indexing: indeed, as we noted in an earlier chapter, he developed protocols for applying a variant version of SI to book indexes which he used to generate indexes for the published reports of the Tariff Commission and for his own books (see Chapter 5, Section 3, above). Yet if card indexes created in accordance with SI and back-of-the-book indexes shared a high degree of analytic minuteness, they differed

in another fundamental respect. Card indexes covered information found in a range of documentary materials composing an intelligence department's collection, the holdings of which were constantly increasing with the afflux of new documents into the ambit of the department. Thus, as Kaiser (1911, § 572) noted, an analytic card index "is unfinished and although additions are constantly made to it, it must necessarily remain so": it constituted what he called an "interminable index". A book index, on the other hand, was, in the words of one contemporary English writer on indexing, an index to "one book or ... a series of books" only (Petherbridge 1904, xiii) and thus served as the key to the text of a published document, the contents of which were fixed and not subject to further expansion. Accordingly, Kaiser (1911, § 572) observed, it "is complete in itself, it is closed, it is permanent" and, for this reason, he dubbed it "a terminable index".²⁸⁰ Underlying the open-endedness of the "interminable" systematic card index and the fixity of the "terminable" book index was the fact that the latter was tied to a single document (or limited set of documents), whereas the former ideally accounted for all documentary materials in a collection, much like a catalog. In effect, the kind of analytical card index that Kaiser advocated was very much a thing betwixt and between a catalog and a book index, combining the collection-oriented scope of the former with the analytic granularity of the latter.²⁸¹

²⁸⁰ Note that Kaiser (1911, § 105) also applied the opposition between "terminability" and "interminability" to classifications as well. In his view, a "terminable" classification was one wherein "we are concerned with a definite number of subjects"—that is to say, a concrete group of a fixed number of entities that are immediately present to the classifier—whereas an "interminable" classification was one in which "there is no definite number of subjects"—that is to say, a group of entities, some of the members of which are not immediately present to the classifier and the number of which is not fixed but indeterminate. To Kaiser's mind, general classifications of "knowledge", "commodities", and "books" all were examples of interminable classifications. Apart from establishing that one could classify objects that were not immediately present to the classifier and creating a loose analogy between kinds of classifications and kinds of indexes, the distinction between terminable and interminable classifications did not play a major rôle in Kaiser's theory of classification.

²⁸¹ Regarding this point, it is worth observing that Kaiser's distinction between "terminable" and "interminable" indexes bears at least a superficial resemblance to Klement's (2002) recent distinction between "closed-system" vs. "open-system" indexing (on which also cf. Mulvany 2005, 4). According to Klement (2002), closed-system indexing is typically applied to a single document and seeks "to facilitate finding a unit or units of relevant information *within a document*", whereas open-system indexing is generally applied to collections of documents and "may continue indefinitely" as a collection continues to grow (p. 25, Table 1, Attributes 3, 4, 8 [emphases hers]). However, Klement overlays this distinction with that of level of granularity as well: to her mind, closed-system indexing always has to do with information units within a document, whereas open-system indexing always applies to bibliographic, or documentary units: thus, the prototype of the former is the back-of-the-book index, in which the "[t]he indexer *analyzes* the contents of [a] document" while that of the latter

Kaiser was not alone in advocating the use of highly analytic card indexes, for a comparable idea had already been broached in the final years of the 19th, and the first years of the 20th, century by one of the *primi moventes* of the then nascent Documentation movement, Paul Otlet (see Chapter 1, Section 5.2.3, above). As early as 1892, shortly after he had begun to participate in projects for the preparation of bibliographies of law and the social sciences (Rayward 1975, 29–33), Otlet (1891–1892) developed a conceptualization of published documents within the latter field as vehicles for the recording and communication of “facts”, “perceptions”, and “observations” regarding human society—that is to say, individual items of information that, if properly collated and classified, might prove revelatory of the “scientific laws” underlying social phenomena (p. 12). In an early programmatic article on the bibliography of the social sciences, he suggested that “from a purely formal point of view one can break it down into the following elements: facts, interpretation of facts, statistics, sources. All of its materials are reducible to these four terms” (p. 16). These elements, in turn, were susceptible to being “brought together and re-arranged in particular categories” corresponding to the structure of inquiry of the social scientific discipline(s). By the same token, Otlet argued,

the various parts of any book, periodical article, or lecture can be easily reduced to the different elements we have mentioned above. For written works a re-arrangement of their contents not along the lines of the special plan of a particular book, but according to the genus and species appropriate to each element does not make for any loss of substance (p. 17).

In his view, the ideal technological infrastructure for undertaking such a rearticulation of recorded facts, the interpretations thereof, statistical data, and the sources contained in social scientific literature would be the card index, which would include “cards containing actual information or simply notes of references” where this information might be found (p. 17). This analytical work marked what Otlet envisioned as the second stage in the construction of a general bibliography of the social sciences, the first stage of which was to create a catalog of sources, comprising books and periodical articles (Rayward 1975, 31–32;

is the periodical index, in which “[t]he indexer describes the documents, although multiple descriptors, taken together, become somewhat analytical” (p. 25, Table 1, Attribute 5 [emphases hers]). Here, she parts company with Kaiser, for he allowed that a systematic card index constructed according to the canons of SI could be analytical in its granularity (like a closed-system index) yet be applied to a collection of documents (like an open-system index). This point of contrast between Kaiser and Klement neatly illustrates what one might call the liminal quality of Kaiser’s conceptualization of SI, which fit neither the standard mold of the back-of-the-book index nor the kind of index typically used for extensive document collections.

1994, 237). In the earliest phase of his work as bibliographer, then, Otlet seems to have viewed the enumeration of documentary units and the listing of analytic pieces of information alike as forming distinct parts of a single bibliographic project.

In subsequent years, this initial vision was transformed, refined, and implemented. By the mid 1890s, Otlet and his close collaborator, Henri La Fontaine, had expanded the scope of their bibliographical ambitions from the legal and social sciences to universal bibliography *tout court* (Chapter 1, Section 5.2.3, above). With the foundation of the Institut International de Bibliographie (IIB) in 1895 (Institut International de Bibliographie 1908, 82), work began in earnest on the creation of the Universal Bibliographical Repertory (RBU), a card index catalog designed to be universal, international, and encyclopedic in its coverage, in that it was “to provide information on publications of all times (universal), all countries (international), relative to all subjects (encyclopedic)” (Institut International de Bibliographie 1905a, 19). The RBU, which confined itself to entries describing “bibliographical units” (*unités bibliographiques*) such as books, pamphlets, periodicals, and periodical articles (p. 74), was a primary focal point of the IIB’s activities in the first decade of its existence. Nevertheless, Otlet continued to harbor plans for a yet more detailed, analytic approach to bibliographical work that would deal directly with the informational contents of documentary units. In a seminal article published in 1903, in which he described his program, for the first time, as “Documentation”, he proclaimed that

[j]ust as the chemist has passed from the analysis of the molecule to that of the atom and just as the biologist, after [having considered] tissues, has studied cells, so will the bibliographer, after having carried out the inventory of writings (*écrits*), undertake an inventory of the content (*contenu*) of these very writings. *Analytical indexes (les index analytiques)* will then take their place alongside bibliographical repertoires (*des répertoires bibliographiques*); methods will be found to lay bare the works in a connected and cohesive manner and to permit one to find immediately, without trouble or difficulties, the subject-matter itself (*les matériaux mêmes*) which each publication contributes to the totality of knowledge (Otlet 1903, 136).

He envisioned that, thanks to centrally coordinated cooperation among bibliographers and subject experts, an analytical index would be created for each domain of science, constituting a “Universal Book” (p. 143) for that science, wherein

“[the individual piece of] information (*le renseignement*)²⁸² ... will be set out in a completely analytical manner; it will be recorded on a separate leaf or card. ... The

²⁸² The noun “*renseignement*”, one of the French words that correspond to the English noun “information” (Chevalley & Chevalley 1934, 712b), is a count noun that can be used either in the singular or in the plural (cf. p. 380, n. 333, below). When it occurs in the singular form, it is often best

collection of the leaves, classed and arranged in accordance with the rubrics of a sure, precise, and detailed classification, will form the “Universal Book” of the science, a book never completed, but growing without cease (p. 144).

Constituting an up-to-date and, thanks to its leaf or card format, ever-updateable “cadaster of knowledge” (p. 144), the analytical index was no less “interminable” for Otlet than for Kaiser.

In 1907, four years after Otlet penned these programmatic statements, the IIB formally instituted the Universal Repertory of Documentation (RUD), its own instantiation of such an analytical index (see Chapter 1, section 5.2.3, above).²⁸³ Although unitary in theory, the RUD actually consisted of several different sections: the principal one was a vertical file consisting of dossiers of loose sheets and cuttings from periodicals arranged by subject in accordance with the UDC, while subsidiary sections took the form of card files, sometimes accompanied by vertical files, representing separate repertoires of information on associations and institutions, legislation, inventions, artworks, analyses and reviews of larger works (Institut International de Bibliographie 1907b, 20–23; 1908, 90–93). Throughout his long career as documentalist, Otlet (1905, 27, n. 5; 1934, 409–411) considered this series of vertical and card files to form the nucleus of a universal “encyclopedia” comprising units of “facts and data” extracted from their original documentary context and set into relation to one another through a process of classificatory “codification”.²⁸⁴

Although the RUD was intended to be universal in its coverage, we have seen that Otlet, at least in his earlier writings, tended to view the analytical index as something applicable to particular sciences or areas of knowledge. Among these domains was that of business. In a report on “the rational organization of information and documentation in economic matter(s)” presented at an international conference on economic expansion held at Mons in

translated as “a piece of information” or “an item of information” in accordance with its grammatical status as a count noun. In the plural, however, it can be translated either as “information” alone, a rendering that, following English usage, treats it as a mass noun, or as “pieces/items of information”, a translation that again treats it as the count noun that it is in French. In this and the following translations from Otlet’s texts, whenever “*renseignement*” occurs in a context where a translation as a count noun seems appropriate, I insert “piece(s) of” in square brackets as an indication of this; otherwise, I translate it simply as “information”.

²⁸³ Note, however, that, preliminary trials (*essais*) for this repertory appear to have been underway since at least 1905; see Otlet 1905, 27, n. 2.

²⁸⁴ For latter-day discussions of Otlet’s views on the decomposition of documents into “facts”, their rearticulation into card files, and their codification, see Dousa 2009–2010; Frohmann 2008; Moura & Lara 2012, 4–8; Rayward 1990, 6–8; 1994, 240–241, 247; 1997, 295–296.

1905, he briefly set forth a proposal for creating “a central repertory of documentation”—that is to say, an analytical index—for the fields of economics, commerce, and industry (Otlet 1905, 26). Recapitulating the theme of the analytical index as a “universal book” of science, he described this repertory as

a kind of continuous book, a vast encyclopedia of economic, commercial, and industrial facts, constantly increased and susceptible of becoming complete, integral, universal, [a] veritable cadaster of that which exists in this domain, (a) living archive of the world as it currently is (*le monde actuel*), [a] practical instrument of documentation and information (p. 26).

Drawing upon “innumerable documents” including “reports, articles from reviews, correspondence, extracts of works, manuscript notes, [pieces of] information (*renseignements*) drawn from correspondence, cuttings from journals, ... collections of statistics, consular publications, administrative publications” (pp. 26, 27) and so on, this repertory of economic documentation would be established in a manner common to all analytical indexes:

In order to fuse the different documents into a homogeneous and coordinated whole, they are laid bare and the information (*les renseignements*) reduced to its ultimate analytic elements, that is to say, to the unitarily simplest [pieces of] information (*renseignements unitairement les plus simples*). To each unit, or [piece of] information forming a distinct note, is devoted a movable card (*une fiche mobile*), whether the information has been transmitted, or whether it comes from the cutting and pasting of preexisting documents [that have been] conserved (p. 27).

Here, again, the unit cards bearing separate items of information would be arranged in accordance with a subject classification, namely the UDC (p. 30), which allow for the collocation of pieces of information from different documents pertaining to the same subject (p. 27). In Otlet’s view, the resultant analytical index, which, he imagined, would be created and operated by an Office of Documentation (cf. Chapter 1, Section 5.2.3, above) devoted to economic and industrial information, would provide a valuable tool for reference work: as he explained to his readers, “the compilation of [pieces of] information (*renseignements*) under the analytical form permits [one] to utilize them as elements of a response to any and every question of the public, whether these questions concern wholes or details, simple aspects or complex ones” (Otlet 1905, 28).

Despite obvious differences in detail, Otlet’s general conceptualization of analytical indexing as a process involving the decomposition of documents into morsels of information recorded on cards and the subsequent rearticulation of this information in card

files was very similar to that espoused by Kaiser (Dousa 2009–2010, 20–21): moreover, the proposed central repertory for documentation pertaining to economic matters dealt with the same kinds of documentary materials as those handled by the intelligence department. Given that Otlet's presentations of his ideas about analytical indexes preceded Kaiser's account of SI by a number of years, the question naturally arises whether Kaiser's conceptualization of information analysis as the enucleation of facts and opinions from documents was tributary to the ideas of the Belgian father of Documentation. The rather meager evidence available to the historian strongly suggests that the answer is negative. To be sure, Kaiser was not ignorant of the IIB and its ambitious informational project. Commenting in *Systematic Indexing* on the application of Dewey's decimal notation to the organization of card indexes, he observed that

we have a good example in the activity of the *Institute [sic] Internationale [sic] de Bibliographie* in Brussels of how the classing of cards by these numbers works. This institution has taken upon itself the task of indexing (i.e., cataloguing!) the scientific (periodical) literature of the world. Its indexes extend to millions of cards which are arranged on an *improved* Dewey plan (Kaiser 1911, § 271 [emphases his]).

As this brief passage shows, Kaiser knew that the IIB was compiling a universal bibliographical index on cards, that its card files had reached truly monumental proportions,²⁸⁵ and that the UDC—the “improved Dewey plan” (cf. Chapter 1, Section 5.2.4, above)—served as the preferred mechanism for the organization of the IIB's repertories. At the same time, his equation of the IIB's “indexing” with “cataloguing” indicates that he considered its indexes to be confined to the description of bibliographic, or documentary, units rather than to the analytic recording of pieces of information within documents (cf. Kaiser 1926, 32, § 38): he was evidently thinking of the RBU, not the RUD. This perception of the IIB's indexing activities perhaps received reinforcement from the fact that Kaiser (1911, §§ 271, 273) was acquainted with one of the periodical indexes published under its aegis, the *Index of the Technical Press*, or *Index de la Presse Technique*, which, like other publications of its genre, took the journal article as the unit of interest.²⁸⁶ At any rate, his

²⁸⁵ Kaiser's claim that the IIB's indexes “extend to millions of cards” was no exaggeration. According to Rayward (1990, 3), the RBU had grown from about 400,000 card entries in 1895 to about 3,000,000 entries by 1903 and, by the outbreak of the First World War, it comprised no fewer than, approximately, 11,000,000 cards.

²⁸⁶ On the *Index de la Presse Technique*, soon renamed as the *Revue de l'Ingénieur et Index Technique*, which formed part of an ambitious series of bibliographical publications known as the *Bibliographia Universalis*, see Rayward 1975, 115.

brief characterization of the IIB and its indexes betrays no knowledge of Otlet's proposals for a truly analytical index.

Taken by itself, the absence of any mention of Otlet or the IIB in association with the idea of information analysis in Kaiser's writings does not amount to conclusive evidence that he developed his notion of analytical indexing in complete independence of his Belgian contemporary. Writers on filing and indexing tended to be sparing in referring to the sources of their ideas, a pattern to which Kaiser, for the most part, conformed: furthermore, when he cited sources by name, he tended, for the most part, to do so in order to single them out as objects of critique rather than to invoke their authority.²⁸⁷ However, there is good reason to believe that Kaiser's views on information analysis ultimately derived from a different source, one that shaped his thought in a number of other ways: the PCM. According to its administrative leaders, most of whom, significantly, came from backgrounds in the natural sciences (See Chapter 3, Section 3, p. 98, n. 88), the primary activity of the museum was "the accumulation and distribution of all attainable facts" (Philadelphia Commercial Museum 1897, 10) about overseas markets that might be of interest to American businessmen. The PCM accumulated facts in different ways. One was by the collection and analysis of samples of raw materials and manufactured products, physical items that formed the substance of the museum's various exhibits (p. 9). Another was by the collection of documents containing "all the facts bearing on trade conditions" (p. 9) in foreign markets within the Bureau of Information, one of the functions of which was "to compile all facts relative thereto" (Philadelphia Commercial Museum 1896, [1]). This involved the analysis and extraction of pieces of information from the documents in question—an activity that

²⁸⁷ In his discussion of book classification in *Systematic Indexing*, Kaiser (1911) explicitly cited the 6th edition of the DDC (§ 243), Cutter's EC (§ 275), Brown's SC (§ 278) and L. S. Jast's (1906) *Classification of Library Economy, Administration, and Office Papers* (§ 285): in each case, the classification was cited not to uphold a theoretical point that Kaiser was making but rather as an object of analysis and criticism in its own right. Similarly, he mentioned by name and discussed examples of classifications of concretes, such as the classifications of exhibits from the 1900 Paris and 1910 Brussels World's Fairs (Kaiser 1911, §§ 195–197) and the tariff schedules of several different countries (§§ 201–202) as objects of comment, critique, and explanation, not as authorities for his own ideas; the same held for his treatment of alphabetization, in the course of which he drew upon examples from a bookseller's catalog and different directories purely as examples (1908, § 133, with n. *; 1911, §§ 221, 223, 226, 229, 231–236). However, Kaiser did occasionally invoke the works of others as either authorities for points he was making or as sources of information on general subject; for example, he cited articles from the 9th edition of the *Encyclopaedia Britannica* on Arithmetic and Numbers to support specific statements he was making about numbers and their use in classificatory notation (1911, §§ 124, with n. *; 126, with n. *), while commending to his readers James Duff Brown's (1898) *Manual of library classifications* (*sic*; the title was actually *Manual of library classification and shelf arrangement*) as a source on library classifications (§ 242) and "textbooks on logic" for the treatment of classification in general (§ 19; cf. § 195)

contemporary accounts of the Bureau's activities were keen to mention. W. P. Wilson, the director of the PCM, characterized the processing of trade journals in the museum's library in the following terms: "[a]s fast as they arrive they are turned over to a staff of readers versed in different languages, who cull from them what facts appear to be worth preserving. The information thus received is indexed by the card system" (Wilson 1899, 117). An unsigned article that appeared in *Sell's Dictionary of the World's Press*, perhaps written by Henry Sell himself, used comparable language to describe the Bureau's treatment of foreign periodicals:

In this department are received the official trade and commercial publications of every country, and more than 1,500 different trade newspapers. All these newspapers and periodicals are systematically examined by the polyglot staff. Every piece of information, whether a couple of lines or a column, affecting any description of trade, is extracted and indexed (The Philadelphia Commercial Museum 1899, 128; cf. Chapter 3, Section 2, pp. 89–90, above).

Such detailed analysis of documents and the recording thereof in the Bureau's "card catalogue system", proclaimed one of the PCM's publications, ensured that "every fact that has practical business value finds its way into the hands of a body of experts, who include it at once in ... individual reports" (Philadelphia Commercial Museum 1899a, 414). In short, the decomposition of documents into discrete items of information arranged within card files was an outgrowth of the PCM's founders' aim to collect and distribute commercial "facts", and as such, it played a central rôle in the work of the museum's Bureau of Information where Kaiser first cut his teeth as librarian and indexer. The notional disaggregation of documentary units into informational ones also came into play at CIB, an institution that Sell set up in imitation of the PCM's Bureau and the organization where Kaiser worked as librarian after leaving the PCM (Chapter 4, Section 1, above): the informational services offered to subscribers there included the provision of printed cards "giving extracts from home and foreign literature, including consular report of all countries, also report from Chambers of Commerce and other commercial organisations, trade papers, &c" embodying "the latest information" about a host of commercial subjects.²⁸⁸ It is at the Bureau of Information of the PCM and, to a lesser extent, the offices of the CIB, then, that one should situate the origins of Kaiser's idea of the analytical card index as the ideal vehicle for, and product of, information analysis.

²⁸⁸ *Commercial Intelligence*, 21 July 1900, p. 11 ("British trade. ").

As we have already noted, Kaiser's mode of analytical indexing differed from library cataloging and periodical indexing in its high degree of granularity, which was comparable to that of back-of-the-book indexes; yet, unlike book indexing, it was applied to growing, open-ended collections of documents (pp. 283–284, above). At first blush, it would appear that the application of such an intensive form of indexing to multiple documents would have placed a well-nigh intolerable burden upon the staff of an intelligence department or business library, for it would be prohibitively time-consuming and labor-intensive to identify and inventory every single item of information contained in each document in a collection. This, however, was not the case, for Kaiser did not expect that analytic indexing would be carried out to such a degree that a card index would encompass every individuable piece of information within a given corpus of textual documents; rather, he envisaged that it would be applied *selectively* so that only a circumscribed portion of the documentary information would be recorded on cards and incorporated into the index files (See Chapter 6, Section 2.2, pp. 201–202, above). The underlying rationale was simple. As noted earlier, Kaiser understood documents to be bearers of complex discursive content and, as such, to yield information about a number of different subjects (See Chapter 6, Section 3.2.2, above). He also assumed that a given business organization would be engaged in “[its] own particular sphere of activity” (Kaiser 1911, § 91) and that its members would require information on those subjects that fell within its area of interest. However, not all the information contained in the documents collected by an intelligence department necessarily pertained to these subjects: as Kaiser reminded his readers, “[o]n inspection, we shall find that our books and other literature contain a good deal of matter which does not interest us at all and some which only interests us indirectly” (§ 45). Since the goal of analytical indexing was to identify, enucleate, and so render easily accessible information on those subjects that had “a direct bearing on [one’s] business” (§ 46), the area(s) of interest staked out by a given organization set limits to the information included within the card index: as Kaiser put it, “every firm or individual who has occasion to index literature does so, not to make an absolute index to it (i.e., indexing the whole of the information) but to extract from it those parts which come within his purview” (§ 309; cf. § 248, point 5). To be sure, even when circumscribed in this way, information analysis still placed considerable demands upon the staff of an intelligence department: Kaiser readily admitted that the development and maintenance of an analytic card index in accordance with the protocols of SI entailed “serious work” (§§ 18, 629). Nevertheless, the limitation of scope to only those

elements of information deemed relevant to the interests of the business organization for which the index is being created made the task of indexing more manageable than would have been the case if the goal had been to create an “absolute index” covering the totality of the informational contents of a collection.

The selective extraction of information from documentary materials was a core feature of SI. For Kaiser, the value of selectivity lay not in any reduction of work for the staff of an intelligence department that it might occasion, but rather in the fact that it configured the contents of a card index to the informational needs of the business organization and, at the same time, promoted efficiency in the mobilization of information within the intelligence department. The latter two factors featured prominently in his account of the general significance of indexing, which he framed as follows:

[i]ndexing by which we make our information accesible [sic] has ... a negative and a positive function,
it throws out what is not required,
it concentrates on that which is required.

The negative side is only too apt to be overlooked, just because it is negative. By judicious rejection we may reduce the bulk of our literature by a considerable amount, at the very least by one half. This reduction means a saving of time which may be most essential when large quantities are handled.

The positive side too benefits by the reduction. What we have selected is all live material; it all has a direct bearing on our business. By the process of indexing therefore we *boil down*, we reduce our materials to that which is essential for our purpose, we create a nucleus of effective information, information which will be of real use to us in the pursuit of our business. We cast aside what after due examination is found to be of no value or to lie outside our field of action (Kaiser 1911, §§ 45–46 [emphasis his]).

As the foregoing passage indicates, Kaiser posited that indexing had both a negative and a positive function. He viewed the negative function of indexing primarily in quantitative terms. To his mind, the collection of documentary materials kept in a business organization’s intelligence department contained a certain aggregate amount of textual information. The selection of only those pieces of information touching upon subjects of interest to the business in question for inclusion within the department’s card index files meant that all the other items of information fell *hors de considération* or, in Kaiser’s (1911) words, were “throw[n] out” (§ 45), “reject[ed]” (§ 309), or “cast aside” (§ 46): as a result, the amount of information in the index would inevitably be smaller than the total amount of information available in the documents from which it had been culled: as Kaiser put it, “by

indexing we reduce the bulk of our [documentary—TMD] materials” (§ 51). From this perspective, indexing constituted a process of subtraction, one whereby those portions of the informational contents of an intelligence department’s documents that were deemed irrelevant to the work of a business organization were excluded from its card index and thus were effectively removed from the attention of the department’s patrons. The negative function of indexing thus contributed to the control of quantities by reducing the amount of information entering into a card index and that a user thereof had to consult to find those particular pieces of information most likely to be of use to him. In Kaiser’s view, such a reduction entailed “a saving of time” (§ 46), especially in contexts featuring large document collections and so helped render the card index an efficient mechanism for search.

“Strictly speaking indexing has two distinct objects, to reject what is not required, and to select what is usable” (Kaiser 1911, § 309; cf. § 83). Whereas the negative function of indexing was to screen out unsuitable pieces of information from a card index and so make the quantity of information that it contained manageable, its positive function was to enhance the utility of the index by selecting for inclusion only those elements of information having to do with subjects falling within a given business organization’s area of interest. To this end, Kaiser wrote, “we limit ourselves in indexing to information concerning our own particular sphere of activity” (§ 91). In his view, it was imperative that the person overseeing the design of an intelligence office’s or business library’s card index carefully demarcate its scope in light of the parent organization’s sphere of interest: indeed, he insisted, “[i]t is necessary that we should define this sphere, mark the boundary lines as definitely as we can, and once we have determined our boundaries, not to vary from them” (§ 91). Once such limits had been set, an intelligence department might well aspire to comprehensive coverage of information on the subject(s) falling within the purview of its index: after all, Kaiser noted,

[w]e have pegged out our field of activity and we naturally desire to concentrate on that exclusively. We want to be informed—and we want all possible information—on that which has a direct bearing on what we are concerned with (§ 45).

Yet, even within the restricted subject scope of a particular domain of interest, there was still need for selectivity. As Kaiser pointed out, published business literature varied in genre, format, quality and specificity of information, and authoritativeness (§§ 74–79, 92–93, 95–96). Moreover, he observed, given the abundance of published business literature, it was not uncommon to find duplication of informational content across different (kinds of)

publications (§§ 80, point 2, 91, 94): in such cases, one had to decide from which, of several possible sources, to take information for inclusion in an index. The decision whether to include a given item of information within an index or not would depend in large measure upon an indexer's acquaintance with the specific domain to be covered by the index and its literature:

[e]xperience in dealing with quantities of literature and our special knowledge in our particular field should enable us to discriminate so that on the one hand no information of value is allowed to slip by and on the other hand we are not burdening ourselves with useless material (§ 90).

In short, the positive function of indexing consisted in the selection of just those items of information contained in a corpus of documentary materials held by an intelligence department that fit the specific informational needs of its parent organization. In the case of published sources of information, such as periodical articles and books, selection was determined not only on the basis of the pertinence of the information to the interest(s) of the organization, but also in accordance to judgments made concerning the quality of the sources in question. By means of such selectivity, Kaiser maintained, "we create a nucleus of effective information, information which will be of real use to us in the pursuit of our business" (§ 45).

Such, then, were Kaiser's rationale for, and general conception of, indexing as a form of information analysis, the main lines of which may be usefully recapitulated here. In his view, the central concern of an intelligence department was to organize, and provide ready access to, the textual information that it had collected (See Chapter 6, Section 2.2, above). The physical organization of documents in files and on the shelves and the drawing up of registers were necessary preconditions for achieving this aim, for they served as mechanisms for the storage and retrieval of the textual sources of information—documentary materials and, in some instances, sets of documents (See Chapter 6, Sections 3, 3.1 & 3.4, above). Although registers functioned as points of entry to document files, they afforded only rudimentary control over the information contained in documents, primarily because they were designed to treat documents as bibliographical units: the same limitations hedged standard publicly available bibliographical tools, such as library catalogs and periodical indexes, which, as a rule, gave access to books and articles. A single document, however, might contain multiple items of information, the majority of which would be unaccounted for if one treated documents at the low level of granularity characteristic of Kaiser's registers, published catalogs and their congeners. Accordingly,

drawing upon lessons learned at the Bureau of Information of the PCM and consolidated at the CIB, Kaiser (1911, § 44) advocated a highly analytical approach to indexing as the means of “bringing [their] contents under control, so far as it applies to our business”. As we have seen, this entailed the conceptual disaggregation of documents into component pieces of information, the recording of these elements of information upon cards, and the subsequent reorganization thereof within the framework of a systematic card index. According to Kaiser (1911, § 47), the relatively high level of granularity rendered the card index a more potent instrument for information search than conventional bibliographic tools: “[o]ur indexed information will generally be of a much more specific character than the originals from which it is drawn, and we shall therefore be able to bring it better within immediate control for our purpose”.

Although the kind of analytical indexing advocated by Kaiser was intensive in nature, it did not entail the total decomposition of any given document into pieces of information or the inclusion of all possible items of information contained in a given corpus of documents within a card index. Only those elements of information deemed pertinent to the domain(s) of interest of the individual business organization were recorded and incorporated into the index: as Kaiser (1911) put it, “by indexing we extract ... what is useful” (§ 50) from the documentary materials at our disposal and “reject what is of no use to us” (§ 83). Such a selective approach to information analysis brought with it a twofold advantage. On one hand, by virtue of the exclusion of material, it allowed an intelligence department to keep “the bulk of the index ... within reason” (§ 311). On the other, it gave an intelligence department leeway to customize the contents of the index in accordance with the informational needs of its parent organization: after all, as Kaiser stressed to his readers, “we possess the special knowledge required to do justice to our own wants, we can discriminate best to meet our own case” (§ 97, point 2). Selectivity, he pointed out, went hand-in-hand with the dissociation of information from documents that lay at the heart of information analysis:

In the case of books we are always more or less forced to take into account their form; their form does not depend upon us, it is given; in the case of information we at liberty to give it that form which falls in best with our individual requirements (§ 85).

Kaiser’s own method of indexing—SI—was designed in accordance with the ideals of high analytic granularity, selectivity, and flexibility for the purpose of creating card indexes yielding “specific information” (§§ 12, 85, 93) configured to the particular contexts in which

they were to be used. Having considered its general background and aims, we are now in a position to consider, in turn, its theoretical underpinnings and practical implementation.

7.2. The Theoretical Foundations of Systematic Indexing: Epistemological and Linguistic Aspects

In *The Card System*, Kaiser (1908, § 116, *) spoke of SI as a form of “literary indexing”, while, in *Systematic Indexing*, he described it somewhat more narrowly as “[a] method of systematic analysis of literature for the purpose of indexing” (1911, § 17). Both of these brief characterizations of SI reflected the assumption that literature—that is to say, textual documents (cf. Svenonius 1978, 135)—constituted the “prime material” (Kaiser 1911, §§ 19, 621) upon which the operations of indexing were to be carried out. Yet, Kaiser went on to assert, literature as such was not the primary focus of SI: “although we have taken literature as our basis ...,” he stated, “we are in reality dealing with information rather than literature” (§ 663, s.v. “Analysis of Literature”). Underlying this distinction between literature as the ostensible starting point of SI and information as the actual object thereof was a particular conceptualization of the relation between the two, which Kaiser formulated in the following terms:

Literature is a record, a *descriptive* record [T]he manner of recording is that of description by means of letters, hence literature. ... [L]etters are grouped into *words*.
...

Words are brought into relation according to recognized rules and thus give *language*. Language is that by means of which we describe or record intelligently. Records represent knowledge, they give information, information belongs to our business materials; we use it, we apply it, hence we group it into classes to make it accessible, we index it (§§ 52–53 [emphases his]).

On this view, textual records were a form of representation of *knowledge* about the world. The medium for this mode of representation was *written language*: it was ultimately resolvable to letters, a set of primitive “signs or symbols” (§ 52) that served as the building blocks for forming words,²⁸⁹ which, in turn, were combined in accordance with the rules of syntax to yield language. Although this characterization of written language stressed its formal, syntactic aspects, Kaiser considered it to be more than a series of nested levels of formal combinations of graphic marks inscribed or printed upon a paper surface. It was the

²⁸⁹ Strictly speaking, it would have been more accurate to speak of clusters of letters as forming graphic representations of words rather than words themselves: however, Kaiser did not make this distinction in his text.

vehicle by means of which people recorded their knowledge about the world “intelligently”: that is to say, the configurations of signs from which texts were composed conveyed meaning or, if one will, semantic content. By virtue of the meaning-bearing combinations of signs comprising written language, textual documents yielded *information*, which, as we have already seen, Kaiser considered to be a crucial resource for businessmen since it served as the basis on which decisions about business activities were to be made (See Chapter 6, Section 2.2, above): obviously, the goal of indexing was render this resource more accessible and ready for use. The upshot of all this was clear: inasmuch as literature constituted a representation of knowledge by means of written language for the purpose of communicating information (See Figure 14), the indexing thereof had both an epistemological and a linguistic dimension.

This conceptualization of literature and its relation to information informed Kaiser’s understanding of the nature of the analysis involved in SI. We noted earlier that he defined analysis as the resolution of a given whole—*in casu*, the text of a document—“into constitu-

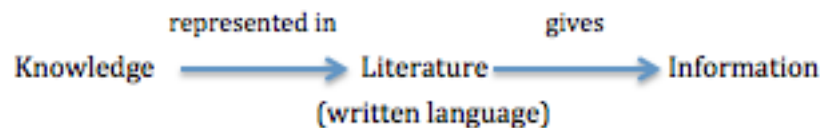


Figure 14: The relation of knowledge, literature, and information according to Kaiser 1911, § 53.

ent parts or elements” (Kaiser 1911, § 296, cited at p. 281, above). The purpose for which a particular analysis was carried out determined the identity of the constituent parts into which the text was to be decomposed: as he put it, “[e]lements may differ according to the standpoint from which we analyse” (§ 296). With regards the analysis of literature, Kaiser identified three different standpoints (cf. Svenonius 1978, 135). One was rooted in the grammar of natural language. “Grammatical analysis”, he wrote, “takes note of the various kinds of words and their relation to one another, it has for its basis *words* and for its purpose the correct use and combination of these words” (Kaiser 1911, § 296 [emphasis his]). Although he did not expand further upon this point, the natural interpretation is that, in this analysis, grammatical categories, such as parts of speech, morphological classes, and syntactic roles, would serve to define the elements of a text. Another approach was founded on the logical structure of the text. As Kaiser explained it, “[l]ogical analysis treats of the

various kinds of thought or forms of reasoning and their relation to one another, it has for its basis *reason*, its purpose is to demonstrate the correct ways of reasoning” (§ 296 [emphasis his]). Here, too, he did not elaborate further, though one may well imagine that various structural categories of logic, such as the components of propositions, kinds of propositions, syllogistic forms, or modes of induction, would provide the framework for discerning the logical elements of the text. The third mode of analysis, which Kaiser identified as his own, had a somewhat different orientation:

For our analysis we take neither the form of words as in grammar, nor the form of reasoning as in logic, we assume grammar and logic as given; we take for our basis *knowledge*, the information (from a business point of view) conveyed by written language (§ 297 [emphasis his]).

From the wording of this passage, it is evident that Kaiser’s preferred approach to the analysis of literature acknowledged the grammatical and logical properties of texts: indeed, as we shall have occasion to observe in the following sections of this chapter, issues regarding grammar and logic were hardly absent from SI. Yet, SI did not concern itself with uncovering grammatical or logical structures as such. Rather, as a system of indexing, it sought to pick out those elements of “the information conveyed by written language” that defined it in terms of subject content: in Kaiser’s words, “[o]ur purpose in analysing literature is: to discover those elements by means of which we may bring together knowledge or information of like kind” (§ 297). As shall become apparent in Sections 2.2.3–2.2.4 & 3 of this chapter, these elements were the categories of index terms used to form complex index terms indicating the subjects about which particular pieces of text conveyed information. To understand how these categories were “discovered” and their relation to the items of information that they helped not only to demarcate but also, in an important sense, to define, it is necessary to examine in greater detail Kaiser’s view of what it meant to speak of knowledge and “the information conveyed by written language”: in other words, we must familiarize ourselves with the epistemological and linguistic assumptions on which he based SI.

7.2.1. The Epistemological Background to Systematic Indexing

Literature is a record, it is a *descriptive* record What we record is what we *observe*, what we *reason out*. The subjects of our observing and reasoning are *things* in general, real or imaginary, and the conditions attaching to them. We shall call them *concretes* and *processes* respectively (Kaiser 1911, § 52 [emphases his]).

With these words, Kaiser set forth, in lapidary form, his rationale for considering textual records to be representations of knowledge. In his view, human beings generated knowledge about the world through acts of observation and reasoning, the results of which were recorded in documentary form. These acts were directed towards objects of knowledge, of which Kaiser identified two distinct kinds: “things in general”, which he designated *concretes*, and “the conditions”, or very roughly, the states of being, “attaching to them”, which he termed *processes*. The notions of concrete and process occupied a central place in Kaiser’s conceptualization of SI and they shall be discussed in greater detail in Sections 3.1 ff. and 3.3 ff. of this chapter. Here, it is sufficient to note two points. First, in the passage under consideration, Kaiser treated concretes and processes as top-level ontological categories—that is to say, concepts of extremely broad generality that, when taken conjointly, represent, in classificatory terms, the highest set of *genera* into which existent entities can be distributed (Meiland 1999; Thomasson 2009). He held that, at least within the horizon of human experience, these two categories exhausted the kinds of entities existing in the world: as he bluntly put it, “[o]ur observation is limited to that of concretes and their conditions, there is nothing else to observe” (Kaiser 1911, § 56). Second, although concretes and processes both counted as top-level categories in what can be called Kaiser’s ontological scheme, he did not accord them the same ontological status. So much is patent from the formulation of such statements as “things ... and the conditions attaching to them” and “concretes and their conditions”, in which he indexed processes to concretes: such a *façon de parler* suggested that processes never occurred in isolation, but always stood in relation to some concrete or other, which served as the substrate upon which they supervened (cf. Section 3.3.2 of this Chapter). For Kaiser, the existence of concretes was a precondition for the existence of processes: indeed, he maintained, albeit in somewhat different discursive contexts, that “processes are dependent on concretes” (Kaiser 1911, § 574) and that “there can be no process without a concrete” (§ 184; cf. 1908, § 15). In short, concretes, or things, enjoyed ontological primacy *vis-à-vis* processes: they were, so to speak, the subsistent anchor points of being that provided the occasion for the occurrence of processes.²⁹⁰ Needless to say, this ranking of ontological categories was congruent with

²⁹⁰ One latter-day commentator has suggested that “Kaiser’s *concretes* may be likened to Aristotle’s substances and his *processes* to accidents” (Svenonius 1979, 66 [emphases hers]). To the extent that Aristotelian tradition held that “[w]hat is accidental is dependent upon something. ... By its very nature it is dependent upon a substance” (Owens 1986 [1963]), this comparison seems apt from an ontological point of view. The same commentator, however, frames the relationship between substances and accidents in terms of predication rather than ontology: “An accidental predication

Kaiser's assumption that commodities—a kind of concrete—constitute the central concern of the businessman (1911, §§ 39, 299): it would also materially affect the formulation of complex index terms derived from this category scheme (See Section 3.5 of this chapter).

Whereas Kaiser took concretes and processes as the objects of the knowledge represented in textual records, he identified observation and reasoning as the two avenues by means of which this knowledge arose in the first place, stating that “[w]hat we record is what we *observe*, what we *reason out*” (Kaiser 1911, § 52 [emphases his]). The sequence of phrases in the predicate nominative of this statement suggests that Kaiser considered observation to precede that of reasoning, with the latter activity building upon the results of the former. This supposition finds reinforcement in another passage where he sketched out a scenario in which a person intending to write a book about an exhibition—presumably one of the industrial or trade exhibitions that were a routine feature of late 19th-century and early 20th-century commercial life—would go about his research:

Let us imagine that ... we pay a visit of investigation to some exhibition which we desire to describe. We see the various kinds of exhibits, we notice the divergence in their forms, their construction, their functions, their application etc. We find them placed together in groups having more or less pronounced common characteristics, we compare the groups among themselves, we compare the members in each group among themselves, we study each individual—we observe; we try to account for our observations; we reason them out; we try to justify our reasoning, we look for proof, for something tangible which will endorse our reasoning (§ 560).

This depiction of the process of investigation followed a progression from observation of the exhibits in question (“we observe”) through reasoning about what had been observed so as to form inferences about it (“we try to account for our observations; we reason them out”) to the search for further evidence to confirm these inferences (“we try to justify our reasoning, we look for proof, for something tangible which will endorse our reasoning”), a stage which might trigger renewed rounds of observation and/or reasoning. Here, too, observation—which, in this case, comprised the visual perception of objects (“We see the various kinds of exhibits”), the cognitive differentiation thereof (“we notice the divergence in their forms, their construction, their functions, their application ...”), and the making of

says something that is contingently true about the world; ... For Aristotle, only elements in the substance category could be the subject of an accidental predication, i.e., a statement of contingent empirical fact” (Svenonius 1979, 65). There are difficulties with applying a predicative model, at least in the strict sense of the term, to concretes and processes (see Frické 2013, ¶ “Kaiser”), although, as we shall see in Section 3.2.2.2 of the present chapter (esp. pp. 430–433, below), Kaiser did draw analogies between concretes and subjects and between processes and predicates (cf. Dousa 2011, 169).

comparisons between them (“we compare the groups among themselves, we compare the members in each group among themselves”)—was presented as antecedent to reasoning and as delivering the data to which inference was to be applied.²⁹¹

For Kaiser, then, observation was the starting point on the path to knowledge. In holding this view, he subscribed to the general empiricist tenet that “[a]ll our knowledge proceeds originally from experience” (Jevons 1958 [1877], 399), “either directly by perception, or indirectly by way of inference from perception” (Ryland 1900, 169). By and large, the idea that observation was the ultimate source of knowledge and the data derived from it, grist for the mill of reason, enjoyed wide currency in the late 19th and early 20th centuries. It was a staple feature of textbooks dealing with inductive logic and the scientific method (e.g., Jevons 1881, 231; Jones 1909, 5–6, 13; Stock 1903, 159–160, § 159; 160, § 165), as well as popular accounts of these subjects intended for the broader public (e.g., Swineburne 1904, 4–7). It underwrote the educational efforts to cultivate “the observing faculties” of schoolchildren by means of “object teaching”, a pedagogical method in which children were shown physical objects, or pictures thereof, and prompted by the teacher to describe them in some way (e.g., Board of Education 1902, 61–73; Dexter & Garlick 1899, 92–95; Garlick 1907, 49–50; Glashaw 1884–1885; Object Teaching 1883, Rooper 1907), while, in a somewhat different youth-related context, it motivated the prescription of tracking as an exercise in “the art of observation and deduction” for boys involved in the Scouting movement (Baden-Powell 2005 [1908], 63).²⁹² Nor, *mutatis mutandis*, did it fail to

²⁹¹ Kaiser’s schematic description of the relationship between observation and reasoning, wherein the latter followed on the former, represented a simplification of what contemporary writers on inductive logic and scientific method understood to be a much more complex situation. In their view, the act of observation was not a purely sensory act but involved a healthy admixture of sub- or semi-conscious inferential processes as well: as was routinely noted, the step from sensing patches of color correlated with shapes (sensation) to recognizing them as particular (kinds of) things (perception and, *a fortiori*, observation) was largely based on such processes and it was difficult to draw a precise boundary line between sensory perception and the spontaneous inferences attending it (e.g., Ryland 1900, 2–3; Stock 1903, 162–164; Venn 1889, 110–116; Welton 1911, 142–148). Although observation was shot through with inferential activity, these commentators generally agreed that inferences qualifying as reasoning were those made by someone who was fully conscious of making an inference and able to reproduce it in words—a view that reflected the everyday understanding of what reasoning was. On this score, Kaiser’s distinction between observation and reasoning reflected the simplified popular model of the relationship between these two cognitive processes.

²⁹² The Scouting movement was established in 1907 by Robert Baden-Powell (1857–1941), with Scouts being the British equivalents of, and antecedents to, what are known as Boy Scouts in the United States. For Baden-Powell (2005 [1908], 63, 65, cf. 89), observation consisted in the art of carefully noting “little details” in one’s physical surroundings, “such as footprints, broken twigs, trampled grass”, and so on, that might provide clues, or “information”, about events that had taken place there, while deduction was “the art of subsequently reasoning out and extracting the meaning

make inroads into the pragmatically oriented realm of business discourse, where knowledge was sometimes subsumed under such concepts as business experience or business judgment. "Business experience", proclaimed an American commentator on commercial education, was founded on "the observation and the interpretation of business phenomena" (Person 1906, 105), the implication being that interpretation of these phenomena had to follow upon the observation thereof. In a similar vein, the editor of a middle-American journal entitled *The Business Philosopher* set forth an account of the genesis of "business judgment", in which the generation of "true ideas" by means of observation preceded the combination thereof through reasoning:

Correct judgment is nothing more than the right combination of true ideas. ... To get hold of true ideas, you need trained senses, accurate observation intensified by close attention, the habit of noting the slightest differences and putting your finger upon the most essential similarities, and care to take in the surrounding circumstances and background of the ideas under investigation. ... Having settled upon true ideas, the next thing is to combine them logically (Sheldon 1908, 150–151).

From the scientific laboratory and the classroom to the Scout camp and the business office, then, different versions of the empiricist belief that knowledge ultimately derives, directly or indirectly, from observation of objects in the world, pitched at varying degrees of sophistication, came to form part and parcel of the common stock of assumptions held by members of the educated public. Kaiser's general position regarding the empirical roots of knowledge was one that the majority of his readers would have shared.

For Kaiser, as for his contemporaries, observation was a specialized mode of perception. In the psychological and educational discourse of the time, perception was defined as "the form of Cognition whereby we become aware of a world of objects, immediately presented to our senses" (Brackenbury 1907, 24); to perceive was "to distinguish and recognize objects" falling within the range of one's sensory field (Perception, Observation 1889, 258). Perception was understood as a fundamental mental activity coterminous with conscious experience, the performance of which, in the normal course of daily life, was carried on without much conscious effort: as one late Victorian authority on psychology noted, "we are often able to discriminate and recognise an object ... by a momentary glance which suffices to take in a few prominent marks. Such incomplete fugitive perception is ample for rough everyday purposes" (Sully 1892, Vol. 1, 274). Observation, on the other hand, was held to be

from the points observed". This account of observation and deduction, no less than Kaiser's, reflected the everyday understanding of the relation between the two kinds of cognitive acts, with deduction inevitably following upon observation.

a clarified form of perception involving a greater degree of intentional focus upon a given object and a more methodical approach to discerning its features than normal perception. The author of a university textbook on logic characterized it in the following terms:

[o]bservation means systematic and careful perception. It involves voluntary attention, directed on the object. When we thus purposely attend to an object, the object is ordinarily perceived with greater quickness, vividness, definiteness, and completeness than when we merely just notice it. Features which would be overlooked become clear, and are distinguished from other features with which they are at first confounded. A certain abstraction of attention from other objects is involved in this concentration of consciousness on the given object (Ryland 1900, 169).

On this view, observation was a mode of “regulated perception” (Sully 1892, Vol. 1, 275). Some commentators, however, went further and connected it with higher cognitive processes as well: one writer on observation in business characterized it as being “essentially impression plus deduction” and as a mode of “exercising the senses and the mind so as to comprehend logically what is going on around us”, concluding that “[i]n every observation—if we are to make practical use of it—there must be a deduction, a judgment, and a classification” (Holland [ca. 1914], Vol. 2, 585).

Although scientific observation was, in the eyes of many, the paradigm case and the highest form of observation (Sully 1892, Vol. 1, 275), writers also stressed that it could be usefully applied in many other contexts, including the quotidian world of work (e.g., Holland [ca. 1914], Vol. 2, 585; Observation 1901, 787). Writers on education and psychology held that the capacity for observation was a natural one; however, inasmuch as observation demanded deliberate, disciplined, and, indeed, systematic use of the senses, it required cultivation and training, particularly in the impressionable years of childhood and youth, if one was to develop the habits of the skilled observer (Dexter & Garlick 1897, 91–92; Perception, Observation 1889; Observation 1901; Sully 1890, 121–130; 1892, Vol. 1, 276). Kaiser agreed entirely with these views. “Observing is not an automatic act, it requires an effort, it is work” (Kaiser 1911, § 56), he wrote, clearly mirroring the notion that as “an act of voluntarily attentive experience”, observation typically required “some, often ... great, effort” (Peirce & Baldwin 1901, 198). Given that he had worked as a schoolmaster (Chapter 2, Sections 2 & 3, above), it is unsurprising that he endorsed the claim that observation was a learnable skill to be cultivated in the course of a person’s education: “[w]e may improve our capacity for observation by training. ... The training in proper observation and its application should be the object of our education” (Kaiser 1911, § 56).

While Kaiser held that observation was the channel through which minds gained cognitive access to objects in the world, he recognized its limitations and harbored modest expectations about the knowledge that it would yield. “Concretes are only known to us superficially”, he declared, “We perceive their likenesses and differences by comparing them. We are unable to give a complete description of any concrete, no matter how many attempt a description” (Kaiser 1911, § 54), for “our knowledge of concretes is limited to that of their appearance to us individually” (§ 108). Implicit in these statements was a distinction between things as they appear to human observers—i.e., as phenomena—and things as they are in themselves. Although Kaiser did not develop this distinction in any detail, the underlying argument is not difficult to reconstruct. Descriptions of concretes encode knowledge about them that ultimately stems from acts of observation. Because descriptions of concretes obtained from observation account for them only as phenomena, any aspects of concretes that are not, for whatever reason, observed by, or observable to, humans cannot but fall outside of any description. Thus, inasmuch as all human knowledge publicly available in the form of descriptions is directly or indirectly derivative of observation, it accounts, at any given point in time, only for those aspects of concretes that have been observed; no less important, it cannot exceed, at any time, the limits of what could be derived from observation. Human knowledge, then, is knowledge of concretes as phenomena rather than of concretes as they are in the fullness of their being: hence, Kaiser’s characterization of it as limited and superficial. In general terms, his view of knowledge appears to have been akin to what some latter-day commentators have termed “epistemological phenomenalism” (Bunge 2003, 211; 2006, 38): that is to say, whereas he did not deny that things, or concretes, exist in the world independently of the human mind, he held that knowledge of them is restricted only to what could be learned from observation of them *qua* phenomena (Dousa 2008, 244).²⁹³

²⁹³ With regard to this aspect of Kaiser’s epistemology, one philosophically aware commentator has claimed that “Kaiser at times writes in a somewhat Kantian vein” (Svenonius 1978, 135). Although this writer did not elaborate further on her statement, it is clear that she had in mind Immanuel Kant’s (1724–1804) well-known distinction between *phenomena* and *noumena*, which he presented as part of his doctrine of transcendental idealism. In brief, this doctrine argued that phenomena, or things as they manifest themselves within the categorically structured experiential horizon of a cognizing subject, are objects of human knowledge, while noumena, or the things-in-themselves that stand behind the phenomena but are inaccessible to human experience, are unknowable (Eisler 1964 [1930], 93, 95, 142–143). Whereas there is a general typological similarity between Kaiser’s view that concretes can be known only as they appear to individual observers and Kant’s doctrine that only phenomena are objects of perceptual experience and, ultimately, knowledge, it consists in the fact that both are variants of epistemological phenomenalism rather than in any special affinity on

Inasmuch as concretes in themselves were not fully accessible to human ken, it was necessary to develop knowledge of them within the limits set by the human capacity for observation. In Kaiser's (1911, § 55) view, observation of processes was a cardinal means of doing so.

Since we cannot tell what concretes are, we are obliged to give increased attention to their processes, to what they do or what we can do with them. We observe their behaviour under given conditions, we compare results. Electricity for instance is a concrete but is only known to us by its actions, and it is by observing its actions that we arrive at any appreciation at all as to what its probable nature is.

Subordinate to concretes in Kaiser's ontological scheme, processes acquired a new importance in his epistemology. To be sure, he still considered knowledge of concretes to be the ultimate goal of observation. Nevertheless, he stressed that it was observation of concretes in relation to the processes in which they were implicated that was most likely to shed the most light on their properties and so to advance understanding of their nature. To illustrate this, Kaiser invoked the case of electricity. His choice of example was a shrewd one. Although, by the first decade of the 20th century, electrical forces had been harnessed as a source of energy for numerous applications in daily life, ranging from artificial illumination and the transmission of messages over distance *via* telephone and telegraph to the powering of various forms of machinery (Pitman's Commercial Readers [ca. 1907], 107–128), it was widely recognized that, despite the best efforts of physical scientists to develop an adequate theory of electricity, its essential nature remained unknown. Thus, for example,

the part of Kaiser for a Kantian approach to epistemology: there is, at any rate, no collateral evidence to suggest that Kaiser had any direct acquaintance with Kant's critical philosophy. There were, however, other versions of epistemological phenomenalism circulating in the late 19th and early 20th centuries, one of which may well have fallen within Kaiser's horizon of experience—namely, that of Herbert Spencer (1820–1903), an engineer-turned-philosopher, whose positivistically inflected, pan-evolutionist “synthetic philosophy” enjoyed immense popularity among members of the British and American educated public in late-Victorian times (Taylor 2007, 1–8). *Inter alia*, Spencer developed an epistemological theory of what he called “transfigured realism”, according to which human beings had direct knowledge only of the phenomena encountered in sense-perception, while maintaining a vague awareness of the existence of the substrate underlying the phenomena: this existential substrate was causally related to the phenomena, but the phenomena, though correlated to the substrate, did not necessarily represent to the perception of the observer the substrate as it was in itself, which thus belonged to the realm of the “Unknowable” (Smith 1981, 114–121; Taylor 2007, 131–135). Later in life, Kaiser (1926, 28, § 24) evinced some familiarity with the work in which Spencer set out this theory, the *First Principles* (See Chapter 9, Section 4.1, esp. pp. 784–789, below). Although it is unknown whether he had read this at the time that he was developing the theory of SI in the latter half of the first decade of the 20th century, one cannot exclude the possibility that he did so and came by his epistemological phenomenalism from exposure to Spencer's thought. Neither, however, can one exclude the possibility that Kaiser found inspiration in some other source or that he developed his views independently of any specific source: after all, the road from empiricism to phenomenalism is a short one.

a contemporary British school textbook on manufacturing industries observed that “[e]verybody has heard of electricity, and seen many of the ways in which it is turned to use in everyday life, but strange to say, no one to this day can tell exactly what is” (Pitman’s *Commercial Readers* [ca. 1907], 104) and the author of a popular article in the American journal *The Business World* began with the statement that “[t]here have been men for years and years trying to decide what electricity really is, but up to this date no one that I know of knows anything as to the correct definition of electricity, or what it is” (Brown 1907, 650), while the American engineer-authors of an elementary textbook on electricity began it by telling their readers that “[t]he exact nature of the electricity which makes itself evident in so many ways has never been determined” (Jackson & Jackson 1910, 1) and an American physicist commenting on “the science problems of the Twentieth Century” in *The Popular Science Monthly* wrote that “the nature of electricity remains to be discovered and stated in terms common to other phenomena” (Dolbear 1905, 250). Yet, if electricity as such was regarded as something mysterious, its effects were well known. The authors of the aforementioned American textbook went on to observe that “by experimental evidence (which has been gathered for decades), we have been able to determine some of the laws which govern the action of electricity” (Jackson & Jackson 1910, 1), while contemporary dictionaries defined electricity as “the cause of an important class of phenomena of attraction and repulsion, chemical decomposition, etc., or, collectively, the phenomena themselves” (Whitney 1906, Vol. 3, 1868, 1 s.v. “electricity”) laying emphasis on what it did rather than what it was. Viewed against this background, the case of electricity provided apt support for Kaiser’s thesis that observation of the processes in which a concrete was involved could contribute to knowledge of the concrete in question, even if it did not yield full insight into its nature. Needless to say, the example was not entirely unproblematic, for electricity was, in many ways, an atypical concrete: it did not “occupy a space”, “have a form”, or “represent[] something definite to handle” (Kaiser 1911, § 108) in the same sense as such prototypical concretes such as, say, a bundle of wool, an automobile, or, for that matter, a book. Kaiser, however, was willing to overlook such niceties in order to make the point that there were good epistemological grounds for attending to processes.

Although Kaiser maintained that human knowledge, individual and collective, was inherently limited, he also held that it was extensible, for descriptions of concretes could be rendered better and more complete over time. To his mind, this extensibility became manifest with “every new discovery, which forces us to modify sometimes some of our

fundamental conceptions of concretes, which in turn leads to modifications in our methods of observing and describing them” (Kaiser 1911, § 54). As his characterization of the effects of new discoveries indicates, Kaiser did not think that the growth of knowledge was merely cumulative: it was not confined simply to the piling up of new observations (and inferences therefrom) that might add details to current descriptions of concretes. It also occasionally involved the reconceptualization—or, if one will, redescription—of what they were and the concomitant development of new techniques of observation and description for the purpose of yet further study of them. The accumulation of data, or facts, about concretes, the refashioning of conceptual frameworks for understanding them, and the elaboration of observational methods, then, all contributed to the increase of knowledge. Like many of his contemporaries, Kaiser held that he was living in an age marked by “the continued advance of knowledge on almost every subject; the result either of discoveries or of more advanced methods of investigation” (§ 80, Point 3). Yet, the perception that knowledge was constantly advancing also awakened in him a keen awareness of its provisional nature. Thus, he cautioned his readers, “[w]hatever we assert [sci., about a given concrete—TMD] is *always* subject to the proviso: *at the present stage of our knowledge*” (§ 54 [emphases his])—that is to say, the knowledge generated by observation and reasoning and represented in documentary sources was incomplete, ever open to revision and, if need be, emendation, in light of further experience yielding new data and better interpretations thereof. In this sense, at least, Kaiser’s view of knowledge can be characterized as fallibilist in outlook (Dousa 2008, 245).

Another epistemological matter that loomed large in Kaiser’s thought was the perspectival nature of both observation and reasoning. To his mind, the act of observation was ineluctably conditioned by the individuality of the observer. As he emphatically stated,

[o]bservation is individual. Each individual represents an organisation, a system peculiarly his own, and his work is systematic to the extent of his capacity. The individuality of an observer will be expressed in each of his observations and their applications ..., he must be consistent with himself (Kaiser 1911, § 57).

Although Kaiser did not specify the ways in which an observer’s individuality might leave its imprint upon his or her observations, there can be little doubt that he had in mind such commonly acknowledged conditioning factors as the interests of the observer, his purposes for observing a given phenomenon, his background knowledge regarding the observed phenomenon, and the degree of skill in observing that he had already developed through past experience (e.g., Lang 1906, 93–97; Welton 1899, 141–142; 1917, 135–137). Similar

considerations held for the inferences drawn from the facts, or data, generated by observations. Thus, in discussing the utility of periodical articles as sources of information for the merchant and manufacturer, Kaiser opined that

[a] supply of facts—so far as articles give them—on which to generalise will always be welcome and useful, for while the facts may for the time being be regarded as indisputable, generalisations based on them will always show individual tendencies. Our systems like our individualities differ, new facts will be absorbed or fitted in differently with each individual system, hence generalisations will differ accordingly (Kaiser 1911, § 79).

This, too, was an accepted commonplace of the methodological literature of the time: “[e]ven the most intelligent persons differ in their inferences from concrete facts”, observed the author of an introductory textbook for university students on logic (Ryland 1900, 179).

Kaiser’s indexing of observation and reasoning to the individual observer and thinker constituted a form of what one recent commentator has termed “epistemological individualism” (Lukes 2006, 92–93)—the view that “the source of knowledge lies within the individual” who perceives, conceptualizes, and makes inferences about things in the world. His version of epistemological individualism foregrounded the idea every individual person comes to know about concretes and their attendant processes in light of a particular perspective. In this, he would have surely agreed with the statement set forth by the author of a contemporary textbook on “the logical basis of education” that “each one of us sees the world from a standpoint somewhat different from that of all others, and sees it through a different medium of personal knowledge” (Welton 1911, 25). To be sure, such a view did not deny that different persons, each operating within his own individual perspective, might well converge in their understanding of any number of phenomena: after all, as the same writer went on to note, “there is common knowledge, for all knowledge is of the same reality, and though there are many minds yet there is one kind of intelligence” (p. 25). Nevertheless, Kaiser expected that individuals confronted with the same body of facts regarding a given phenomenon were likely to reach different, perhaps even contradictory, conclusions about it. Taking it as axiomatic that “you cannot standardise the human intellect”, he held that “[d]ivergence of views is ... universal and necessarily so” (Kaiser 1911, § 57).

For his part, Kaiser (1911, § 57) welcomed the existence of a diversity of perspectives on the grounds that it “is of immense value to us, difference of opinion is in fact the parent of improvement and progress. Divergence causes us to compare notes as it were, it helps to

broaden our views". Along the same lines, he invoked the fallibilist notion that knowledge at any given time is incomplete and subject to revision as an argument for "the necessity of taking note of any serious assertion" regarding a phenomenon of interest "even if contrary to our own ideas" (§ 54): only by collation, and consultation, of as many reasonable views about the phenomenon in question as possible could one come to a just estimate of what was known about it and put oneself in a position to develop an informed opinion regarding it. A similar idea also motivated one of Kaiser's arguments for collecting and using literature in a business setting in the first place. In comparing the relative merits of literature and samples as sources of information about commodities (cf. Chapter 6, Section 2.4, above), he noted that an advantage of the former over the latter lay in the fact that "it gives a multitude of opinions on any one commodity or process" (Kaiser 1911, § 40, Point 4), thus exposing the businessman to a broader spectrum of insights about the object(s) of his interest than he could obtain through his personal observation alone.

For Kaiser, then, acquiring knowledge about a given concrete or process involved not only personal observation thereof (this was fundamental but, in many cases, impractical or impossible, because of obvious constraints of space and distance), but also the enlargement of one's own understanding of the object of interest by consulting accounts of it written by other persons, based either upon their own observation and reasoning or upon their interpretations of statements made about it by yet others, passing along a chain ultimately anchored in acts of observation. In other words, one enriched one's own perspective by taking into consideration the reported perspectives of others. In this way, his strong sense of epistemological individualism was tempered somewhat by the recognition that an individual might draw upon reports of others' experiences as well as his own. Even though Kaiser clearly accorded primacy to the individual as both source and user of knowledge, he tacitly acknowledged a social dimension to the generation and acquisition of knowledge, one which, within the setting of the intelligence department and business library, took tangible form in the documents serving as vehicles for the communication of information pertaining to the world of business.

We have already seen that Kaiser considered literature, or textual records, to "represent knowledge" and to "give information" (See Section 2 of the present chapter). Although he did not explicitly discuss the relation between knowledge and information, the schema by which both were related to literature suggests that, to his mind, the difference between the two concepts was vanishingly small, at least within the documentary context of the

intelligence department. Whereas knowledge was the cognitively derived semantic content of what was recorded in textual form by a person, information was this content as “conveyed by written language” (Kaiser 1911, § 297) to those reading it. In this sense, to cite a standard dictionary definition of the time, information was “knowledge communicated or received” (Whitney & Smith 1911, Vol. 5, 3088, 2 s.v. “information”):²⁹⁴ it is hardly surprising, then, that, on occasion, Kaiser (1911, §§ 23–24, 297) used the words “knowledge” and “information” interchangeably, even though, as we shall see, he employed the term “information” in more material senses as well. Additional insight into his epistemological assumptions can thus be gained by considering his views on the character of the information conveyed by literature.

Kaiser (1911, §§ 1, 48, 115) held that, within the realm of business literature, the informational content of textual documents was primarily composed of two kinds of ingredients: facts and opinions. This was not a novel distinction within the discourse of indexing, for, in a “manual of practical indexing” published a few years before *Systematic Indexing*, the British librarian Archibald L. Clarke (fl. 1898–1920) had stated that book indexing required the indexer to identify both “facts” and “expressions of opinion by an author” within a text; moreover, with respect to indexing works of history, he had differentiated between “statements of fact” and “statements of opinion”, both of which, in his estimation, should be thoroughly accounted for in an index (Clarke 1905, 49, 118, 133–134).²⁹⁵ Whether Clarke’s differentiation between fact and opinion influenced Kaiser is

²⁹⁴ This definition, taken from the *Century Dictionary*, was amplified in the first edition of the *Oxford English Dictionary* (then known as *A New English Dictionary on Historical Principles*) which defined information, *inter alia*, as “[k]nowledge communicated concerning some particular fact, subject, or event; that of which one is apprised” (Murray et al. 1888–1928, Vol. 5/2, 274, I.3 s.v. “Information”). The notion of information as communicated knowledge continues to underlie the conception of information to this day, as the following passage from a modern commentator makes clear: “One way of distinguishing between them [sci., knowledge and information—TMD] is to understand that knowledge only exists in people’s minds. When it is conveyed from one individual to another, in speech, writing or by some other means, it becomes *transmitted or recorded knowledge, which can be equated to information*” (Black 2007a, 107, n. 3 [emphases mine]).

²⁹⁵ The distinction between “statements of fact” and “statements of opinion” or simply “fact” and “opinion” had deeper roots in discussions of evidence in the historical, political, and legal realms. For example, in a famous and influential essay “on the influence of authority in matters of opinion”, the British lawyer, statesman, and man of letters, George Cornewall Lewis (1806–1863) contrasted “matters of fact” and “matters of opinion” (Lewis 1849, 1–4), a contrast that would become standard in later legal discussions of evidence (e.g., *The Law of Evidence* 1899, 69). Clarke, who was librarian at the Royal Medical and Chirurgical Society (later, the Royal Society of Medicine) in the first two decades of the 20th century and whose writings reveal him to have been a man with intellectual interests, may well have drawn on this broader discussion in formulating this distinction (cf. Munford 1987, 14).

unknown. While other writers on card indexing read and cited Clarke's manual (e.g., Mares 1909, 15–17), Kaiser did not mention it nor is there independent evidence that he read it: he may well have picked up the distinction closer to home (cf. pp. 316–317, below). At any rate, neither Kaiser nor Clarke defined what they meant by “fact” and “opinion”, for these words were common enough in everyday discourse that, in their estimation, they did not require explication. Yet consideration of the contemporary meaning of these commonplace, but by no means unproblematic, words is necessary if we are to understand how Kaiser conceived of information.

We begin with the first member of the pair: facts. Etymologically derived from the passive perfect participle of the Latin verb *facere* “to do”—*factum*—, the word “fact” had the primitive meaning of “[a]nything done” (Whitney 1906, Vol. 3, 2112, 1 s.v. “fact”; cf. Jevons 1881, 275): in the words of one introductory logic textbook, “[w]hat has actually been done is a fact” (Ryland 1900, 178). Thence, it came to signify “any phenomenon or group of phenomena actually observed in time or space—an event or a thing—thought of more or less as individual and distinct” (p. 178). On the assumption that, as a matter of course, “[w]hat is observed is real” (p. 178), “fact” also carried the meaning of “[s]omething that has really occurred or is actually the case” (Murray et al., 1888–1928, Vol. 4, 12, 4 s.v. “Fact”) or “a real state of things” (Whitney 1906, Vol. 3, 2112, 2 s.v. “fact”) with respect to which a belief could be held or a statement made. Inasmuch as beliefs or statements about things in the world were held to be true if they agreed with the “real state of things” and false if they did not, the term “fact” also took on the meaning of “that in the real world agreement or disagreement with which makes a proposition true or false” (Whitney 1906, Vol. 3, 2112, 2 s.v. “fact”), the presumption being that a true belief or statement was one “[c]onsistent with fact” (Murray et al., 1888–1928, Vol. 10/1, 417, 3 s.v. “True”).

Defined in the preceding manner, facts themselves obviously could not form part of the informational contents of a textual document, but statements about them could: indeed, the word “fact” was routinely used in an elliptical manner for what Clarke (1905, 118) had more precisely termed a “statement of fact”, a linguistic elision acknowledged by one contemporary dictionary, which defined the word as “an assertion or statement of a thing done or existing” (The Encyclopaedic Dictionary 1903, Vol. 3, 474, I.3 s.v. “fact”). Taken in this discursive sense, a fact was generally taken to be a true statement about the phenomenon to which it referred (e.g., Whitney 1906, Vol. 3, 2113, 2 s.v. “fact”). However, the meaning of “fact” was sometimes understood in a weaker sense as referring to

“something asserted to have happened or existed, whether true or false” (The Encyclopaedic Dictionary, Vol. 3, 474, I.3 s.v. “fact”): on this view, it was possible to speak of “false facts”.²⁹⁶ Generally speaking, Kaiser seems to have adhered to the view that, *ceteris paribus*, facts are to be taken as true. Nevertheless, his formulation of the *obiter dictum* that the facts reported in business journal articles “may for the time being be regarded as indisputable” (Kaiser 1911, § 79) hinted at the possibility that there might be circumstances in which a statement of fact might be open to dispute and require verification. Indeed, he set great store by the provenance of reported facts and, appropriately, harbored a preference for “authoritative” sources (§§ 94–95): to an epistemological individualist sensitive to the potential for individual idiosyncrasies in the gathering of facts, not only what was said but who was saying it mattered. These considerations would leave their imprint on Kaiser’s protocols for indexing (see Chapter 7, Section 4.3, below).

The foregoing definitions, recorded in formal sources such as dictionaries and manuals on logical and scientific method, informed the contemporary discourse about business information with which Kaiser was familiar: two examples may serve to illustrate this and to clarify what, in practice, counted as facts with regards to business literature. The first comes from an article on the activities of the PCM written by its founder and director, William P. Wilson (on whom, see Chapter 3, Section 2, above), and published in an American journal of commentary and criticism, *The Forum*. While discussing the dissemination of information about new commercial developments abroad by the museum’s Bureau of Information, Wilson (1899a, 117) set forth the following scenario: “if it should be learned that there was a special demand for harvesting machinery in Argentine [*sic*] or Australia, that fact is made known at once to manufacturers of agricultural machinery”. Here, a given state of affairs—that there had arisen a particularly great demand for harvesting machinery in such-and-such a country—about which reports had been received, either from one of the PCM’s many on-site correspondents or from a current business publication, the contents of which derived, directly or indirectly, from observation of market conditions in the country in question (See Chapter 3, Section 2, above), constituted a fact concerning which the Bureau sought to apprise those American businessmen trafficking in agricultural machinery: needless to say, the statements of the Bureau’s sources regarding the state of the market in harvesting machinery in that country were presumed to be true. A more

²⁹⁶ The *New English Dictionary on Historical Principles* rendered this meaning as “something that is alleged to be, or conceivably might be, a ‘fact’”, characterizing it as a “loose” usage of the word (Murray et al., 1888–1928, Vol. 4, 12, 5 s.v. “Fact”),

extensive series of examples was given by the E. A. Cope, the British author of a manual on filing systems, in a passage expatiating on the utility of subject indexing one's business correspondence, especially in a global marketplace:

A correspondent in Sierra Leone, in Shanghai, or in San Francisco, may in the course of a business letter ... mention some fact that the recipient of the letter will promptly recognise as worth knowing and possibly acting upon. The writer may quite incidentally make a number of statements which throw a flood of light upon the peculiar features of the market with which he is intimately acquainted. He may say something illuminating as to the quality, size, shape, colour, decoration or accessories which will render a particular article easy of sale in the local market. He may intimate the price or prices which local purchasers are prepared to pay, or the discounts which rival manufacturers are allowing locally; he may describe the effect of the climate upon the goods or upon the cases or wrappings in which they are enclosed. ... Or a correspondent in Germany may give particulars of a new invention enabling certain articles to be produced more cheaply, or he may mention some social or commercial fact that is likely to cause an increased demand for certain classes of British goods. Another correspondent elsewhere—perhaps in South America—may refer to the opening of a new railway or a new canal making accessible towns and districts and settlements which were not accessible before; or he may call attention to new sources whence raw material may be advantageously obtained (Cope [1913], 109–110).

Statements about the kinds of goods on sale in a given market and their attributes, the prices at which a given type of commodity was being sold in a certain country, the effects of climactic conditions upon goods or their packaging in a given locale, the appearance of a novel invention; or the instauration of a new transportation route in a region of interest—insofar as these statements were statements about an observed state of affairs, were consistent with the state of affairs to which they referred, and were based on the correspondent's own "actual observation" or on "authentic testimony" provided to him by trustworthy sources who could refer, directly or indirectly, back to an original set of observations, they comprised statements of fact (Murray et al., 1888–1928, Vol. 4, 12, 4 s.v. "Fact"). Such statements appear to have been what Kaiser had in mind when he spoke of facts.

Opinions formed the second primary component of the informational content of business literature. Here, too, it is helpful to consider the meaning of the word "opinion" in contemporary parlance if we are to appreciate what Kaiser meant by it. In its widest acceptation, opinion referred to "[w]hat one thinks about a particular thing, subject, or point" or "one's view of a matter" and so was virtually synonymous with belief (Murray et al., 1888–1928, Vol. 7, 151, 2 s.v. "Opinion"; cf. Vol. 1, 782, 3 s.v. "Belief"; Whitney 1906, Vol.

5, 4127, 1 s.v. “opinion”). Kaiser’s usage tended, in the main, to conform to this broad, rather anodyne sense of the word. For instance, when discussing the advantages of physical samples of commodities over literature, he stated that, inasmuch as samples “represent[] commodities in concrete form, they afford each individual a chance to form his own opinion about them and their conditions by means of experiments or without”, while, concomitantly, a disadvantage of literature *vis-à-vis* samples lay in the fact that “at best the inquirer has to accept the opinions of others, to which he may rightly think his own preferable, but which will depend on the possession of the samples” (Kaiser 1911, §§ 39, 1 s.v. “Advantage”; 40, 1 s.v. “Disadvantage”): in these contexts, “to form an opinion” about a commodity by examining a sample or “to accept the opinions of others” about it as recorded in literature seems to have meant little more than to acquire beliefs about the commodity in question by direct personal experience or by reading about it.

Additional semantic nuances emerge when one contrasts the notion of opinion to that of fact. In the broadly empiricist worldview within which Kaiser operated, there existed a substantial gulf between the two. As we have seen, facts were phenomena observed in space and time, while opinions were beliefs held about these phenomena. Facts were deemed to be known through “actual observation” of a given phenomenon (or, where this was impossible or impracticable, through its substitute, “authentic testimony” from reliable witnesses, which, ultimately, was grounded in an original act, or in original acts, of observation) (Murray et al. 1888–1928, Vol. 4, 12, 4 s.v. “Fact”; cf. Stock 1903, 153), whereas opinions were taken to be the products of “inference” or “a process of reasoning” (Robertson 1894, 650, 649; cf. Lewis 1849, 3): tellingly, one contemporary way of defining opinion was as “a judgement formed or a conclusion reached” (Murray et al. 1888–1928, Vol. 7, 151, 2 s.v. “Opinion”; Whitney 1906, Vol. 5, 4127, 1 s.v. “opinion”).²⁹⁷ Inasmuch as

²⁹⁷ Although the contrast between fact as deriving, directly or indirectly, from sense perception and opinion as deriving from inference or judgment was often popularly presented in stark, black-and-white terms, informed commentators were well aware that the situation was considerably more complex, as the following remarks from a contemporary American textbook on rhetoric clearly show: “If the evidence of our senses were confined to mere matters of fact, it would be more trustworthy than it is; but in almost all that we see, or rather say that we see, facts are mingled with inferences from facts. We speak of seeing an orange, for example; but what we do see is an object of a certain shape and color which experience justifies us in calling an orange. In this case, fact and inference seem to be merged in one. That they are not one is proved by common experience: we often imagine that we see what we do not see. ... In such cases, the mistake is not in fact but in inference from fact: what seemed a matter of fact turns out to be a matter of opinion. The difference between so-called matters of fact and so-called matters of opinion is, then, a difference between matters in which the element of observed fact preponderates and those in which the element of inference from observed fact preponderates” (Hill 1895, 334). Needless to say, this argument was essentially the same as that

facts were the objects of direct perception, they were generally invested with an aura of indubitability: according to the author of an influential introductory textbook on logic, “[s]ometimes it [sci., the word “fact”—TMD] means what is certain and known by the evidence of the senses” (Jevons 1881, 275), while a contemporary dictionary not only defined the word “fact” as “[s]omething that has really occurred or is actually the case” but added, for good measure, that it was “something certainly known to be of this character” (Murray et al., 1888–1928, Vol. 4, 12, 4 s.v. “Fact”).²⁹⁸ Opinions, on the other hand, were intrinsically hedged with incertitude. According to a standard definition, an opinion was a “belief of something as probable, or as seeming to one’s own mind to be true, though not certain or established” (Murray et al., 1888–1928, Vol. 7, 151, 1 s.v. “Opinion”): it represented “a judgment formed on evidence that does not produce knowledge or certainty” (Whitney 1906, Vol. 5, 4127, 1 s.v. “opinion”). A fact, then, was something about which, *ceteris paribus*, all normal observers would agree (cf. Ryland 1900, 179), whereas a matter of opinion was something over which reasonable persons might disagree (cf. Lewis 1849, 3; Murray et al., 1888–1928, Vol. 7, 151, 1 s.v. “Opinion”). On this view, opinions manifested a lesser degree of objectivity than did facts.

The general distinction between facts and opinions adumbrated above came into play in contexts well known to Kaiser. One of these was the Tariff Commission, which he was serving as librarian as he formulated his theory of SI. According to the Commission’s secretary and administrative leader, W. A. S. Hewins, the investigations that it was carrying out as a prelude to the formulation of a scientific tariff were predicated on a strict separation of facts from opinions: in his words,

The view that the Commission has consistently taken from its very first meeting is this – that we do not want people’s opinions on this [sci., fiscal questions—TMD]. You want business facts upon which opinions may afterwards be formed if you like, but you do not want opinions. We do not want somebody to say in my opinion you should do this, that and the other; what we do want are facts relating to each

presented in textbooks of logic and scientific method about the intergrading of observation and inference (See p. 302, n. 291, above).

²⁹⁸ Again, the attribution of certainty to facts tended to occur at the level of popular discourse and represented what can only be characterized as an oversimplified view of the matter. Writers on logic and scientific method were well aware that “‘fallacies’ of perception”, “mal-observation”, and “non-observation” could undermine the apparent stability of observed facts (e.g., Jones 1909, 16–23) while assertions of fact derived through the testimony of witnesses might well engender doubt (Jones 1909, 28–29; Lewis 1849, 2–3), thus blurring the lines between fact and opinion.

particular business which when combined with other information will enable us to form an opinion.²⁹⁹

As Hewins described it, an ideal investigation of economic conditions pertaining to tariff policy would begin with the collection of facts alone, which were to serve as the raw material, so to speak, from which opinions were to be formed, presumably by processes of inductive inference—a standard model of investigative method directly comparable to the one articulated by Kaiser (1911, §§ 74, 79), according to whom the collation of specific facts served as the ground for the generalizations on the basis of which a businessman developed the views guiding his activity. In any event, as we saw in Chapter 5, Section 2, the Commission’s research work turned out, in practice, not to conform to Hewins’s ideal, for its Forms of Enquiry mixed questions asking for statements of fact with those soliciting expression of opinion. Fact and opinion were not always so easy to separate, especially for an organization aligned with definite political interests.

By the same token, business literature commingled expressions of opinion with statements of fact. E. A. Cope ([1913], 109–110), whose characterization of facts in business correspondence was quoted earlier, observed that the writer of a letter “may make a number of statements which throw a flood of light upon the peculiar features of the market with which he is intimately acquainted”, such as descriptions of products sold, prices, types of packaging used, and so on: to this he added that the correspondent “may offer valuable suggestions based upon his local knowledge and experience”. Such suggestions, which might include evaluations of a given state of commercial affairs, advice on what course of action to take regarding an emergent business opportunity, or speculations about future developments in the market in question, went beyond the statement of fact: they belonged to the realm of opinion, for they expressed the writer’s judgment or conclusions he had reached on the basis of his knowledge of the facts on the ground, so to speak. As for business periodicals, editorials, letters to the editor, reports of business outlook, and similar kinds of articles all provided venues for the expression of opinions upon any number of industrial or commercial matters of interest. Kaiser had good reason to view opinions as an element of the informational content of business literature in the large.

Taken together, facts and opinions—or, more precisely, statements of fact and expressions of opinion—comprised, in Kaiser’s view, the information carried by business

²⁹⁹ TCP 8/2/9 B88, “The Tariff Commission. Its Methods of Inquiry. Explained by Mr. W. A. S. Hewins.” Typescript of unpublished lecture presented to the Middlesbrough Chamber of Commerce, March 22, 1904, p. 11. Cf. p. 156–157, with n. 171, above.

literature. Both found a place within the systematic card index and both were to be used in the preparation of summaries from index items (Kaiser 1911, §§ 36, 48, 660). Yet Kaiser was careful to maintain a distinction between the two, advising his readers that, when a summary report was being compiled, “[f]acts must be separated from opinions, both must be presented in a simple and concise manner, so that the inquirer may if necessary draw his own conclusions” (§ 661). In light of the preceding discussion, his insistence on differentiating between facts and opinions can best be explained as a direct consequence of the different epistemological statuses that he attributed to these two elements of information. According to the popular empiricism that he espoused, knowledge of facts ultimately derived from direct observation of phenomena in the world: it was, at least within the limits of the quality of the observation and the perspective of the observer, objective and, insofar as it was objective, was taken to convey truths about the phenomena observed. Opinions, on the other hand, were beliefs about phenomena based on inferences, or reasoning, from facts: unlike the latter, they were not considered to constitute bedrock truths but rather perspectival views that were more or less likely to be true, depending upon the quality of the inferences upon which they were founded and the kinds of evidence upon which they were based. To distinguish facts from opinions, then, was both to differentiate between the raw material for reasoning—i.e., facts—and the results of reasoning—i.e., opinions—and to segregate that which could be considered as objectively true—i.e., facts—from that which could be considered as probably, but not certainly or necessarily, true—i.e., opinions: such a separation, in Kaiser’s view, would aid the user of a summary report to better interpret the nature of the evidence presented to him and so “draw his own conclusions” regarding it.

Consideration of the different epistemological statuses that Kaiser accorded to facts and opinions affords us the opportunity to characterize his concept of information in broader terms. Some latter-day perspectives provide useful interpretative frames for doing so. One LIS researcher has suggested that, as a rule, textual documents contain statements that say something about a given thing or statements that say something true about a given thing: the former he identifies as embodying “information in a weak sense” and the latter, as “information in a strong sense”, the difference being that information in a strong sense is always veridical, whereas information in the weak sense may, or may not, be so (Wilson 1977, 10–11). In a similar vein, albeit without any restriction to textual information, another scholar, working within the newly emergent field of philosophy of information, has

distinguished between a “general definition of information” and a “special definition of information” (Floridi 2004, 42 & 46). The general definition stipulates that information consists of well-formed, meaningful data, whereas the special definition requires that the data must not only be well-formed and meaningful but also true: in the former case, information is understood simply as “semantic content”, whereas, in the latter case, it is recognized as robustly “factual information” (pp. 42, 45). Considered in light of these distinctions, Kaiser’s concept of information corresponded, in the main, to information in the weak sense and the general definition of information. To be sure, facts were, by definition, truth-conferring, and, thus, statements of fact, if accepted as accurate, were presumed to be true. Statements of opinion might also lay claim to truth, even if this was only more or less probable and open to dispute. However, there were certain kinds of opinions—such as views on how a certain kind of good exported to such-and-such location should be packaged, whether a given adjustment in tariff schedules would lead to certain kinds of consequences, or whether it would be advantageous to introduce a such-and-such a commodity into a given regional market—that were neither true nor false: they could be held to be more or less sound or appropriate in a given circumstance but were not evaluable in terms of truth or falsity. For Kaiser, then, information encompassed both statements saying something true about some thing and statements simply saying something about some thing: truth was not a decisive criterion for attributing to a statement the status of being information. In this, his view of information anticipated, at least to a limited extent, the general tendency within present-day LIS to define information as semantic content writ large rather than circumscribing it to strictly factual information (Floridi 2004, 42; Furner 2010, 178; Svenonius 2000a, 7).

Kaiser’s (1911) conception of information as information in a weak sense was consistent with his fallibilist understanding of knowledge and its imperative that one “tak[e] note of any serious assertion” about a subject of interest that came to one’s attention (§54). Yet, it also reflected a more pragmatic approach of information, one that set great store on its usefulness as a resource in making decisions about the conduct of business affairs and defined it accordingly (§§, 5, 24, 36, 621, 662; see Chapter 6, Section 2.1, above). From this perspective, knowledge of facts was obviously a *sine qua non* for intelligent decision-making, for they embodied truths about the world and so formed the basic building blocks on which any process of reasoning leading to a course of action. This was an assumption

commonly held by businessmen of Kaiser's day, powerfully articulated in a protreptic editorial published in the business magazine *System*:

KNOW THE FACTS. You can't give information—sell an article—carry out a plan—unless you *know*. To get results—know the facts. Wrap your mind about the thing you have to do: study it—analyse it—finger it over with the tentacles of your brain. Concentrate on it so long that all its parts and relations and details stand out before you. KNOW THE FACTS (Know the Facts 1909 [emphases theirs]).

Opinions, however, also had their uses as indicators of what others in the business arena thought about a given subject of interest on the basis of their own interpretations of facts relating to it: inasmuch as they formed part of the “actual status quo” (Kaiser 1911, § 36) of thinking on the subject and reflected a variety of different perspectives on it, knowledge of them enriched one's own views regarding it and had a rôle to play in decision-making. The importance of seeking the opinions of one's fellows, too, was an element of conventional wisdom in the business community, to which another editorial in *System* gave expression in an exhortation to its readers:

Ask this man's advice—that man's experience. Take it—analyse it—balance it with yours. ... Gather opinions and information ... to provide knowledge from which to sift your decision out for yourself. Be broad and liberal and open-minded towards others' ideas and methods. Look at your problems from the other man's viewpoint. But settle it from your own” (Decide it yourself 1911).

Opinions had informational value and, accordingly, Kaiser did not hesitate to include them within his concept of information, although he gave primacy to facts and assumed that readers of business literature would do likewise (Kaiser 1911, § 76). The epistemological distinction between facts and opinions was mitigated by their common utility in providing a basis from which “to draw deductions” and “arrive at new conclusions in furtherance of [one's] business” (§ 297).

Whether taking the form of statements of fact or expressions of opinion, information, in Kaiser's view, exhibited two constant features. The first of these was time-boundedness. The relentless pace of industrial activity and the mutability of commercial conditions in local and global markets alike assured that, at any point in time Y, a given statement of fact valid at an earlier time X—say the statement that the price of a certain commodity in a given market is such-and-such—might no longer hold true. Similarly, an opinion recorded with reference to market conditions obtaining at a time X might be less sound or appropriate with respect to those at a subsequent time Y. As Kaiser (1911, § 661) observed, “what is true to-day may be untrue to-morrow. Nothing is so constant as change”. As with

knowledge, information was subject to revision and updating in light of new developments and, accordingly, there was a need to correlate specific items of information to the times for which they held, especially if, within the framework of the intelligence department, one was to follow Kaiser's counsel "to use the latest information available" (§ 661) for the preparation of summary reports. We shall consider the provisions that Kaiser built into SI to facilitate this later in the chapter (See Sections 4.3 & 4.4 of the present chapter).

Second, and more crucially for the constitution of SI, Kaiser (1911, § 298) posited that "from the standpoint of knowledge literature is confined to the description of concretes and of the conditions attaching to them". On this view, any given piece of information, whether communicating a fact or an opinion, could not but pertain to at least one concrete and one process in which that concrete was implicated. The basic ontological categories under which all objects of knowledge fell, concretes and processes, thus constituted the basic conceptual elements—what Kaiser called "fixed points" (§ 663, s.v. "Fixed Point")—for undertaking information analysis. Yet, insofar as these conceptual elements were expressed within textual documents by means of language, their interpretation—and information analysis as a whole—was also hedged by linguistic considerations, to a discussion of which we now turn.

7.2.2. The Linguistic Assumptions Underlying Systematic Indexing

For Kaiser (1911, § 56), observation and reasoning were acts involving the use of one's "mental faculties". The results of these acts he designated variously as "conceptions" (§§ 54, 60, 62), "ideas" (§§ 60, 65, 318 664, s.v. "Fixed Point"), and "thoughts" (§ 64), while the particular configuration of thoughts present in a person's mind at a given point in time constituted a "picture" or, more fully, a "mental picture" (§§ 63, 64, 65, 70, 664, s.v. "Overlapping and underlapping"). There is no indication that, in employing these different terms, Kaiser intended to capture fine distinctions among the results of cognition: rather, he seems to have used them more or less interchangeably to refer to "any product of mental apprehension or activity, existing in the mind" (Murray et al., 1888-1928, Vol. 5/2, 16, 9 s.v. "Idea").³⁰⁰ Inasmuch as they originated through acts of cognition, the ideas and thoughts

³⁰⁰ In the parlance of contemporary psychology, the term "mental picture" typically denoted a mental image of a particular object perceived in the past, preserved in memory and represented to the mind through the process of imagination; "conception" was a synonym for "concept", which designated a general notion—i.e., one typifying a class of objects—produced through the processes of comparison, abstraction, and generalization; "idea" could be used to refer to mental images or concepts (in the latter sense, as "general ideas"); while a "thought" designated the product of one of

generated by a given individual were mind-internal and, as such, not directly accessible to the minds of others. Furthermore, an individual's ability to employ these fruits of past cognitive experience depended upon his capacity to retain them in memory and recall them at the appropriate time: the mental processes of recollection, though, were hardly infallible in this regard. In Kaiser's estimation, both of these considerations provided motivation for the use of written language as a medium for the expression of thought.

Kaiser's understanding of the functions of written language is perhaps best viewed against the backdrop of contemporary opinion on the subject, which was expressed most incisively in the discourse of logic manuals. According to some commentators, written language served as "a means of recording thought" in a permanent form (e.g., Ryland 1900, 244; Venn 1889, 142; Welton 1896, Vol. 1, 5). For his part, Kaiser placed a high value on this function. While acknowledging that "a well trained memory is always a great asset", he nevertheless insisted that

in these days of multifarious activity and ever increasing accumulations it will not do to trust to memory solely, we must needs keep some record by means of which we may aid or refresh our memory when there is occasion for it (Kaiser 1911, § 1).

Records—more specifically, descriptive records, under which he included the entire spectrum of literature ranging from notes and to books and periodicals (§§ 52, 42)—embodied linguistic representations of thought fixed in writing and so preserved for future use: in this respect, they served as pieces of externalized memory. Another rôle of language, which some authors identified as its "primary" function (Venn 1889, 142, 146, 149) and others as its "most obvious" one (Welton 1896, Vol. 1, 5), was the communication of thought or ideas between persons.³⁰¹ In this regard, a particular virtue of "written or printed

the higher stages of intellection, be it conception, judgment, or reasoning. See, e.g., Brackenbury 1907, 37, 43; Stout & Baldwin 1901; Sully 1892, Vol. 1, 277, n. 1 & 388–389; 1894, 132–133, 200–201. By and large, these meanings were retained in everyday discourse as well (cf., e.g., Murray & et al. 1888–1928, Vol. 2, 760, 3 s.v. "Concept" & 761, 7 s.v. "Conception"; Vol. 5/2, 15, III & 8b s.v. "Idea"; Vol. 9/2, 340, 1.c s.v. "Thought"). However, these words were also often used in broader and vaguer senses as well: for example, the distinction between mental images as copies of particular percepts and concept(ion)s as general notions was effaced, with "mental picture" covering both indiscriminately (e.g., *Essentials of English* 1906, 9) and the meaning of "idea", normally referring to images or concepts, was extended to include "an item of knowledge or belief" (Murray et al., 1888–1928, Vol. 5/2, 16, 9 s.v. "Idea"). So far as one can tell from his text, Kaiser seems to have followed laxer, everyday usage.

³⁰¹ For writers operating within the framework of traditional logic, the communicative function of language was largely restricted to what the linguist Roman Jakobson (1990, 73) would later term the "referential" or "cognitive" function of language (i.e., the use of language to communicate information about a given context) and, to a lesser degree, its "metalingual" function (i.e., the use of language to communicate information about language), while largely prescinding from some other functions that

language” lay in the fact that, inasmuch as it both preserved particular expressions of thought over time and was encoded in concrete objects that could be transported across wide distances, it was a medium of communicating ideas across time and space (Welton 1911, 47; 1917, 18). Kaiser did not explicitly address the communicative aspect of written language, perhaps because it seemed so obvious that comment was superfluous. Yet the notion was hardly absent from his thought. In commenting on the fact that, thanks to “[t]he obliging assistance of scissors and paste pot”, substantially the same information tended to appear in different articles in the business press—a phenomenon that he termed “duplication”—, he noted that one positive effect thereof was “to bring new facts to the knowledge of a given circle of readers” (Kaiser 1911, § 94): underlying this statement was the communicative model of persons (i.e., the authors of articles) imparting the results of observation (i.e., “new facts”) to others (i.e., “a given circle of readers”) by means of a segment of printed language (i.e., an article). The same scenario was implicit in his argument, already encountered above, that one benefit of collecting literature was exposure to the opinions of different individuals, which was clearly predicated on the notion that written or printed language would make accessible to readers the thoughts of the writers whose documentary productions were collected within the framework of an intelligence department. Ultimately, Kaiser (1911, § 59) insisted, we formulate textual records both “for ourselves and for the benefit of others”: the former, self-directed purpose was oriented primarily towards recording one’s observations and thoughts for future reference; the latter, other-directed, one, towards communicating them to others.

7.2.2.1. Written Language and its Semantic Discontents

Written language, then, served as a vehicle for representing the results of observation and reasoning in a permanent, mind-external form accessible to other minds. As discussed

he identified, such as the “expressive” or “emotive” function (i.e., the use of language to indicate and communicate emotion and feeling), the “conative” function (i.e., the use of language to induce somebody to do something), the “phatic” function (i.e., the use of language to make contact with others, to establish or renew social relationships), and the “poetic” function (i.e., the use of language for aesthetic effects) (pp. 73–75). As for Kaiser (1911, §§ 38, 52), his view that the role of textual records was to “describe” concretes and processes clearly indicates that he was almost exclusively concerned with the “referential” or cognitive” function of communicating information: as Metcalfe (1976, 179) noted with some truculence, “there is no nonsense here [sci., in Kaiser’s writings—TMD] about identifying literature with imaginative or creative literature and treating informative literature as only something the cat dragged in”. This reflected, of course, the fact that Kaiser was thinking in terms of commercial and technical literature, which tended to be overwhelmingly “informative” in intent.

earlier (See Section 2.1 of the present chapter), Kaiser held that the objects of observation and reasoning—that is to say, the objects of cognition—fell into two categories: things in the world, or concretes, and the conditions, or processes, associated with them. These objects were also represented on the plane of language. “[C]oncretes are given *names* to distinguish them”, stated Kaiser (1911, § 52 [emphasis his]), “the various conditions attaching to them are also named separately. Names are rendered by means of signs or symbols—letters; letters are grouped into *words*; names may consist of more than one word”. On this view, names were words, or strings of words, that functioned as designations of things in the world and their attendant processes; whereas any given individual would inevitably correlate the name of a concrete or process with his particular conception of that concrete or process, the referential anchor of the name ultimately was the thing or process in question, not the idea thereof.³⁰²

In light of Kaiser’s valorization of the name as a significant linguistic unit, one latter-day commentator has characterized his account of language as exemplifying a “naming theory of meaning” in which “words are regarded as ... names or labels for things” and has gone on to ask “whether Kaiser thought that all words had a naming function” (Svenonius 1978, 136). This question does not admit of a definitive answer, for Kaiser did not make an explicit statement on this score and the circumstantial evidence that can be gleaned from his writings is conflicting. On one hand, he subscribed to the view, held both by authors of logic manuals (e.g., Mill 1874, 31; Stock 1888, 15–17, §§ 60, 65–66) and by writers on subject cataloging (Cutter 1904, 71–72), that names were not restricted to single words but could be composed of multiple words: that is to say, names did not stand in a simple one-to-one relation with words *qua* lexical units. On the other, logical doctrine held that, whereas certain classes of words, such as prepositions (e.g., “of”, “in”) and articles (e.g., “the”, “an”), could form parts of multiword names, they were not capable of functioning as names in

³⁰² In this, Kaiser’s view appears congruent to that of the influential English empiricist philosopher John Stuart Mill (1806–1873), who, while conceding that, when a name is uttered, it is “the conception alone, and not the thing itself” that is “imparted to the hearer”, argued that, when names are used in statements intended to communicate beliefs about something, they refer to the thing “about which we intend to give information” rather than to our own conception thereof: in other words, names were “names of things themselves, and not merely of our ideas of things” (Mill 1874, 30). Perhaps this can be seen as (admittedly) slender evidence for Metcalfe’s (1976, 180) otherwise unsupported surmise that Mill’s *System of Logic* figured among the collectively cited “textbooks on logic” commended by Kaiser (1911, § 19, n. *) to his readers. However, as Mill (1874, 30) himself pointed out, it was “in common use” to speak of names as being “names of things” rather than names “of our conceptions of things” and Kaiser may well have been following common usage: after all, in his native German, one of the grammatical terms in use for noun (< Latin, *nomen*, “name”) was “*Dingwort*”—that is to say, “thing-word” (e. g., Krüger 1883, 4).

themselves (cf., e.g., Mill 1874, 30–31; Stock 1888, 17, § 66). Here, matters become considerably murkier. In *Systematic Indexing*, Kaiser spoke of names only in relation to concretes and processes, neither of which was a category within the framework of which the aforementioned classes of words (e.g., prepositions, articles, conjunctions, adverbs) could serve as names. However, in his final presentation of SI, he used the word “term”—which, as we shall presently see, he used elsewhere as a synonym for “name” (See Section 2.2.3 of the present chapter)—to refer not only to terms of concretes and processes but to words such as “prepositions, adverbs, etc.” (Kaiser 1926, 25, § 17): in effect, he spoke of all words in a language as being terms. Given Kaiser’s propensity to use the words “name” and “term” interchangeably, such a *façon de parler* would seem, at first blush, to lend some credence to the thesis that, in his view, all words did have a naming function. However, two considerations call for interpretative prudence on this score. First, one must make allowance for changes in Kaiser’s own use of language over time. It is striking that, whereas he used “name” and “term” as equivalent terms in *Systematic Indexing*, in his final exposition of SI, he confined himself exclusively to the word “term”, prescinding from the use of the word “name” altogether: it may well be that, in the latter case, “term” signified little more than a word or verbal expression of some sort. Second, in his later presentation of SI, Kaiser made it quite clear that, although prepositions and adverbs were terms, they had no place as terms in an index (1926, 25, § 17): the only permissible terms were those for concretes and processes and these, as we have seen, were what he had considered to be names *par excellence* in his earlier writings (cf. Kaiser 1911, § 52). This would tend to suggest that, despite his use of the word “terms” to refer to articles, prepositions, adverbs, and conjunctions, he did not consider them to function as names in the way that terms of concretes and processes did. Ultimately, it is not possible to say whether Kaiser believed that all words in a language had a naming function or not: what is evident is that, since he developed his account of language within a discussion of literature “from the standpoint of the indexer” (1911, § 97), he was primarily concerned with names, or terms, as they related to indexing and, within that framework, only words or collocations of words referring to of concretes and processes counted as names.

Names, then, when combined with other words into statements, allowed one to express one’s observations of, and thoughts about, things in the world and their processes in written language. On the face of it, this would suggest that thought and language were to be understood as being thoroughly imbricated with one another. This was an opinion held by

many members of the educated public of Kaiser's time. For example, writers in the two fields laying claim to thought as their subject—logic and psychology—routinely argued that verbal language was an instrument of thought without which it would be impossible to form general ideas, or concepts, such as “man”, “machine”, or “motion”, much less to manipulate them efficiently in the course of thinking; on this view, words functioned as shorthand symbols for complex ideational content (e.g., Barker 1897, 2–3; Keynes 1906, 4; Sully 1892, Vol. 1, 411–412, 419–426; Venn 1889, 143–145; Welton 1895, Vol. 1, 3–4; 1911, 45–46). Some commentators held that thought, to a large degree, made use of interior(ized) language, manifesting itself, *inter alia*, in the form of visual or auditory images of words, which could be deployed consciously or unconsciously (e.g., Ryland 1900, 246); among these, interestingly, was the documentalist Paul Otlet (1934, 84), who believed that “we think largely with words and signs”. Kaiser, however, took a substantially different view, positing that there existed a palpable disjunction between the process of thinking as such and that of recording the results thereof in the form of written language:

As long as we deal mentally with concretes our faculties can work unfettered within the range of their powers. Whether we can express in words or not what we observe, has nothing to do with the fact of observing and reasoning, which must be regarded as quite independent and separate from any record in words. When we arrive at a stage where we desire to reproduce our observations by means of language, we enter an entirely new field of reasoning. We start on a new set of observations with the object of rendering in words what we have observed and reasoned out previously (Kaiser 1911, § 59).

Kaiser did not explicitly describe the form that he imagined ideas of concretes would take within the mind and the few allusions to the subject in his writings do not point unequivocally in any single direction: whereas his emphasis upon observation, his tendency to speak of mental contents in pictorial terms, and his belief that (photo)graphic illustrations of objects allowed one to “practically reason in terms of concretes” (§ 69) all suggest that he considered visual images as the primary mode of mental representation of objects,³⁰³ his assertion that the verbal description of an object often led people “to reason

³⁰³ The view that thought was carried out, in large measure, by visual images also enjoyed considerable currency in the late 19th and early 20th centuries, as a few random examples may serve to indicate. The British civil engineer and geologist T. Mellard Reade claimed that “designing and invention are done entirely by mental pictures”, not words (T. Mellard Reade, in *Thought Without Words* 1887), while the eminent British logician John Venn believed that “visible images play a large part in our private reasonings:—images, that is, raised up in the mind, either without being accompanied, so far as we are aware, with any words whatever or at most merely followed by words which were not necessary for the production of the idea. ... [W]hen I am thinking in private I may

in terms of words" (§ 69) seems to indicate that he did not altogether reject the view that (images of?) words could function as instruments of thought. What is clear, however, is that, in his estimation, the linguistic formulation of a textual record was an act quite distinct from the cognitive generation of its semantic content in the mind. Indeed, he baldly asserted that "[b]roadly speaking literature is the result of

1 observation of concretes

2 translating our observations into language" (§ 53).

On this view, thought and language constituted two separate systems, which could be bridged only by an act of translation from one to the other.

In Kaiser's estimation, the translation of thoughts into language was fraught with pitfalls. We have already seen that he took it as axiomatic that a person would observe objects in the world and form his ideas about them on the basis of his individual experiences and interests: an obvious corollary of this was that each individual's ideas were uniquely configured to his mind. Language, on the other hand, was the common property of society at large and each of its lexical elements—words—had, at any point in time, a common meaning, or range of meanings, more or less shared by "all who use the word intelligibly" (Welton 1917, 22). Kaiser believed that it was difficult, if not impossible, for a person to find words whose meanings conformed *precisely* to the specific contours of his ideas. As he put it,

[w]e have a given stock of words or names, but it does not follow that it contains exactly the words we require. Sometimes we may have quite a number of words to

resort to such a help as well as, or instead of, the sounds or words which I have to employ in talking to others" (Venn 1889, 147); he also speculated that this visual mode of thinking was probably "very common in the case of somewhat ill-educated craftsmen, who are thoroughly versed in their trade, but who have not been in the habit of talking about it with others", and who would conceive of their work processes by means of "a succession of images, and quite possibly without resort to anything of the nature of a word" (p. 148). Somewhat different were the views of François Gouin, the French originator of the so-called Series Method for learning foreign languages, which, first published in French in 1880, enjoyed a brief vogue in Great Britain in the final decade of the 19th century. Basing himself on observations of how young children learn their native language, Gouin predicated his method on the assumption that mental visualization of a sequence of actions always precedes the formulation of (spoken) sentences: for him, it was the visual image that underlay the meaning of a word (cf., e.g., Fritsche 1907, 103–104; Swan 1892, vii–viii; 1893, 233). The same idea was also not uncommonly encountered in textbooks of English geared towards high and commercial school students, as the following extracts from a grammar published by the International Textbook Company indicate: "Suppose that the word horse is heard or seen [sci., by reading—TMD]. At once something like a pictured horse is formed in the mind; this mental picture or image is called an *idea*—a word that means "an appearance" or "a thing seen". ... In a properly constructed sentence, the mental pictures or ideas expressed by its words follow in a kind of procession, and form a complete *thought*" (International Textbook Company [1906], 1–2 [emphases theirs]).

choose from, each giving a slightly different turn to what we want to express, but neither covering our idea exactly; at other times we cannot find the words required, we have to express our ideas in a roundabout way (Kaiser 1911, § 60).

In other words, one might know of a number of quasi-synonyms as candidates for expressing a given notion without any of them satisfactorily capturing the specific nuances of one's thought in all its particularity; conversely, one's language might simply lack the lexical resources to represent a conception so that circumlocution became necessary. Although some of these difficulties might well be due to limitations in an individual's vocabulary, others, Kaiser held, were attributable to the fact that the specific content of individuals' ideas tended to deviate, more or less, from the semantic boundaries marked out by the common meanings of words with which they were correlated.

To illustrate his conception of the misalignment between the meanings of words and the contents of the ideas corresponding to them, Kaiser employed a simple analogy drawn from elementary plane geometry. In geometrical terminology, *congruent* figures are figures that have both the same shape and size, while *similar* figures are figures that only partake of the same shape (Bush & Clarke 1909, 2). When superposed on a plane, two congruent figures coincide with one another (i.e., each part of the figure matches up exactly with the corresponding part of the other), whereas similar figures do not. Kaiser (1911, § 663, s.v. "Overlapping and underlapping" [emphases his]) described the relationship of superposed similar figures in terms of the inverse relations of overlapping and underlapping:

If we superpose two *congruent* geometric figures, we find that they are co-extensive, they neither overlap nor underlap. If we superpose two *similar* geometric figures then from the standpoint of the smaller figure the larger one overlaps, and from the standpoint of the larger figure the smaller one underlaps, that is to say in neither case are the figures co-extensive.

Figure 15 gives a visual representation of the superposition of two similar figures, taking as its examples a larger Triangle A and a smaller Triangle B: in this case, Triangle A overlaps with respect to Triangle B and Triangle B, in turn, underlaps with respect to Triangle A. According to Kaiser, the relationship between words, or terms, and ideas, or mental pictures, was directly comparable to that of superposed similar figures: "When the meaning of a term does not exactly reproduce our mental picture, it either more than covers it, it overlaps, or it does not cover it completely, it underlaps."³⁰⁴ In his view, overlapping and

³⁰⁴ Kaiser sought to buttress this statement with an example, stating that "[t]he term *agriculture* as generally used underlaps considerably, for it includes all kinds of operations which are not

underlapping were a constant concomitant of language use and so inevitably introduced an element of distortion into an individual's attempts at rendering his ideas into words. Himself a polyglot (See Chapter 3, Section 1), Kaiser was sensitive to the ways in which translating a text from one language to another can subtly alter the nuances of a given message: "[t]ranslation from language to language is known to be merely an approximation,

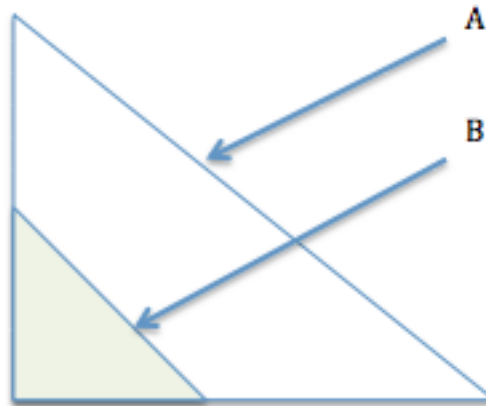


Figure 15: Overlapping and underlapping visualized according to Kaiser 1911, § 663, s.v. "Overlapping and underlapping".

an exact translation is out of the question" (§ 60) he averred. Yet, he went on, "[t]ranslation

agriculture at all but are only more or less connected with it" (§ 663). At first blush, this opaquely phrased statement seems confusing and, indeed, paradoxical, for how could the word "agriculture" *underlap* if its meaning covered non-agricultural, as well as agricultural, activities? And what, precisely, did it underlap? The confusion can be resolved as follows. The word "agriculture" is etymologically derived from the Latin noun *agricultura*, which meant "cultivation of the field" (Whitney & Smith 1911, Vol. 1, 117, s.v. "agriculture") and, accordingly, Kaiser (1911, § 184) took "land cultivation" to be its basic meaning. However, in everyday usage, the word was used not only in the narrow, literal sense of land, or field, cultivation but also included "the allied pursuits of gathering in the crops and rearing live stock" or "farming (in the widest sense)" (Murray et al., 1888–1928, Vol. 1, 191, s.v. "Agriculture"); cf. The Tariff Dictionary ([1904], 2): "Agriculture is strictly applicable only to those of the farming industries which are directly connected with the cultivation of the soil, and is often even more narrowly confined to arable cultivation pure and simple. Speaking generally, however, the agricultural industry includes almost all the distinctively rural industries, such as dairy-farming, stock-raising, butter and cheese making, &c." Kaiser appears to have construed the etymologically-derived meaning as the primary, or proper, meaning of the word—thus committing what linguists call "the etymological fallacy" (Matthews 1997, 119)—and considered the more general acceptance as a secondary, inexact one that reflected the popular conception of what agriculture was. On this view, "agriculture" *qua* tillage could be said to underlap "agriculture" *qua* farming in the widest sense: this, it would seem, was what Kaiser was trying to say. However, the example was poorly chosen, for he was describing an underlapping relationship not between a term and a mental picture, but between two different senses of a single term, a highly specific and a much more general one.

from conceptions of concretes and processes into words is more difficult still" (§ 60). The obvious implication was that language could capture the lineaments of one's thoughts only partially and inexactly: as such, it was an imperfect mechanism for representing one's ideas with full fidelity.

Although words were an imperfect vehicle for the exact expression of thought, the semantic properties that they possessed were fundamental to the functioning of language as a communicative medium. As was occasionally pointed out in contemporary logic manuals, a name or term must possess a certain core meaning held in common by the members of a language community if communication of thought about the (kind of) object to which it referred is to be possible (cf., e.g., Venn 1889, 37–38; Welton 1896, Vol. 1, 5–6, 55–56). Kaiser did not dispute the basic validity of this contention: indeed, it underlay his notion of overlapping and underlapping, which presupposed a certain fixity of meaning in words. Yet, somewhat inconsistently, he also harbored strong reservations about the semantic determinateness of the common meanings of names, holding that whatever fixity of meaning they might have was partial and, in good measure, illusory. In his view,

[n]ames certainly represent concretes and processes, but it would be rash to say that there is a general agreement as to what is exactly covered by a particular name There is a general acceptance as to what is meant by a given name *on the surface*, but when we go deeper to trace its exact limits, divergence generally makes its appearance (Kaiser 1911, § 112 [emphasis his]).

As this passage indicates, he acknowledged that, on the whole, there tended to be sufficient agreement about the meanings of names to assure some level of mutual understanding among speakers or readers of the same language. At the same time, he argued, there was little unanimity regarding where the exact semantic boundaries of names were to be drawn, especially in the case of "collective terms" referring to broad classes of (kinds of) objects (§ 112): such names, he believed, eluded precise definition and, to that extent, their meaning was not fully determinate.

Kaiser himself did not give any illustrations of how a name might have a generally agreed-upon meaning and yet remain indeterminate in its semantic limits. This was, however, a not uncommon linguistic phenomenon in the world of commerce and industry that formed his primary point of reference. A salient example is that of the term "machine tool", the definition of which precipitated a lively debate in print among machinery manufacturers and engineers in the early decades of the 20th century (e.g., Bentley 1911; Clegg 1913; De Leeuw 1920; Eberhardt 1911; Myers 1911; Smith 1911; Thwing 1920;

Views on Nomenclature of Machine Tools 1913; Wright 1914, 252). Contributors to the debate generally concurred that a machine tool had, at minimum, the following attributes: it was a machine—"an apparatus for applying mechanical power, consisting of a number of interrelated parts, each having a definite function" (Murray et al. 1888–1928, Vol. 6/2, 7, 4 s.v. "Machine")—part of which served as a tool—"a mechanical implement for working on something" (Murray et al. 1888–1928, Vol. 10/1, 1 s.v. "Tool")—to "alter, shape, or change" (Eberhardt 1911, 1110) pieces of hard material "by cutting, striking, rubbing, or other process" (Murray et al. 1888–1928, Vol. 10/1, 1 s.v. "Tool") for the purpose of making tools, machine parts, or other items to be used in manufacture. Yet, within the broad limits staked out by these attributes, they tended to disagree about other definitional criteria for classifying machines as machine tools. The nature of the materials worked by a machine was one point of dispute: some commentators held that, to qualify as a machine tool, a machine could only operate on metals, whereas others considered woodworking machines to be viable candidates for the status as well (e.g., Bentley 1911, 379; Clegg 1913, 652; De Leeuw 1920; French 1911, Vol. 1, xix & xx; Myers 1911; Tariff Schedules 1913, 1986–1988; Smith 1911, 616). The source of motive power was another bone of contention: while some authorities confined the status of machine tool only to machines powered by a source other than the human hand or foot, others considered manually powered machines to fall within the class as well (e.g., Bentley 1911, 379; Clegg 1913, 652; French 1911, Vol. 1, xx; Machine Tools Legally Defined 1913; Tariff Schedules 1913, 1986–1988; Views on Nomenclature of Machine Tools 1913, 824). Other parameters along which writers proposed criteria for defining machine tools included the kind of the operation that a machine performed (i.e., whether it worked on the material by cutting, turning, boring, drilling, planing, or some selected machining activities) (e.g., Clegg 1913, 652; French 1911, Vol. 1, xx–xxi; Myers 1911; Thwing 1920), whether the machine could be used in the production of many different kinds of items or was specialized for the manufacture of a single type of item (e.g., Bentley 1911, 379; De Leeuw 1922, 578; French 1911, Vol. 1, xxi; Tariff Schedules 1913, 1986–1988; United States Tariff Commission 1921, 43–44), and the location of its use (i.e., whether it was operated in a machine shop or not) (e.g., Clegg 1913; Myers 1911): these provided yet further occasion for differences of opinion. In short, despite the fact that machinery manufacturers and engineers seeking to define machine tools began from a common set of assumptions about the most fundamental features of such machines, each individual adopted his own favored set of definitional criteria, so that the resultant

definitions, while overlapping in many respects, differed, sometimes quite significantly, in their intension and extension:³⁰⁵ as the author of a contemporary American government report on classes of machinery subject to tariffs observed, “the term “machine tools” has not a fixed connotation”, with some meanings being much broader than others (United States Tariff Commission 1922, 55). In this way, the case of machine tools neatly bore out Kaiser’s contention that a name might have a commonly accepted general meaning and yet be defined in divergent ways so that its semantic boundaries were fully determinate.

In prefacing his discussion of the definition of machine tools, one of the protagonists in the debate stated that, as a rule, the meanings of words were the result of an organic process of development within a given language community, one in which they emerged from the activity of myriad individuals putting them to use and lay beyond the control of would-be systematizers of language:

“Usage” is the final court of appeal in matters of speech, and to its formation all of us contribute in some slight measure. Authorities cannot coerce it; all they can do is suggest, endorse and finally record the decision unconsciously expressed in the every-day talk of those who speak the language (Bentley 1911, 378).

For his part, Kaiser held similar views. In his estimation, the primary reason for the semantic indeterminacy of names lay in the fact that they “have come about in a haphazard way. Innumerable minds have helped and are helping to mould and make our names, our language. These names or terms are subject to changes more or less imperceptible ...” (Kaiser 1911, § 112). Heirs to an ever-developing and unsystematically formed stock of names, the semantic contours of which had been, and were constantly being, (re)shaped by the linguistic activity of countless persons past and present, the users of a language had to employ the words at their disposal as best they could for the purpose of recording and communicating their thoughts to others.

³⁰⁵ Cf., for example, a definition set forth by Bentley (1911, 379)—“A machine tool is any hand- or power-driven unitary mechanism actuating cutters, tools, dies or other forming or shop implements, to perform any process or operation in making tools, machines, structures or any part thereof from metal, in distinction from one for producing a special or specific article”—with that of Myers (1911)—“A machine tool is a machine holding a tool and performing such machining operations as turning, boring, drilling, facing, milling, planning, slotting, shaping, or grinding”: the first excluded from consideration any machine that produced only a particular kind of item but otherwise admitted any metal-working machine regardless of the kind of process or operation that it performed, whereas the latter excluded any machine that did not perform one of the enumerated machining operations but was agnostic as to the specificity of the article produced. This, in turn, had implications for what kinds of machines were included within, or excluded from, the class of machine tools: on Bentley’s definition, a punching or a shearing machine would count as a machine tool, but not on that of Myers, who, in fact, explicitly denied that punching machines were a machine tools.

Language, then, was a collectively constituted medium of communication in the use of which individuals could exercise, to some degree, their own agency. In a manner not unbefitting a former schoolmaster, Kaiser sought to impress upon his readers the desirability of cultivating good linguistic habits, above all in the formulation of written texts. “[B]eing aware that language can only be approximate we must take great care to make use of such words as come nearest to what we intend to convey”, he counseled them, adding that “[e]xtra trouble on this account is never lost” (Kaiser 1911, § 62). “Precision, directness, unambiguity” were the linguistic ideals that the businessman *qua* writer should set before himself, he declared, for they constitute “the foremost qualities required to secure the best understanding and they should apply to every word” (§ 63). “Elegance in expression and other literary ornamentation” were to be eschewed in favor of clarity and consistency, a consideration that led Kaiser to recommend avoiding the use of quasi-synonyms to refer to a single idea within a text for the sake of stylistic variation:

[I]t is usual to regard the repetition of the same word as bad form. That is quite a mistaken notion so far as accuracy is concerned. It is certainly preferable to repeat each word as many times as may be expedient, for with each substitute the picture under review will be thrown out of focus, however little, while in repeating the same word, even if our conception of it be hazy, we at any rate stick to the same picture (§ 63).

Kaiser’s views were, for the most part, in accord with advice meted out by contemporary authorities on business letter writing: although many would have balked at his insistence on the repetition of key terms, the need for clarity, lack of ambiguity, and directness in expression was routinely discussed in contemporary literature on business correspondence (e.g., Business Correspondence Library 1910, 64, 67–68; Hotchkiss 1911, 234–238; Kimball 1908, 99–100; Smith & Mayne 1906, 60).

Yet, if Kaiser extolled clarity, accuracy, consistency, and, insofar as possible, exactitude in the use of words as ideals towards which to strive in formulating a text, he held no illusions about the difficulties involved in reaching them. Some of these difficulties had to do with the linguistic habits of language users. Much as observation demanded effort on the part of the observer, so did precise and unambiguous self-expression in language on the part of a speaker or writer. Such effort, Kaiser contended, was typically not expended in the course of quotidian linguistic activity: in his words, “it is only on special occasions that we are *guarded* in our utterances” (Kaiser 1911, § 61 [emphasis his]). More fundamental impediments to attaining communicative clarity and consistency, however, were inherent

to language itself, for reasons that have already been discussed above. Inasmuch as names were the products of an organic, largely unplanned, development within a language community over time, they had not only recognizable core meanings towards which users of a language converged but also indeterminate semantic boundaries, for individuals might vary in their criteria for demarcating the definitional limits of a word: in other words, they tended towards vagueness, at least in the ordinary sense of being “not precise or exact in meaning” (Murray et al., 1888–1928, Vol. 10/2, 13, 2 s.v. “Vague”). At the same time, the collectively shared core meanings of words—their conventional meanings, if one will—generally failed to coincide fully with the content of the particular ideas held by individuals or, to put it in terms of the geometrical imagery invoked by Kaiser, language was not, as a rule, congruent with thought. All of these factors led him to the pessimistic conclusion that “[l]anguage as a means of expression is not a systematic effort. There is no machinery for regularising or standardising, language, no medium for giving exact expression to our thought” (Kaiser 1911, § 67; cf. 1908, § 356). Under such circumstances, one might, with requisite effort, asymptotically approach the ideals of exactitude, precision, and lack of ambiguity in one’s deployment of written language: however, the various tensions between names as artifacts of common usage and names as means of individual expression rendered full attainment of those communicative ideals impossible.

The vagaries of language had implications not only for the composition of texts by their authors but also for the reception thereof by readers. In Kaiser’s (1911, § 64) view, the process of reading a text was, in effect, the mirror image of writing it: “In formulating our expressions we proceed from thoughts to words, in reading—interpreting—records, the process is reversed, we try to construct the original thoughts, the original picture, from the meaning conveyed by words”. The goal of interpretation, in a business setting, was simple and prosaic: to understand, as exactly as possible, the message that a writer, be he a correspondent or the author of a journal article, was trying to convey. In other words, it was a practical exercise in what some latter-day commentators would call “reconstructive hermeneutics” (Sousedík 2008, 24; Stodola 2011, 23–24). Yet the misalignment between the conventional meanings of names and the particular ideas held by individuals regarding the objects to which names referred, as well as the semantic indeterminacy of names, made the interpretation of the message underlying a given text no less precarious than that of formulation: as Kaiser put it, “[w]e ... endeavor to see a clear picture through an imperfect medium, much as if we had put on a wrong pair of spectacles and were struggling to

decipher some print" (Kaiser 1911, § 64). To illustrate the point, he asked his readers to envisage the following scenario:

Let us read something we have written years ago. We must stop to consider what exactly we meant by this or that expression, for the words we read bear more than one construction. In order to decide us between these we try to recall the actual circumstances, the original picture of which our record is a translation. If our memory fails us, then we shall very likely have to confess that we cannot decipher the meaning of our own words, at any rate not exactly (§ 64).

To put this another way, if, in the course of reading a text that he had previously written himself, a person came across a passage that could be interpreted in multiple ways, he could recover the original meaning of his words only if he could remember the particular contents—indeed, the exact state—of his mind when he wrote the text in question: otherwise, he ran the risk of misinterpreting a message mediated by his own words. Such a task of reconstruction could be a difficult one, especially if a considerable amount of time had elapsed between original composition of the text and the (re)reading thereof. Needless to say, when one undertook to understand a text written by another person, the difficulties attending interpretation increased exponentially, for one had no direct point of reference for reconstructing the thoughts of the writer, which, by the very nature of things, were directly inaccessible to one, other than his words, which, by their nature, were inexact representations of his thoughts. Kaiser set forth the contrast so:

Now let us read something written by others. We proceed as before, we try to reconstruct the original picture from the words given. But there is this difference now, when we are in doubt, we can not recall the original picture, for it is not in our possession. Since we are not always sure that we understand our own expressions, obviously it must be more difficult for us to understand what others have written, and for others to understand what we have written. We for ourselves can at least supply from our knowledge of the originals what on examination is found to be missing or unclear; others can not do that, and the chances are that even if we have been extremely careful in the selection of our words, we shall sometimes be misunderstood, because of the lack of a more exact medium by means of which to give expression to our ideas (§ 65).

Interpretation of others' words, then, was a delicate business and, given that individuals read texts in light of their own particular points of view, one no less subject to perspectively conditioned factors than observation was: indeed, Kaiser (1911, § 67) maintained, "[d]ivergence in interpretation is ... as inevitable as divergence in observation". To be sure, in many cases, the difference between the interpretation placed upon a text by a reader and the intended message of the writer would be slight enough to ensure that, for all

practical purposes, the writer could be said to have succeeded in communicating his message to the reader and the reader to have understood the writer; similarly, multiple readers' interpretations of a single text might overlap sufficiently to preclude *substantive* disagreements about its message, even if none of them read it in *exactly* the same way. Nevertheless, substantive misreading of an author's intended meaning by a single reader or significantly diverging construals of a given text by different individuals were an ever-present possibility, even in the case of such "unusually exact piece[s] of literature" as legal documents, which, despite the care with which they were redacted, might give rise to disputes turning on perceived ambiguities in wording (§§ 61, 66). The interpretation of texts, no less than their formulation, was hedged by the less-than-fully-determinate relation of language to thought. From this, Kaiser drew the general lesson that "care is required in giving expression to our thoughts, and care is required in interpreting or understanding what others have written": "in indexing", he noted, "we are concerned with both" (§ 67).

7.2.2.2. Kaiser's Model of Written Communication

The account of the semantic difficulties facing the writers and readers of textual documents developed by Kaiser and discussed in the foregoing pages can be summarized in the form of a model of written communication (See Figure 16, below). Although Kaiser himself did not explicitly present it as a model in his writings, the view of communication that it embodies provided the general structural framework within which he related his views on the relationship of thought and language to indexing. According to the model, communication began with an individual who had in his mind a certain mental picture, or configuration of thoughts, the result of antecedent observations of, and reasoning about, a given (type of) concrete. During an initial process of formulation, this person translated his thoughts into the words comprising the text of a written document: as we have seen, Kaiser considered any such translation to be, at best, an inexact representation of the original picture of the concrete in the mind's eye of the writer. Once inscribed or printed on a physical medium, the text constituted a record, consultable by other persons, in which the linguistic representation of the writer's thoughts—that is to say, the message he wished to convey, was set down in more-or-less permanent form. Any person who read the words of the text undertook a process of interpretation, wherein he sought to reconstruct the writer's thoughts about the (type of) concrete in question by decoding the linguistic repre-

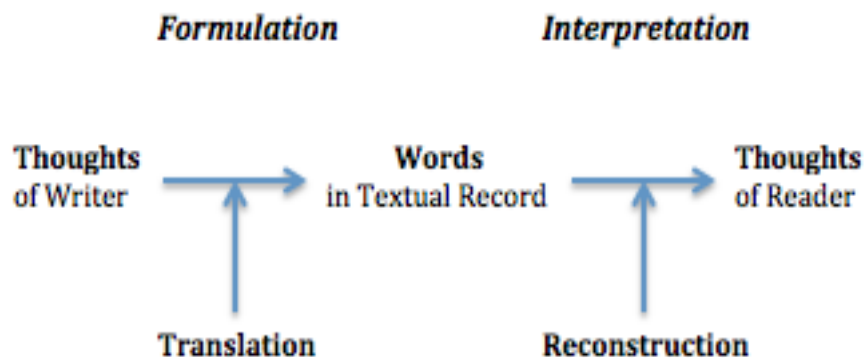


Figure 16: Kaiser's model of the process of written communication
(Source: Based on Kaiser 1911, §§ 64–65).

sentation embodied in the words of the text. Again, as noted earlier, Kaiser deemed the results of such reconstructive interpretation to be, at best, approximate in terms of their accuracy: in addition to the fact that the very process of translation from thoughts to words had already introduced an element of distortion into the textual representation of the writer's message, the process of reconstruction was conditioned by the reader's own understanding of the meaning of words in the text, which would not match that of the writer in all particulars, and so would provide yet further occasion for deformation of the message, with the result that the resultant mental picture in the mind of the reader would diverge, to a greater or lesser degree from that picture in the mind of the writer. In short, the disjunction between words and the thoughts with which they were correlated affected the process of written communication at the points of encoding a message into textual form and decoding the textual representation of the message; on the other hand, the text of the record itself, provided that it was not physically altered in some way, remained stable as it made its way from the writer to the reader.

The significance of Kaiser's model of written communication lies partially in the fact that it formed a parallel to—or, rather, a variant statement of—his general thesis that knowledge was represented in literature, which, in turn, yielded information (See p. 337, Figure 14, above). On this interpretation, the thoughts in the mind of the writer corresponded to knowledge; the words in a textual record representing these thoughts were nothing other than literature broken down into its linguistic components; and the thoughts in the mind of the reader were analogous to information in the sense of what one latter-day commentator has called "information-as-knowledge" (Buckland 1991, 3–4; 41–42). Arguably, the model added depth and complexity to the thesis, for the notion that the conceptual

content of the message translated by a writer into textual form underwent more-or-less subtle distortion during the processes of formulation and interpretative reconstruction implied that the information derived from a textual document by readers would tend to reproduce only approximately—not exactly—the knowledge that the text was intended to represent. This Kaiser (1911, § 97, 258) regarded as being an inherent deficiency—what he called a “weak side[]” or “weak point[]”—of literature as such.

The congruence of Kaiser’s model of written communication to his more general account of the relation of knowledge to information does not, by any means, exhaust its interest, for, *mutatis mutandis*, it also bears some resemblance to a later, much better known model of communication—namely, the one propounded by the American mathematician Claude Shannon (1916–2001) and interpreted for the public by the science administrator and popularizer Warren Weaver (1894–1978) almost forty years after the publication of *Systematic Indexing* (Shannon & Weaver 1998 [1949]). According to the Shannon-Weaver model of communication (See Figure 17), an information source selects a sequence of signs comprising a message from a set of possible messages and encodes it by means of a transmitter into a set of physical signals that are then sent out over a communications channel. As the signals pass through the channel, they are liable to encounter interference from external sources that, in one way or another, distorts them: this

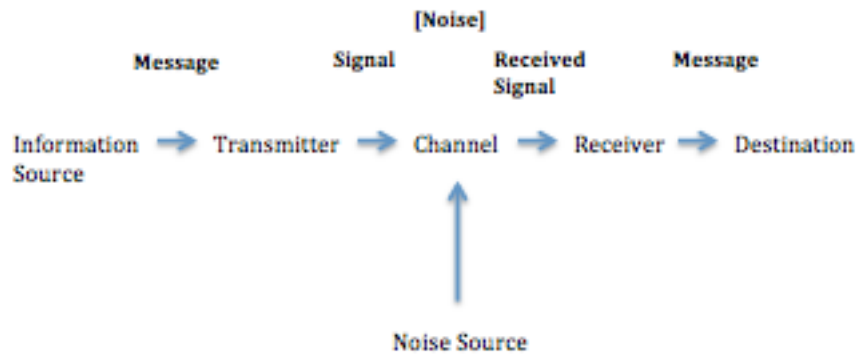


Figure 17: The Shannon-Weaver model of communication (Source: Adapted from Shannon & Weaver 1998 [1949], 7 & 34, Fig. 1. Copyright 1949, 1998 by the Board of Trustees of the University of Illinois. Used with permission of the University of Illinois Press).

constitutes noise. At the other end of the channel, the signals are received by a receiver, which, reversing the actions of the transmitter, decodes the signals and reconverts them into the message, which is then passed on to a final destination (Shannon 1998 [1949], 31, 33–34; Weaver 1998 [1949], 6–8, 16–17).

Shannon originally developed this model within the horizons of telecommunications engineering, where its application was restricted to different modes of mechanical transmission of signals. As Weaver (1998 [1949], 7) explained,

[i]n the case of telephony, the channel is a wire, the signal a varying electrical current on this wire; the transmitter is the set of devices (telephone transmitter, etc.) which change the sound pressure of the voice into the varying electrical current. In telegraphy, the transmitter codes written words into sequences of interrupted currents of varying lengths (dots, dashes, spaces). ... In radio, the channel is simply space (or the aether, if one still prefers that antiquated and misleading word), and the signal is the electromagnetic wave which is transmitted.

Shannon, whose primary concern was to formulate general mathematical parameters for the most efficient coding of messages for transmission across telecommunications channels, used the model as a framework for developing what is sometimes styled a “mathematical theory of information” (Floridi 2010, 37–45), in which information was quantified as “a measure of one’s freedom of choice when one selects a message” from a given set of possible messages (Weaver 1998 [1949], 9, 13) and so became a key variable for assessing coding efficiency and determining channel capacity within a communications system (pp. 16–17). For Shannon’s purposes, what mattered was purely the form of the message to be encoded by a transmitter, sent across the channel, and received and decoded by the receiver. Accordingly, he regarded messages purely as sequences of signs (or, in some cases, as mathematical representations thereof) that, in the course of encoding were transformed into physical signals of some type and, in the course of decoding, were transformed back into their original form: for him, the “semantic aspects of communication”—that is to say, the meaning conveyed by the signs—were “irrelevant” (Shannon 1998 [1949], 31, 33).

Weaver (1998 [1949], 7), on the other hand, generalized the model to encompass all forms of communication, including human linguistic communication unmediated by any mechanical means:

In oral speech, the information source is the brain, the transmitter is the voice mechanism producing the varying sound pressure (the signal) which is transmitted through the air (the channel). ... When I talk to you, my brain is the information source, yours the destination; my vocal system is the transmitter, and your ear and the associated eighth nerve is the receiver.

Needless to say, the schema also accommodated communication based on “written speech” as well (pp. 3, 4, 7), though he did not elaborate on this.³⁰⁶ Unlike its originator, Weaver believed that Shannon’s mathematically-based account of signal transmission could serve as a foundation for the treatment of “the *semantic problems*” of communication, which, to his mind, were primarily “concerned with the identity, or satisfactorily close approximation, in the interpretation of meaning by the receiver, as compared with the intended meaning of the sender” (p. 4 [emphasis his]; cf. p. 6). He speculated that it might be possible to refine the model by inserting a “Semantic Receiver” (p. 26) between the receiver and the destination in the model (See Figure 18): while the original receiver only (re)converted physical signals into a sequence of signs, the semantic receiver would generate an interpretation of them. Similarly, whereas Shannon had considered the noise affecting the channel to consist of such physical factors as “distortions of sound (in telephony ...) or static”, “distortions in shape and shading of picture (television)”, or “errors of transmission (telegraphy or facsimile)”, Weaver posited that a distinction might be made between “semantic noise” and “engineering noise” (Weaver 1998 [1949], 8, 26): the latter corresponded to Shannon’s original conception of noise, while the former, representing “perturbations or distortions of

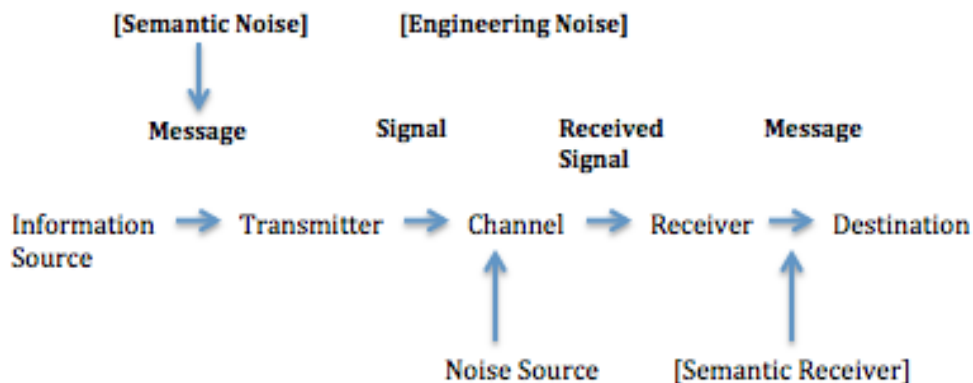


Figure 18: The Shannon-Weaver model of communication augmented by Weaver’s semantic components (Source: After Shannon & Weaver 1998 [1949], 26).

³⁰⁶ For a later “document-based” interpretation of the Shannon-Weaver model, see Foskett 1982, 5, 7: “In information retrieval, the sources are the originators of the documents we handle; the encoding process includes the choice of the appropriate words and their translation into print (or whatever medium is used); the channel is the document and its progress from originator to user; and the decoding process involves the user and his ability to comprehend the message in the form in which it is presented to him”. See also Ranganathan 1951a, 220–221, § 3162 for a similar model of “thought transfer” *via* written records.

meaning which are not intended by the source but which inescapably affect the destination” (p. 26), was to be situated between the information source and the transmitter (See Figure 18, above). Taking communication, in the broadest sense, to encompass “all of the procedures by which one mind may affect another”, Weaver (1998 [1947], 3) hoped that erecting a semantic account of communication on top of Shannon’s technical one would be a stepping stone to understanding how most effectively “to influence the conduct of the receiver” (pp. 5–6) on the basis of the message transmitted: in other words, he envisioned the communication of meaning by efficiently coded signals as a determinative factor in directing action.

If one prescind from the specific mathematical account of information underlying the Shannon-Weaver model of communication, it is not difficult to see that, as interpreted by Weaver, it shared several features with that of Kaiser. In most general terms, Kaiser’s model and Weaver’s semanticized version of the Shannon-Weaver model both posited that communication consisted of the transmission of a meaningful message (Kaiser’s “thought” or “mental pictures”; Weaver’s “intended meaning of the sender”) from a point of origin (Kaiser’s writer or author; Weaver’s “information source”) to a point of reception (Kaiser’s reader; Weaver’s “destination”) by means of a medium (in the case of Kaiser, a textual document; in that of Weaver, a channel, broadly construed): both thus conceived of communication as essentially a unidirectional process.³⁰⁷ The two models also shared in common the premise that communication involved the encoding and decoding of the message being transmitted. For Kaiser, this involved the translation from thoughts into words in the formulation of a text by a writer and, conversely, the conversion of words into

³⁰⁷ As regards unidirectionality, some latter-day commentators have suggested that Weaver’s model, which he claimed to be general model of communication, gives only a partial and distorted account of human communication, in part because it leaves out of consideration such common modes of communication as dialogue (e.g., Ma 2012, 718, 719), which would require, at the very least, a bidirectional model. Yet, as others have shown, a two-way version of the Shannon-Weaver model involving “feedback” can be generated by doubling back the model upon itself so that the destination of the original message becomes the source of a new message, sent in response to the one received from the original source (Foskett 1982, 6–7, with Figure 1b). This indicates that Weaver could have easily developed a dialogic model, had he chosen to do so: however, since he was building upon a theory of communication concerned primarily with point-to-point transmission, he did not. At any rate, the critique of unidirectionality has little force in the case of Kaiser, who confined his (implicit) model solely to written communication and used it to provide background for the analysis of literature from the point of view of an indexer working for the recipient(s) of textual documents: he was not concerned with oral communication, the analysis of which might well have led to the development of a dialogic, bidirectional model, as was the case with his contemporary, the eminent Genevan linguist Ferdinand de Saussure (1857–1916), who developed just such a schema for what he called the “speech circuit” (Saussure 2005 [1916], 27–31, esp. pp. 27–28).

thoughts during the interpretative reconstruction of the writer's thoughts from his words by the reader, while, for Weaver, the process occurred at two levels: at a strictly syntactic level of encoding a single set of signs into new physical form, from which it would eventually be decoded by the recipient, and at the semantic level, where an interpretation was placed upon the signs that were to be transmitted or that had been received. Finally, both models took into account that, in the course of communication, the message imparted by the originator might undergo deformation. Kaiser regarded the imperfection of language as a vehicle for conveying ideas with exactitude as the primary cause for this, while Weaver considered both semantic and physical noise as factors contributing to the degradation of messages over a channel.

For all the general similarities between Kaiser's and Weaver's respective models of communication, they also differed in substantial ways, one of which is especially germane here. We have seen that Weaver presented his model as one for communication in general, be it face-to-face "oral speech", "written speech", or—his point of departure and emphasis—technologically mediated oral, written, and audiovisual communication. Inasmuch as most of the communicative scenarios that he envisioned involved the momentaneous transmission of physical signals across a medium susceptible to influence from various external factors, he considered the irruption of distortive noise, either physical or semantic, to be a possibility at any point in a message's trajectory across the channel from an information source to the (semantic) receiver of the destination. The channel, then, was an area in which the signs representing the message manifested lability and were subject to mutation: there was no assurance that the signals arriving at a receiver would, upon decoding yield the same signs as those that had been encoded by the transmitter whence they came. By contrast, Kaiser's model dealt only with written communication. Writing at a time when texts were primarily committed to paper documents of various formats, he assumed that the physical vehicle by which a textual message would be transferred from a writer to a reader would be fixed: barring easily detected physical alterations of written or printed words on the page by erasure, overwriting, or other such interventions, the signs on the document sent out by the writer would be the same as those received by the reader. Within the process of communication, then, the equivalent of Weaver's channel—the textual document—served as the primary *locus* of stability, whereas the equivalent of Weaver's noise—in particular, semantic noise—entered into the picture only at the points of formulation and interpretation—that is to say, the transition from thoughts to words and

that from words to thought: one might fail to express one's ideas adequately in words or, conversely, one might misinterpret the words of another in reading them, but the *verba ipsissima* of documentary texts remained a largely immutable constant in the transmission of messages from writers to readers.

7.2.2.3. Terms: The Elementary Units of Systematic Indexing

Kaiser's appreciation of the relative fixity of documentary texts as channels of communication was not inconsequential for his conceptualization of SI, for, in combination with his broadly empiricist outlook and his epistemological individualism, it led him to adopt a language-based, text-oriented approach to indexing. Perhaps the most significant indication of this was his view that *names* or *terms* were to be the primary elements in analytical indexing (Kaiser 1911, §§ 73, 298). Interestingly, Kaiser appears to have been among the earliest writers on subject indexing to use the word "term"—today a term of art in KO (e.g., ANSI 2005, 11 & 166, s.v. "term"; Prytherch 2005, 687, s.v. "Term"; Stolk & Holloway 1974, 31, s.v. "Term"; Venkatappaiah & Kumar 1994, 106, s.v. "Term")—alongside the word "name" to designate words or word groups indicating the subject matter or the informational contents of a document.³⁰⁸ His equation of terms with names was consistent with the usage of contemporary logic manuals, the authors of which employed these designations interchangeably to refer to words or phrases designating objects of thought, though it is difficult to say whether he modeled himself directly on these sources or not.³⁰⁹ Whatever the immediate source of Kaiser's vocabulary may have been, his choice of

³⁰⁸ In the contemporary literature on literary, back-of-the-book indexing, both Clarke (1905, 134) and Petherbridge (1904, xix) used the word "term" sporadically to refer to the words or word groups used to indicate subjects: however, they generally preferred to speak of "headings" or "subject-headings". Commentators on commercial indexing tended to speak of "titles" (in the sense of "labels"), "headings", or "key-words" (e.g., Belew 1910, 97; Hudders 1916, 81, § 367, 94, §§ 417, 419, & 129, §§ 601–606), though some occasionally used "term" alongside one or the other of these (e.g., Holmes 1905). Authorities on library cataloging employed the words "subject(-)heading", "subject-word", "subject-name", or "heading" alone (e.g., Cutter 1904, 23, s.v. "Subject heading" & 71; Quinn 1899, 71, 74, 78), utilizing the word "term" only with reference to "scientific terms" serving as subject headings (Quinn 1899, 78). Among writers on library classification, Sayers (1907, 427–428; 1912, 5) utilized the word "term" to designate the name of a class, a usage later adopted by Bliss (1929, 120, 134, 138; 1939 [1933], 24, 38–39, II & IV, 86–88), who, however, also referred to the names of classes as "names" or "captions". Of all of Kaiser's contemporaries in the field of KO, Sayers was perhaps the closest to him in adopting "term" as a regular expression for designating the verbal representation of subject content: it is perhaps no accident that he had firsthand acquaintance with the logic textbook tradition (See Chapter 1, Section 5.2.5, above & cf. the following note).

³⁰⁹ Strictly speaking, there was a semantic distinction between the two terms in the discourse of logic. Whereas a name was generally understood to be a verbal designation of a thing real or imaginary, a term was "a name regarded as the possible subject or predicate of a proposition"

terms clearly signaled that *verbal units*, to which he attributed both formal and semantic properties (cf. § 178), formed the basic building blocks of SI.³¹⁰

At first glance, Kaiser's insistence on the primacy of terms may seem to be an unexceptional—indeed, a trivial—feature of his understanding of SI: after all, few would dispute that index terms, whether they take the form of verbal expressions or notational codes, are a standard feature of any indexing system (e.g., Cleverdon & Mills 1963, 107; Svenonius 1990, 82, with n. 3). The full import of his assumptions comes into sharper focus when one considers current views of what the elementary units of KOSs are. In recent years, many KO researchers have tended to identify *concepts* as the basic elements of KOSs (e.g., Dahlberg 1974, 12; 1978a, 9; Hjørland 2007, 367–370; 2009, 1528; 2010, *passim*; Smiraglia & Van den Heuvel 2013, 361, 375–376; Stock 2010, 1951, 1953–1954; Stock & Stock 2008, 37–38). Although there is no consensus about the precise definition, or the ontological nature, of concepts, theorists of KO have generally accepted that they constitute “knowledge units” (e.g., Dahlberg 1989, 13–14; Gnoli 2008a, 69; Negrini 2003, 81)—that is to say, they form the building blocks of human thought about, and knowledge of, the world.³¹¹

(Keynes 1887, 8; cf. Stock 1903, 16–17) or, in the eyes of some, a name when it was actually used as a subject or predicate of a proposition (Barker 1897, 25; Jevons 1883, 17): in fact, the form of the word was derived from the Latin *terminus*, or “end(point)” because in propositions of the form “S is P”, the subject (S) and the predicate (P) stood at either end of the proposition (Barker 1897, 25; Ryland 1900, 17). However, most authors of logic textbooks acknowledged that, in practice, “term” was convertible with “name”: thus, for example, Venn (1889, 160) wrote that “[f]or all practical purposes we may regard the ‘term’ and the ‘name’ as being exact equivalents”, while Stock (1888, 15, § 60) stated that “[a] term is the same thing as a name or noun” and Jevons (1883, 17) noted that “we commonly speak of a term or a name meaning any noun, substantive or adjective, or any combination of words denoting an object of thought”. This latter use of “term” merged with the more popular meaning of “[a]ny word or group of words expressing a notion or conception, or denoting an object of thought” (Murray et al., 1888–1928, Vol. 9/2, 202, 13.b s.v. “Term”).

³¹⁰ For completeness' sake, it should be noted that Kaiser also used the word “term” and its paronym “terminology” in non-indexing contexts to refer to “technical expression[s]” (Murray et al., 1888–1928, Vol. 9/2, 202, 13 s.v. “Term”) in the discourse of classification and indexing; cf., e.g., Kaiser 1908, § 366; 1911, §§ 98–104, 663: these technical terms took the form of nouns, noun phrases, and verbs.

³¹¹ The definition and nature of concepts is a large and controversial topic, the full discussion of which lies beyond the limits of this dissertation. Major theoretical treatments of concepts within the literature of KO include Dahlberg 1974, 1978a, 9–26; 1989; Hjørland 2009; Stock 2010; Szostak 2011, 2249–2254. Much of this literature draws upon philosophical discussions of the topic; for a wide-ranging historical survey of the philosophical background to the idea of the concept, see Marradi 2012; an overview of major theories of concepts in recent philosophical literature is given in Margolis & Laurence 2011. Only one general point need be noted here. In KO, concepts have often been understood as general ideas generated in the mind. This view is encapsulated in a recent American standard for controlled vocabularies, which defines a concept as “[a] unit of thought, formed by mentally combining some or all of the characteristics of a concrete or abstract, real or imaginary object” and “exist[ing] in the mind as [an] abstract entit[y]” (ANSI-NISO 2005, 4). Recent

Commentators also have generally agreed that, to be communicable, concepts must be represented in language by means of terms or, as they are sometimes called, descriptors (e.g., Dahlberg 1974, 13; 1978b, 143–144; Foskett 1982, 68; Gnoli 2008– , ¶ 2.2; Hjørland 2010, 38; Soergel 1974, 17, 20, 34). On this view, concepts are the starting point and primary focus of knowledge organization, while the verbal expressions referring to them—terms or descriptors—play the necessary, but subsidiary, rôle of being linguistic representations thereof. Inasmuch as the concept-oriented approach to the constitution of KOSs requires that words be brought into strict alignment with concepts, it provides a warrant for the creation of *controlled vocabularies*, the goal of which is to reduce both the ambiguity of meaning of words and phrases and the unpredictability of vocabulary choice that are characteristic of natural language by establishing a nomenclature, or restricted vocabulary, in which each term is defined so as to denote a single concept and each concept corresponds to one “preferred term” that designates it, while all words that are synonymous (or nearly so) are referred to the latter (Aitchison, Gilchrist, & Bawden 2000, 17; ANSI-NISO 2005, 1; Gnoli 2008a, 73; Svenonius 1990, 82–84). The resultant semantic (and syntactic) normalization of language is intended to render the linguistic representation of concepts within a given KOS consistent and predictable by means of what some commentators have called a “conceptual lexicon” (Maniez 1993, 254, cf. 257) and so to serve as the basis of “concept indexing” (Foskett 1982, 114) for the purpose of retrieval.

Whereas many KO theorists have considered concepts as the elementary units of KOSs, others have taken terms, descriptors, or names of subjects to be the constituent units of such systems (e.g., Bhattacharyya 1979b, *passim*; Buckland 1999, esp. 9–10; Riaz 1989, 71–72; Svenonius 1982, 125–127; 1990, *passim*; 2000a, 55–56; Vickery 1953, 31, s.v. “classification”, & 45, s.v. “term” and “terminology”; 1960a, 9, 12, 20, 38–42; 1965, 21–22; 1985 [1968], *passim*; 2008, 145–147; 2012 [2008], 204). For the most part, these term-oriented researchers have held many of the same assumptions about KOSs as their concept-oriented colleagues: they too have typically viewed vocabulary control—or, as some have called it, terminology control—as a standard, and crucial, feature of classifications, thesauri,

commentators, however, have eschewed this mentalist or “psychologist” account of concepts, preferring to speak “of “classes” or “sets” (in the sense of set theory)” (e.g., Stock 2010, 1952) or as “abstractions or abstract objects (in the standard Fregean third realm)” (e.g., Frické 2012, 33), while still accepting the idea that concepts constitute units of knowledge. Kaiser belonged firmly to the mentalist camp, considering “conceptions” and “ideas” to be the products of human thought, as, in fact, did most early 20th-century writers on knowledge organization (e.g., Bliss 1929, 120–123; Otlet 1935, 84; Richardson 1901, 3, 26–27).

and other varieties of subject indexing systems and, by the same token, they have routinely acknowledged—indeed, they have placed great stress on—the importance of establishing semantic relations among the elements of such systems (e.g., Svenonius 1990, 83, 92–101; 2000a, 56–58; Vickery 1965, 27–28; 33–37; 1971, 71; 1986 [1968], 15–18; 2012 [2008], 204). Yet their view of terms as the basic units of KOSs has frequently gone hand-in-hand with a distinct conceptualization of subject indexing systems as special-purpose artificial languages comprised of vocabularies and grammars, variously known as “bibliographical languages”, “documentary languages”, “indexing languages”, “information (retrieval) languages”, or “retrieval languages” (e.g., Bhattacharyya 1979, 85, 94–95; Buckland 2007, 250 & 252; Frâncu 2003, 175–176; Hutchins 1975, 1, 8–9; Ramsden 1974, §§ 1–4; Svenonius 2000a, 6, 53–58; 2000b, 18–19; Vickery 1962, 246–247; 1971). To be sure, some concept-oriented theoreticians of KO have also set forth or adopted linguistic interpretations of KOSs:³¹² nevertheless, the primary impetus for, and development of, such interpretations have tended to come from their term-oriented counterparts.

In the case of some theorists, a term-based approach to KOSs has been accompanied by broadly empiricist assumptions about the nature of knowledge organization in general and indexing in particular. Perhaps the best example of this tendency was the British special librarian and information scientist Brian Vickery (1919–2009), a leading contributor to the theory of knowledge organization and information retrieval from the mid-20th century into the first decade of the 21st (Broughton 2009; McIlwaine 2009). In Vickery’s eyes, subject indexing was a form of “analysis of information” that entailed “deriving from a document a set of words that serves as a condensed representation of it” (Vickery 1985 [1968], 6). As he saw it, an indexer might use words or phrases directly taken from the text of a document in

³¹² Perhaps the most prominent example is that of the eminent Indian theorist of facet analysis S. R. Ranganathan, although he preferred to speak of “ideas” rather than “concepts”. From 1950 on, Ranganathan (1965, 233, § ZG5; 1967a, 327–339) distinguished between an “idea plane”, a “verbal plane”, and a “notational plane” of work in classification; clearly indicated his belief in the priority of ideas to words (and notation) with the motto “Idea first, word next”; and warned against both the “occultation” of the idea plane by the verbal plane and the “inhibition” thereof by the notational plane: in this, he clearly adopted a concept-oriented attitude. Nevertheless, he considered classifications using notation to be “classificatory languages”, which he characterized in expressly linguistic terms (e.g., Ranganathan 1951a, 35–36; 1951b, 31–38; 1967a, 332, §§ MC1–3); furthermore, he held that the proper linguistic formulation of subject headings was one key task of facet analysis and argued that subject-heading systems based on facet analysis constituted artificial languages in their own right (Ranganathan 1964, esp. pp. 111 & 118). A more recent example is that of the German-American information scientist and KO theorist Dagobert Soergel, who has likewise distinguished between linguistic and conceptual planes within the framework of an otherwise primarily concept-oriented approach to subject-indexing systems and KOSs in general (see, e.g., Soergel 1974, 17, 20, 26–28; 1985, 217–218; 221–222).

order to characterize its informational contents or (s)he might “transform” selected key words or phrases occurring in the text into the “terms”, “descriptors”, or standardized “key-words” of a controlled vocabulary for that purpose (Vickery 1960b; 1965, 21–22, 65–66; 1985 [1968], 11 & 15): the elements of such a vocabulary, he argued, were themselves ultimately to be selected on the basis of their occurrence in literature (Vickery 1985 [1968], 29) in accordance with a principle that he called “literary warrant” (Vickery 1960a, 20) but that is perhaps more appropriately styled “terminological warrant” (See Glossary, s.v. “Literary Warrant”). At any rate, Vickery considered indexing to be an analytic operation carried out on the text of a document and resulting in succinct linguistic representations of its contents in the form of verbally expressed terms or a classification code. Underlying this account of indexing was the assumption that it could be carried out in language alone because language was the only medium through which an indexer could come into contact with the conceptual contents of a textual document and the only vehicle by means of which (s)he could express his or her own interpretation thereof. In other words, linguistic expressions, not concepts or ideas, were immediately accessible to the indexer and so formed both the starting point of the analysis of textually mediated information and its final product.

Viewed in terms of the distinction between concept-oriented and term-oriented approaches to KOSs, Kaiser’s outlook on knowledge and language placed him within the empiricist wing of the latter camp. As we have seen, he took it as axiomatic that each individual formed his own conception or mental picture of concretes, or things in the world; that people differed in their conceptions of the same (kind of) concrete; that persons communicated their conceptions of concretes with one another only by means of language; and that the commonly held meanings of words often failed to capture exactly individuals’ particular conceptions of concretes: as a consequence, readers of textual documents—including indexers—regularly ran the risk of misinterpreting the precise import of the texts that they were perusing (See Section 2.2.1 of the current chapter, above). In order to reduce the risk of misinterpretation, he argued, indexers should attend to the one relatively fixed element in the otherwise semantically treacherous process of written communication—the words in the text of a document (See Section 2.2.3 of the present chapter, above). One consequence of this strict focus on the linguistic formulation of texts was that, as already noted, verbal expressions—names or terms—came to the fore as the primary units of interest in SI. Another was that, within the framework of Kaiser’s indexing system, index

terms were to be taken, whenever possible, from the texts being indexed. Kaiser (1911, § 67 [emphasis his]) set great store by fidelity to texts, observing that, in dealing documents in everyday life, “[w]e *quote* because we are afraid to change words, lest there be a change in meaning”. He maintained that the same counsel of prudence should govern the use of terms in classification and indexing as well. Thus, he enjoined his readers,

as a general rule it would be folly to substitute one term for another for the convenience of classification. The only safe way is not to tamper with names, lest there be a change in meaning. Deal with names as you find them ... (§ 114).

With regard to terms referring to concretes, he was even more insistent regarding the need to respect the form of names found in a text:

Curtailing the terms, modifying them or substituting should be stringently avoided. In all cases the name of the concrete should be taken as it is found. The author of the information must know best which name corresponds to the idea which he wishes to convey” (§ 318).

Indeed, he emphatically declared, “the indexer is not at liberty to change names” (§ 417).

Statements such as the foregoing give the impression that Kaiser was a strong and unwavering advocate of a form of indexing in which index terms were directly extracted from documentary texts—what latter-day KO theorists have come to call “derived”, “derivative”, or “extractive” indexing (e.g., Foskett 1982, 37; Frické 2012, 230; Lancaster 2003, 18, 284; Weinberg 2010, 2286; Wellisch 1996, 227). For the most part, he was. However, his commitment to term extraction was not absolute. As we shall see in Sections 2.2.2.5, 3.6, and 4.2 of this chapter, he allowed indexers to make modifications, sometimes quite extensive, to terms taken directly from texts and, moreover, gave them license, in certain well-defined cases, to introduce their own verbal formulations as index terms. He justified such deviations from the norm of extraction on semantic grounds, arguing that

[a]lthough we have taken literature as our basis ..., we are in reality dealing with information rather than literature, ... and while it is obvious that a change in terms may lead to various difficulties, it is equally obvious that in indexing we must do justice to the sense of the information above all, and from this standpoint changes in terms may sometimes be necessary (Kaiser 1911, § 663, s.v. “Analysis of Literature”).

This argument reflects a genuine tension in Kaiser’s protocols for SI, for it obviously runs counter to the tenet that, to avoid misinterpretation of an author’s message, an indexer should derive index terms directly from the texts being indexed. More generally, from the perspective of the modern historian of KO, it offers some grounds for imputing a measure of

concept-orientation to Kaiser's understanding of SI, for, despite the fact that he viewed terms as the primary component units of his indexing system, his statement that "we must do justice to the sense of the information above all" suggests that, ultimately, the conceptual content of a piece of information—its "sense"—rather than the exact verbal formulation thereof was to provide the final rule and measure for determining its verbal representation in an index. This cannot be denied: we have already seen that Kaiser understood "knowledge," or "the information conveyed by written language", to be the "basis" of analytical indexing (See Section 2 of the current chapter). However, this acknowledgement of the importance of semantic considerations must be placed into proper perspective. Kaiser assumed that, despite the inevitable semantic pitfalls attendant upon the translation of thoughts into words, the verbal expressions used by the author of a text to name things constituted the best—indeed, the only observable—indicators of the conceptual content of his message and so were to be employed wherever possible. However, he also was well aware that the verbal formulation of a text might not always explicitly express all the elements of the message reconstructed by the indexer: for this reason, he invested the latter with certain discretionary powers to apply index terms, whenever the need arose, to a given piece of information even if they were not present in the text being indexed (e.g., Kaiser 1911, §§ 303, 322). In other words, within the framework of SI, terms continued to be the stock-in-trade of the indexer; term extraction remained the primary mode of indexing; and terminological warrant provided the *de facto* basis for developing a vocabulary of index terms within an index: nevertheless, the indexer was given some degree of freedom in assigning index terms to textual items of information so as to ensure that the results of his reconstructive interpretations of their informational contents be expressed as fully and adequately as possible. As we shall presently see, this freedom was to be exercised primarily in relation to certain semantic categories of terms.

7.2.2.4. Two Semantic Classifications of Terms in Systematic Indexing.

In Kaiser's view, index terms—or, simply "terms", as I shall henceforth call them—were ultimately derived from those verbal expressions occurring in texts that served as the names of the objects of textual discourse (See Section 2.2.3 of the current chapter). Detached from their original textual context and incorporated into an index, they indicated the subjects of the pieces of information taken up into the index. The vocabulary of any given index thus constituted a "stock of names or terms" (Kaiser 1911, § 73). Now Kaiser

did not treat the set of terms forming an index vocabulary as an undifferentiated aggregate of units; rather, he provided it with an internal structure based on semantic classifications of terms. In establishing the protocols for SI, he stipulated two distinct, but interacting, classificatory structures upon any given set of terms: one that partitioned an indexing vocabulary into a few broad classes, or categories, of terms and another that established semantic relations between individual terms within these categories. Each of these semantic structures, which a recent commentator has dubbed “category semantics” and “relational semantics” respectively (Svenonius 1990, 92–93, 95–100; 2000a, 56–58; 2000b, 19), had a distinct rôle to play in the articulation of an index as a whole. Over the course of the next three sections of this chapter, we shall have occasion to see in detail how these two classificatory structures helped shape the general structural contours of indexes created in accordance with the protocols of SI; nevertheless, a brief introduction to the two here will help set the stage for what follows.

Let us begin with Kaiser’s category semantics. To get an initial purchase on this, it is necessary to recall that, in his view, the analysis of business literature was to be undertaken on the basis of the knowledge that it represented (Kaiser 1911, § 298). As we have already seen, he considered that the objects of knowledge could be effectively reduced to two primary ontological kinds: *concretes*, or things in the world, and *processes*, in most general terms, the states of being attaching to concretes (See the beginning of Section 2.1 of the current chapter). We have also observed that he regarded literature as a representation of knowledge as mediated by written language (See Section 2 of the current chapter). Taken together, these premises led him to the conclusion that

from the standpoint of knowledge literature is confined to the description of concretes and of the conditions attaching to them, and for our purposes literature may be analyzed into terms of concretes and terms of processes ... To put in the simplest language we may say that literature names *things* and that these *things* are *spoken of* or *described*. The knowledge conveyed by literature all has reference either to *things* or to *spoken of*, i.e. concretes and processes (Kaiser 1911, § 298 [emphases his]).

For Kaiser, then, the ontological distinction between concretes and processes was reflected in the textual descriptions of things in the world. An attentive reader will note that, in moving from concretes and processes as objects of thought to concretes and processes as objects of discourse, Kaiser redefined them in a way that overlaid their ontological definition with a logico-linguistic one, in which terms of processes functioned in a manner akin to, albeit not identical to, that of predicates and concretes as subjects (Dousa 2011,

168–169; Svenonius 1978, 138–140; 1979, 66–67): the full implications of this shall be discussed in Sections 3.3.2 and 3.4 of this chapter. What is of import here is that, according to Kaiser, one could identify, within any given text in the realm of business literature, words referring to concretes and words referring to processes, which, in turn, could provide the basis for the terms of concretes and processes that conjointly made up an indexing vocabulary.

In the passage quoted in the preceding paragraph, Kaiser gave what amounted to a theoretical rationale for a bipartite division of index terms into those denoting concretes and those referring to processes. In practice, however, he extended this division into a tripartite one. As he programmatically declared, “[f]or the purpose of indexing we shall divide our stock of names into those of *concretes*, *processes*, and *countries*” (Kaiser 1911, § 73), with the terms of countries serving to “indicat[e] the localities with which the concretes are connected”. In Sections 3.2 and 3.4 of this chapter, we shall consider the reason for Kaiser’s inclusion of this third category and the way in which he sought to account for it within the theoretical framework underwriting his bipartite division. Here, it is sufficient to note that, for practical purposes, the category semantics of SI ultimately encompassed three distinct categories of terms: concretes, countries, and processes, which, as we shall soon have ample opportunity to see, played a pivotal rôle within the indexing system as a whole.

As already noted, Kaiser held that all texts falling under the rubric of business literature were amenable to analysis into words or terms referring to concretes, countries and processes. An important corollary of this was that no word or term belonging to these three categories occurred in isolation but contracted relationships to other words or terms within the discursive structure of a text. Some of these relationships were between terms from different categories: concretes in relation to countries and processes, countries in relation to concretes and processes, and processes in relation to concretes and countries. Others, however, were relationships that a term formed with other terms belonging to its own semantic category. This idea found its fullest expression in Kaiser’s account of how the text of a (hypothetical) book describing an industrial exhibition might be viewed from the perspective of an indexer:

The text is a multiple of the single statement as an organisation is the multiple of the single transaction. The text describes our subjects whatever they may be. In doing this it discusses the subjects from various points of view, it compares concrete with concrete, it compares their conditions, and from comparison classification inevitably results. In short the text is made up of a number of separate classifications so interwoven that apparently there is no classification at all, (just as in classical music

the melodies and counterpoints may be interwoven to such an extent that the untrained ear cannot hear any melody at all).

Description is a continuous process of classification. Concretes are classed among themselves, by their processes, their parts and functions etc. Processes again are classed among themselves, according to their application to various concretes, etc. The same applies to localities (Kaiser 1911, §§ 565–566).

As this passage indicates, Kaiser believed that beneath the linguistic surface of the text lay a deeper semantic structure rooted in the categories to which the objects of discourse belonged, wherein concretes stood in classificatory relationships to one another, as did countries and processes, respectively. Drawing upon his musical background (See Chapter 2, Section 2, above), he compared each of these category-based classificatory networks to a single melodic line within a polyphonic piece of music, in which the parts might be interlaced in such a manner that the structure of each individual line might become indiscernible within the acoustic texture of the whole. In much the same way, the text of a document such as the kind of book that Kaiser was describing typically consisted of discursive units—namely, sentences expressing statements—in which words or terms denoting concretes, countries, and processes were brought into relation with one another. So seamless was this interrelation of words or terms from various categories within any given natural-language text that the casual reader might not be fully aware that running across the various statements comprising it were implicit classificatory relations among the words or terms belonging to a given category. Such intra-categorical relations formed a semantic substrate that ran through any text of sufficiently substantial length, just as an individual melodic line runs through a piece of music.

What held for texts held for indexes as well. On one hand, the indexer could establish relationships between terms from different categories to form composite terms, or statements (Kaiser 1911, § 302): this constituted, in effect, a syntactic extension of the category semantics of SI (cf. Svenonius 2000a, 57–58). On the other, classificatory relationships could be instituted among the terms belonging to a single semantic category (Kaiser 1911, § 416): these relationships lay at the heart of the relational semantics of SI. Kaiser, however, did not speak of them as relationships *per se*. Rather, he conceptualized them by means of a second categorization of terms orthogonal to that of the three broad classes of concretes, countries, and processes. “In each class”, he wrote, “we have to consider *collective* or *general* and *specific* terms, the former covering a greater area than the latter” (§ 74, [emphases his]). This statement of the distinction between general and specific

terms commands attention for two reasons. First, the description of collective, or general, terms as “covering a greater area than” specific ones recalls the geometric imagery of overlapping and underlapping that Kaiser employed to describe the lack of fit between the contents of individuals’ ideas and the common meaning of the terms that they used to communicate them (See Section 2.2.1 of the present chapter). In this regard, it may be noted that he also spoke of terms as overlapping or underlapping in relation to other terms; however, he used this technical terminology only to refer to what he took to be problematic cases of semantic overlapping (Kaiser 1911, §§ 113, 415, 663 s.v. “Overlapping and underlapping”; see Section 5.1 of the current chapter, esp. pp. 559–563, below). Second, and of greater systemic consequence, the statement implies some form of hierarchical relationship between collective, or general, and specific terms, but does not specify precisely the way in which “the former cover[] a greater area than the latter”. Although Kaiser apparently considered the attributive adjectives “collective or general” and “specific” to be sufficient indicators of the relationship between the terms so designated, the generic nature of his statement actually allowed him to incorporate different kinds of hierarchical relationships within the relational semantics of SI. In large measure, these different forms of relationships were correlated with different categories of terms, a fact that is best appreciated if we consider each separately.

We begin with terms of concretes. In his initial characterization of these terms in *Systematic Indexing*, Kaiser (1911, § 73) gave the following examples: “money”, “machine”, “iron”, “scientific instrument”, “yarn”, “labour”, “information”, and “engineer”. Viewed from the perspective of contemporary grammatical lore, these examples represented different kinds of nouns including “class-nouns” denoting classes of things or persons (e.g. “machine”, “scientific instrument”, and “engineer”), “material nouns” designating kinds of materials and derivatives thereof (e.g., “money”, “iron”, and “yarn”), and certain “abstract nouns” derived from verbal roots (e.g., “labour” and “information”) but functioning, for all practical purposes, as if they were “substance-words” (Bain 1891, 15–21, §§ 5, 7, 9; Sweet 1900, 12, 55–56, 62).³¹³ The one feature that all shared in common was appurtenance to the grammatical category of “common nouns”: that is to say, in contradistinction to “proper

³¹³ One may note that some grammarians viewed material nouns as constituting a subclass of class-nouns (e.g., Meiklejohn 1901, 10, § 5(I)), while others considered them, on formal grounds, to be more akin to abstract nouns (e.g., Leonard 1909, 119). Kaiser’s rationale for the inclusion of terms expressed by abstract nouns such as “labour” and “information” in the category of concretes will be discussed more fully in Section 3.1.2 of this chapter.

names” or “proper nouns”, which denoted particular entities *qua* individuals (e.g., “Melvil Dewey”, “the Philadelphia Commercial Museum”, or “The Austro-Hungarian Empire”), each of these terms could be applied to a number of entities forming a class (in the case of class nouns) or to specimens of kinds of material substance (in the case of material nouns), provided, of course, that the entities in question belonged to the class or kind signified by the term (e.g., Carpenter 1910, 45–46; Sweet 1900, 56–57).

These grammatical categories were derivative of, and so in large measure continuous with, the categories of terms utilized within the discourse of traditional logic. For logicians, the closest analogue to the common noun was the “general term”, alternatively known as the “general name” or “common term” (e.g., Fowler 1905, 12–13; Hawkins 1893, 8, § 5(2); Jevons 1879, 15–16; 1881, 18; Joseph 1906, 18–19; Keynes 1906, 11–13; Read 1898, 30; Stock 1903, 33–34), which stood in contrast to the “singular term”, “individual term”, or “singular name”. “A *singular (or individual) term*”, explained the author of a contemporary textbook, “is one which can be affirmed in exactly the same sense of only a single thing” (Ryland 1900, 25): such terms would include proper names (e.g., “Andrew Carnegie”, “the H. M. S. Dreadnought”, or “the Thames”) or descriptions (e.g., “the current prime minister of the United Kingdom”, “the author of *Au Rebour*”, or “the mill on the floss”) that, within a given universe of discourse, designated a single, unique object (Keynes 1906, 13; Stock 1888, 32–33). “A *general term*”, he went on,

is one which can be applied in the same sense to any of any indefinite number of things. It implies the existence of an attribute or of a number of attributes, and is applicable to any object which possesses that attribute or group of attributes. It suggests the existence of an actual or possible class of things (whether real or imaginary) which possess these attributes. Thus, *dog, leaf, heart* are general terms. Such words are sometimes called *class names* (Ryland 1900, 25, 26 [emphases his]).

In addition to class names proper, general terms were also taken to include “*substantial terms* or names of substances” such as “water”, “air”, or “gold” (Ryland 1900, 26 [emphasis his]; cf. Keynes 1906, 12, n. 1)—in effect, the logician’s counterpart to the grammarian’s “material noun”.³¹⁴ From the vantage point of traditional logic, then, Kaiser’s terms of

³¹⁴ According to some commentators, substantial terms were better viewed as a distinct category of terms that functioned as general terms in contexts where they signified delimited portions of an otherwise continuous substance, singular terms in other contexts, and collective terms (on which, see pp. 360–361, n. 320, below) in yet others; for discussions, see Jevons 1958 [1877], 28–29; Joyce 1916, 23; Read 1898, 31. To avoid unnecessary complications in the discussion, I follow the interpretation of substantial terms as a kind of general, or common, term here.

concretes clearly fell within the ambit of general—or as I shall henceforth call them, common—terms.³¹⁵

When used to designate a given object, a common term indicated that the object in question possessed a certain set of qualities, properties, or attributes in virtue of which it formed part of the class of all objects possessing the same set of qualities, properties, or attributes. On this view, the meaning of a term was twofold, consisting of its “meaning in *extension*” and its “meaning in *intension*” (Jevons 1881, 37 [emphases his]; cf. Hyslop 1894, 68–69; Jevons 1879, 21; 1958 [1877] 25–26). The extension of a term comprised the objects to which it could be applied, whereas its intension consisted of the set of qualities, properties, or attributes in virtue of which it could be predicated of these objects (e. g., Jevons 1881, 37; Hyslop 1894, 69; Keynes 1906, 22; Stock 1888, 42–43, §§ 148–152; The Oxford Handbook of Logic ... 1880, 7).³¹⁶ A simple example from a popular late-Victorian textbook of logic still in print in Kaiser’s day may serve to illustrate this. There we read that the common term “[s]teamship” denotes in extension the Great Eastern, the Persia, the Himalaya, or any one of the thousands of steamships existing or having existed; in intension it means “a vessel propelled by steam-power” (Jevons 1881, 38). In this case, the attributes of being a vessel—or, perhaps more precisely, being a ship, that is to say, “a large sea-going vessel” (Murray 1888–1928, Vol. 9/1, 704, 1 s.v. “Ship”)—and being propelled by steam power constituted the intension of the term, while its extension covered all the individual objects to which the term could be applied by virtue of the fact that they possessed these attributes. As this example suggests, although intension and extension were two different

³¹⁵ Some writers on logic also included adjectives—or “attributives”, as they were occasionally called—among general names, on the grounds that “they may be applied with propriety to many different things” (Ryland 1900, 26; Stock 1888, 30, § 109). Since none of Kaiser’s terms took a purely adjectival form (though they might include adjectives as components of noun phrases such as “scientific” in “scientific instrument”), these shall not be taken further into account here.

³¹⁶ Anglophone logicians writing in the late 19th and early 20th centuries also used other terminology to express the same distinction. Most notably, in the wake of John Stuart Mill’s revival of the words “denotation” and “connotation” as technical terms, these frequently served as synonyms for “extension” and “intension”, respectively (e.g., Fowler 1905, 22; Jevons 1881, 39; Joseph 1906, 131 & 135; Joyce 1916, 22–23; Ryland 1900, 20 & 23; Stock 1888, 43, § 152; The Oxford Handbook of Logic ... 1880, 7; Venn 1889, 173–174; Welton 1917, 55), although some authors, aiming at a more precise account of the semantics of logical terms, introduced fine distinctions between them (e. g., Barker 1897, 32; Keynes 1906, 22–35; Lightfoot 1899, 27–28). At any rate, it was “extension” and “intension” that ultimately made their way into the discourse of KO (e.g., Mills 1968, 17–18, 26; Ranganathan 1967a, 174, § ES1–4; Vickery 1953, 36, s.v. “extension”, & 38, s.v. “intension”), largely through the influence of the British classification theorist and library educator W. C. B. Sayers (1918, 26; 1926, 40–41), who incorporated them into his textbook accounts of the logical basis for bibliographical classification (cf. Miksa 1998, 55, n. 12). For this reason and to avoid unnecessary variation in terms, I shall here speak only of “extension” and “intension”.

aspects of a term's semantic profile, they nevertheless mutually reinforced one another: the former furnished criteria according to which objects might be included in the latter, while the latter served as the field of application for the correct use of the term as defined by the former.

The extension and intension of a common term not only constituted its meaning, but also helped situate it within whatever series of classificatory relationships it might be enmeshed. The prototypical classificatory relationship was held to be that between an including class, or *genus*, and the subclasses, or *species*, included within it (Jevons 1879, 30–31; 1881, 98; Lightfoot 1899, 30; Ryland 1900, 55; Stock 1888, 88, § 318 (1–2)).³¹⁷ Because common terms were, in effect, class names, they were capable of being coordinated in genus-species relationships. Now, it was axiomatic that, when two terms stood in such a relationship to one another, the term representing the species would have a narrower extension and a greater intension than the one representing the genus, while, conversely, the term representing the genus would have a wider extension and smaller intension than the one representing the species (cf. Jevons 1879, 35; Joseph 1906, 121–122; Lightfoot 1899, 29). An example may help to clarify this; accordingly, let us revert to the term “steamship”.³¹⁸ This term denoted a subclass of the broader class of seagoing vessels generally designated by the term “ship”: in other words, “ship” stood to “steamship” as a genus term to a species term. Now inasmuch as the class of ships included both sailing ships *and* steamships within its purview, it encompassed a larger set of objects than the class of steamships alone: that is to say, the genus term “ship” had a wider extension than the species term “steamship”. On the other hand, the only attribute—in truth, a set of attributes—necessary for an object to belong to the class of ships was to be a large, ocean-going vessel, whereas it counted as a steamship only if it possessed that attribute *and* the property of being propelled by steam power: in other words, the intension of the genus term “ship” was smaller than that of the species term “steamship”. A comparable situation obtained in the relationship between “steamship” and “screw-steamship”, a term applied to

³¹⁷ It is useful to remember that, within a classificatory context, genus and species were relative concepts: a single class could be both a genus in relation to the subclasses into which it was divided and a species in relation to the higher-level class of which it formed a division, or subclass. It was only at the extremes of a classificatory structure that the relativity of genus and species broke down: the highest-level class, the *summum genus* or *genus generalissimum*, of a classification was not a subclass of a yet higher class and was a genus alone, whereas the its lowest-level classes, or *infimae species*, of the classification, were not further divided and so constituted species alone (Hyslop 1892, 89–90; Jevons 1881, 100; Lightfoot 1899, 30; Stock 1888, 119).

³¹⁸ The following example is adapted from Jevons 1879, 21–22; 1881, 299, Lesson V, Question 3(3).

any steamship driven by means of screw propellers (Murray 1888–1928, Vol. 8/2, 275, IV.19.b s.v. “Screw *sb.*”), in which the former term now took on the rôle of genus, while the latter played the part of species. In this case, the genus term “steamship”, which denoted all extant steamships, whether these were driven by means of screw-propellers or by means of paddles, had a wider extension than the species term “screw steamship”, which denoted only those steamships driven by means of screw-propellers. By contrast, the species term “screw steamship” had the greater intension, for this common name was applicable to an object only if the latter possessed the property of being driven by screw-propellers *in addition to* the two aforementioned properties necessary for being accorded the genus term “steamship” *simpliciter*.

In the foregoing example, the terms “ship”, “steamship”, and “screw-steamship” were elements forming part of a hierarchical chain of genus-species relationships, in which, at each level of the hierarchy, a species was formed by adding a distinguishing attribute—the difference—to the intension of the class forming its genus (Jevons 1879, 35; 1881, 99).³¹⁹ (The difference, it should be parenthetically noted, was so called because it distinguished a species from every other species included in the genus to which it belonged; for example, in the case at hand, the difference of “steamship”—namely the property of being propelled by steam power—set it apart from the coordinate species of “sailing ship”, the difference of which, in turn, was the property of being propelled by wind power.) Such a chain of genera and species could be elongated indefinitely by effecting further subdivisions through the addition of further attributes to the intensions of the classes being defined—e.g., “iron screw-steamship”; “British iron screw-steamship”, and so on (cf. Stock 1888, 49, § 170). As one moved down the hierarchy from the most general common term, “ship”, through “steamship”, to “screw-steamship” and beyond, the extension of each term was narrower than that of its predecessors, while its intension was greater than theirs. This was sometimes framed as a “law of inverse variation of extension and intension” (Stock 1888, 48), according to which, “in a series of common terms standing to one another in a relation of subordination *the extension and intension vary inversely*” (Keynes 1906, 35 [emphases his]). As a number of commentators rightly cautioned, this formulation was, in some

³¹⁹ Note that some logicians, following Mill (1874, 100–101), defined the difference as “[t]he surplus of connotation [sci., intension—TMD] found in the species over the connotation [sci., intension—TMD] of the genus which contains it”, whether this surplus consisted of a single attribute, as in the example given here, or multiple attributes (e.g., Killick 1888, 42–43; cf. Lightfoot 1899, 32; Stock 1888, § 318 (3); Venn 1889, 266–267).

respects, an overstatement, for, although some writers spoke freely of the extension and intension as having “quantity” (e.g., Jevons 1881, 40, Stock 1888, 42–43), there did not exist a regular or exact quantitative relation between a term’s extension and its intension nor was the relation between increase of intension and decrease of extension a necessary one: indeed, in some special cases, the addition of an attribute to the former did not lead to a diminution of the latter (Keynes 1906, 35–40; Rylands 1900, 21–23; Venn 1889, 174–175). Yet if the tenets that “[t]he greater the extension, the less the intension” and “[t]he greater the intension, the less the extension” (The Oxford Handbook of Logic ... 1880, 7 [emphases theirs]) did not amount to a precisely quantifiable or invariant law, they did express a general tendency in the semantic behavior of terms contracting classificatory relations to one another that provided a basis for establishing scales of generality or specificity within a hierarchical chain: one could, in theory, speak of a term as being more general or more specific than another one occurring in the same chain.

This schema of the relations between terms of greater generality and those of greater specificity carried over from logic into other discourses relating to language, especially those of grammar and rhetoric, where, largely shorn of technical terminology, it served as the basis for discussions of what were known as general and specific words or terms. Such discussions manifested subtle variations in emphasis. For example, the British linguist-author of a major “scientific English grammar” adduced the following example of classificatory relations obtaining between what he called “general and special words”: “*cast iron* and *wrought iron* go under *iron*; *iron*, together with *gold*, *silver*, *lead*, etc. goes under *metal*; and *metal* itself goes under *mineral*, and so on” (Sweet 1900, v & 15 [emphases his]). To this, he added the explanatory gloss that “[t]he more *special* a word is, the more meaning it has. Thus *iron* implies all the attributes implied by the more general word *metal*, and, in addition, all the attributes that distinguish iron from gold and the other metals”. Insofar as it explicitly correlated increase in meaning with the addition of attributes, this account clearly laid stress on what a logician would term the intension of words. Somewhat different in its orientation was the discussion of general and specific words in a contemporary American textbook of composition addressed to first-year college students:

Let the student imagine for the moment that everything included under a given idea is represented by the space which a circle encloses. Thus within the circumference of a certain circle is contained, for example, whatever answers to the idea of boat. If it is desired to narrow this idea to the steamboat, a smaller circle drawn within the space of the first represents this subdivision of the first idea. The second circle is inside and not outside the larger circumference, because steamboats are one kind of

boat; and it is smaller in size because the class steamboat is smaller than the class boat. To narrow the idea still further to iron steamboat, it will be necessary to draw a third circle within the second; and to represent the idea iron steam yacht, there is required a fourth circle inside the third. The relation of these circles to each other stands for a relation which exists among these words. It is based on the comparative extent of the application of words. It is the relation that exists between genus and species, and it is accordingly denoted by the terms “general” and “specific.” The words that are represented by the larger circles are called “general” words; those represented by the smaller circles are called “definite” or “specific” words (Pearson 1898, 122).

Invoking a variant version of an example that we have already encountered and utilizing a simple, but effective, technique of visualizing the successive relationships of inclusion within a hierarchical series of genera and species as a series of concentric circles, the author of this passage adopted what was, in essence, an implicitly extensionalist treatment of general and specific words; for, if he spoke of the members of the hierarchical chain as representing successive narrowings of ideas, he nevertheless characterized the relationships between the words as ones based on “the comparative extent of [their] application”—in other words, their respective extensions. Yet another textbook of composition and rhetoric, written for use in high-school and first-year college classes, struck a balance between the poles of intension and extension in its disquisition on the nature of what its authors styled “general and specific terms”:

Words that name a general conception we call general terms. Examples of such words are *substance, rock, animal, vegetable*. We may take any general term and group under it a series of terms more and more specific. Thus under *animals* we may class *mammals, quadrupeds, horses, dray-horses, race-horses*, etc. ... Evidently the greater the number of objects suggested by a general term, the less it can tell about any single object. The term *substance* includes every material object, and suggests scarcely any image at all. *Tree* is a general term, yet far more specific than *substance*. *Oak* is sufficiently definite to call up an image having certain well-marked features (Mead & Gordy 1901, 151–152, 153).

Expositions such as these, which presented some of the core tenets of the semantic doctrine of extension and intension in an informal and fairly non-technical manner, helped to render the idea that words stood in relations of greater semantic generality or specificity to other words part and parcel of the stock of general assumptions about language held by members of the educated public of Kaiser’s day.

This, then, is the background against which Kaiser’s statements about general and specific terms are best interpreted with regard to terms of concretes. Insofar as the latter tended to be common terms, they were capable of standing in genus-species—or, at least, in

genus-species-like—relationships in which a general term denoted a genus, or including term, and its correlated specific term(s), its component species, or included term: in the parlance of modern KO, one would speak of broader terms (BTs) standing in a generic relationship to narrower terms (NTs) (Aitchison, Gilchrist & Bawden 2000, 55, 56–58; Austin 1984, 79–81; Broughton 2006, 122 & 213, s.v. “generic relationship”; ANSI-NISO 2005, 46–48). Although Kaiser did not use the language of extension and intension as such, his description of general terms as “covering a greater area than” specific terms—which, it may be noted, is uncannily reminiscent of the visual image of concentric circles quoted in the preceding paragraph—was consistent with an extensional view of the relationship between general and specific terms: after all, to speak of the “greater area” covered by the former *vis-à-vis* the latter was to refer to their respective fields of application—that is to say, to what a contemporary logician would have called their extensions. This was not the only statement that Kaiser made on this score. In an article summarizing the tenets of SI written a number of years after the publication of *Systematic Indexing*, he noted that, if one sought to place terms of concretes into classificatory relationships with one another, terms that had a greater “extent of meaning” would constitute general terms, or what he called “Higher Collectives”, while those possessing a smaller “extent of meaning” would be specific terms, or what he styled “Lower Specifics” (Kaiser 1926, 23–24, § 13). Here, again, the correlation of generality with a greater *extent* of meaning and specificity with a lesser *extent* thereof apparently gave weight to the extensional side of term meanings. To be sure, one should not read too much into Kaiser’s tendency to characterize the relationship between general and specific terms in implicitly extensional terms. He was not a logician nor was he seeking to expound logical theory: indeed, his choice of expression may well have been based on an elementary visual schema such as that of the concentric circles rather than on a fully articulated notion of extension. Yet, whatever the depth of conceptualization may have been, it does not seem extravagant to suggest that, in Kaiser’s eyes, the relative specificity of terms of concretes embedded in a hierarchical chain of generic relationships depended upon the comparative size of their fields of application—a form of what one latter-day commentator has called the notion of “extensional specificity” (Svenonius 1976, 178–179).

In the case of terms of concretes, the distinction between general—or, as Kaiser idiosyncratically preferred to call them, collective³²⁰—terms and specific terms had its roots

³²⁰ The qualifier “idiosyncratically” is fully justified here, for Kaiser’s use of “collective term” as a synonym for “general term” ran counter to the standard usage of logicians and grammarians alike. As

in the generic relationship, although, as we shall see in Section 5.2.2.2 of this chapter, many of these relationships deviated, to a greater or lesser extent, from that between genus and species in the strict logical sense. Terms of countries or localities presented quite a different picture. Kaiser's (1911, § 73) introductory examples of terms belonging to this category in *Systematic Indexing* were "France", "South Africa", "British West Indies", "French Guiana", and "Canada", to which can be added others that he gave later in the text, such as "South America", "Latin America", "Europe", and "West Indies" (§ 420). Even a cursory glance at these terms indicates that they were proper names of geographical units and, as such, were singular terms. In this regard, terms of countries obviously differed from terms of concretes, for they referred to individual entities—*in casu*, particular geographical territories on the earth's surface, whereas the latter, as common terms, denoted classes of objects. Now terms of countries could be brought into hierarchical relationships with one another: for example,

we have already seen, within logical discourse, the expression "general term" (or "common term") was typically used to refer to terms that could be applied to objects forming a class or belonging to a kind: "sheep", "soldier", and "book" are examples thereof. On the other hand, a "collective term", or "collective name", was "one ... applied to a group of similar things regarded as constituting a single whole": for example "flock" (= a unitary whole composed of sheep), "army" (= a unitary whole composed of soldiers), and "library" (= a unitary whole composed of books) are examples of collective terms (e.g., Keynes 1906, 14; Ryland 1900, 27–28). From the perspective of the logician, the semantic difference between general and collective terms was significant. A general term denoting a class was distributive in character, in the sense that it could be predicated of each member of the class in question. For instance, in a given universe of discourse, any member X of the class of soldiers could receive the predicate "soldier" in a proposition—namely, "X is a soldier": that is to say, "soldier" was a name applicable to each member of the class. By contrast, a collective term was not distributive, in that it could not be predicated of each member of the collectivity which it denoted but only of the collectivity as a whole: thus "army" referred only to a body of soldiers as a whole, not to the individual soldiers within the army (cf. Fowler 1905, 12–13; Hyslop 1894, 34; Jevons 1881, 19). To be sure, these categories could cut across one another in practice, for a single term could, in different semantic contexts, have a general or a collective meaning: for example, the term "army" was collective with respect to the soldiers of which it was composed, but general with respect to the class of armies to which it belonged (Hawkins 1893, 8, § 5(2); Hyslop 1894, 34; Jevons 1958 [1877], 29; Keynes 1906, 15; Stock 1888, 33, § 118): nevertheless, logicians (and, in their wake, grammarians [e.g., Sweet 1900, 55–56]) were careful to distinguish them for analytical purposes.

For Kaiser, on the other hand, a "collective term", like "general term", simply meant any term that could be placed into a hierarchical relationship with more specific terms subordinate to it. He expressed this view obscurely in the statement that "We have names not only for concretes and processes, but we can express a variety, a set, a group of separate concretes in one name. These collective terms enable us to handle masses of materials with ease" (Kaiser 1911, § 110, 3): as the context indicates, the key phrase "a variety, a set, a group of separate concretes" is best understood as referring to "different kinds/types of concretes". Interestingly, Kaiser's contemporary, the librarian E. Wyndham Hulme, who was well versed in traditional logic, also used the locution "collective term" in an almost identical sense. See Hulme 1950 [1911–1912], 18: "It should be observed that a generic class is a collective term for a number of specific subclasses. Such terms can be defined or explained by an enumeration of their component subclasses. Thus the term "Graphic Arts" may be described as a collective term for the Arts of Writing, Engraving, Lithography, and Printing".

“Europe” stood in a superordinate position with respect to “France”, as did “West Indies” with respect to “British West Indies” and “South America” with respect to “French Guiana”. However, these relationships were fundamentally different from those between general and specific terms of concretes. The latter, as we have seen, took the form of genus-species, or genus-species-like, relationships formed by a process of what contemporary logicians termed the “logical division” of a class of objects, or genus, into its component subclasses, or species (e.g., Joseph 1906, 101; Joyce 1916, 161; Welton 1896, Vol. 1, 123–124). Because terms of countries referred to particular entities rather than classes or kinds of entities, they were by definition incapable of contracting such relationships. Rather, the kind of relationship obtaining between a territorially broader geographical entity, such as the continent of Europe, and a territorially smaller one located within it, such as the country of France, was that between an entity and one of its component parts, the result of a process of mental dismemberment of the former that writers on logic characterized as “physical division” or “partition” (e.g., Fowler 1905, 60; Joseph 1906, 117). By the same token, the relationship among the terms denoting such geographical entities constituted a version of what, in the parlance of modern KO, is known as a whole-part, or partitive, relationship (Aitchison, Gilchrist, & Bawden 2000, 58–59; ANSI-NISO 2005, 49; Broughton 2006b, 122 & 218, s.v. “partitive relationship”; Foskett 1982, 74–75), in which the broader term (BT) refers to a whole entity and the narrower term (NT) refers to one of its parts.

Although the hierarchical relationships between terms of countries in SI were exclusively partitive in nature, Kaiser (1911, §§ 333, 420) spoke of them in the same language of collectives and specifics that he employed with regard to terms of concretes, distinguishing between “collective countr[ies]” and “specific countr[ies]”. His use of the terms “collective” and “specific” in relation to both generic and partitive relationships is revealing, for it suggests that it was the hierarchical nature of these two kinds of relationships, rather than the specific logical properties of each, that held special salience for him: in each case, the collective term covered a greater area—semantic in the case of generic relationships involving concretes; territorial in the case of partitive relationships involving countries—than its correlated specific. It is perhaps unsurprising, then, that, as we shall see in Section 5.2.2.2 of this chapter, Kaiser sometimes allowed terms of concretes to stand in partitive relationships to one another without distinguishing them from the generic relationships that he took as his norm.

Finally, we come to terms of processes. In his introductory presentation of the latter category of terms in *Systematic Indexing*, Kaiser (1911, §73) gave the following as typical examples: “exchange”, “trade”, “manufacture”, “description”, “construction”, “finishing”, “spinning”, melting”, “emigration”, and “organization”. From a grammatical point of view, these exemplars all took the form of abstract nouns derived from verbs (e.g., Bain 1891, 22, § 12; Mason 1890, 20–21, §§ 32–33; Sweet 1900, 61), although Kaiser (1911, § 663, s.v. “Concrete and Process”) also allowed for the use of adjectives (cf. Section 7.3.3.2 of this chapter). Logicians had surprisingly little to say about deverbal terms such as the ones listed by Kaiser: the few writers who mentioned them placed them in the class of “abstract terms”—that is to say, terms denoting attributes of things considered apart from the things of which they were attributes (e.g., Hyslop 1892, 37, Jevons 1881, 22, Stock 1888, 26, § 95 & 28, § 101). Although abstract terms, deverbal and otherwise, differed from common terms in some of their semantic properties, one that they shared with the latter was the capacity to be ranged into relationships of generality and specificity: to cite but one example from the realm of commerce, the term “trade” possessed a greater degree of generality than the subordinate terms “home trade” and “foreign trade”, while the term “foreign trade”, in turn, encompassed the more specific ones of “import trade” and “export trade” (Hooper & Graham 1905, 1). In principle, then, terms of processes could be articulated into general term-specific term relationships analogous to those obtaining between terms of concretes. Furthermore, a series of processes could form sequential parts of a larger process. For example, the general process of making calico—a kind of coarse cotton cloth (Murray et al., 1888–1928, Vol. 1/1, 32, s.v. “Calico”; Whitney 1906, Vol. 1, 764, s.v. “calico”)—involved the particular processes of opening (i.e., cleaning and beating cotton fibers), scutching (i.e., further cleaning of the fibers and shaping them into rolls), carding (i.e., combing and brushing), drawing and doubling (i.e., forming long rope-like pieces of fiber to straighten it), twisting and lengthening, spinning the fibers into threads, and weaving the threads into cloths (Pitman’s Commercial Reader [1907], 136–141). Each of these processes formed a phase, or subactivity, of a more general process and thus could stand in a hierarchical relationship to it as a part to a whole (cf. Winston, Chaffin, & Herrmann 1987, 426, § 5.2); by the same token, then, terms of processes could form partitive relationships to one another. Yet, for reasons that shall become clear in Sections 3.5 and 5.2.2 of this chapter, Kaiser did not make provisions for the formal recognition of such relationships between terms of processes. The relational semantics of SI did not recognize any gradations of generality or

specificity within the category of terms of processes nor did it provide scope for expressing processes as forming parts of larger processes: indeed, the only relationships in which such terms could participate were those with terms of concretes and/or terms of countries, which were, as a rule, restricted to the formation of complex index terms, or statements.

Such, then, was the distribution of hierarchical relationships among the three categories of terms within SI: terms of concretes primarily formed generic or, perhaps better, quasi-generic relationships with one another, though partitive relationships were not entirely lacking; terms of countries entered into partitive, or part-whole, relationships with one another; while process terms were not formally involved in any hierarchical relationships. As we shall see in Sections 5.2–5.3 of this chapter, these intra-categorical relationships formed the backbone of SI's cross-reference structure, although other, non-hierarchical relationships were not lacking. However, the distinction between terms of greater specificity and those of greater generality underlying these relationships had a wider significance for Kaiser's indexing system, for he held quite definite views on the relative utility of specific and general terms, views that colored his thinking on such matters as the selection of information for indexing and the choice and treatment of index terms. In light of their far-reaching effects on Kaiser's conceptualization of SI, we shall do well briefly to consider these views here.

7.2.2.5. Specificity in Systematic Indexing

In setting forth the distinction between general and specific terms, Kaiser (1911, § 74) declared that “for the purpose of indexing it is of importance that this difference should be kept constantly in mind”. Immediately following this admonition to pay heed to the relative generality or specificity of terms he presented his rationale for issuing it in the first place:

From the point of view of the user information on both the specific and the general may represent desirable material upon which to work, but the specific is indispensable. The general contains deductions from specifics which may be acceptable to one and not to the other [sci., user—TMD], but given the specifics, we may generalise from our individual standpoint. Specific information has therefore a value which general information does not possess. Obviously we want specifics, for to draw deductions to meet our own case, that constitutes precisely our own business. To have our generalisations ready made for us would mean the same as to have our business done for us. The specific is the prime material on which we build, and in indexing we must concentrate on the specific for that reason (§ 74).

Interestingly, Kaiser framed this argument not with regard to the specificity of terms but rather with regard to the specificity of information, distinguishing between information on

“the specific” and information on “the general”. The primary difference between these two kinds of information was that the latter consisted of “deductions” and “generalisations” derived from “specifics”, whereas the former restricted itself to “the specific”. According to Kaiser, not all users of “general information” would agree with the deductions and generalizations formulated by others. Such a difficulty was avoided in the case of “specific information”, which allowed each user to form his own personal deductions and generalizations from the “specifics” presented to him. Thus, argued Kaiser, “specific information” was to be regarded as possessing greater value than “general information”: within the framework of a systematic card index, it constituted “the prime material on which we build” and, as such, was “indispensable” for the users. It was incumbent upon indexers, then, to take into account “the specific” in their work.

The foregoing argument leaves no doubt that Kaiser strongly valorized specificity as an important aspect of indexing. However, the abstract manner in which he presented it also invests it with a certain ambiguity, for, in equating “information on ... the specific” with “specific information”, he appears to have conflated two distinct senses of specificity. On one hand, the argument echoed leitmotifs of his broader epistemological outlook in which the distinction between specificity and generality took the form of the difference between specific facts and general inferences. We have already seen that in Kaiser’s view, knowledge was ultimately anchored in the observation of things in the world and that, in the world of business, each individual would form opinions—i.e., beliefs serving as grounds for action—about matters of interest to him on the basis of inferences—in other words, “deductions” and “generalizations”—from the facts at his disposal, whether these were obtained from direct personal observation or from the oral and written testimony of others (See Section 2.1 of the current chapter). We have also seen that, in his view, the process of generalization leading from facts to opinions was conditioned by the individual viewpoints of the persons drawing the conclusion (See Section 2.1 of the present chapter). Accordingly, Kaiser expected that different businessmen approaching a given set of facts from the perspectives of their own business concerns were likely to draw different conclusions from them and that not all would find another’s deductions applicable to their own particular situation—precisely the argument that he employed to underpin his claim for the relative inferiority of general information to specific information. On such a view, facts were easily assimilated to “the specific”, whereas the inferences drawn from them constituted “the general” (Kaiser

1911, § 79). Insofar as this notion of specificity involved the notion of making inferences from specific facts to general conclusions, I shall term it *inductive specificity*.

Although Kaiser's argument for the value of specific information was saturated with language redolent of the idea of inductive specificity, he actually made it on behalf of a quite different kind of specificity. As the locution "information on both the specific and the general" suggests, he had in mind the specificity of the subjects to which the information pertained or, as we shall call it, *subject specificity*. This mode of specificity had its basis in the kinds of hierarchical relationships—generic and partitive—that underpinned the distinction between specific and collective terms of concretes and countries (See Section 2.2.2.4 of this chapter): thus, for example, the subject represented by the term "agricultural machine" would be relatively specific in relation to the one represented by the term "machine" but relatively general in relation to the one represented by the term "cotton gin", while the subject designated by the term "South America" would be collective with respect to that designated by the more specific term "Chile". To be sure, for Kaiser, this mode of specificity was nothing other than term specificity and, given his empiricist predilection for the direct observability of written language (cf. Sections 2.2.2, end, & 2.2.3 of this chapter), he naturally preferred to speak of collective or specific terms rather than subjects. Nevertheless, it is appropriate to speak of subject specificity here, for, ultimately, terms did indicate the subjects—namely, concretes and countries—concerning which a given segment of text yielded information.

Although subject specificity and inductive specificity were both forms of specificity, they were not necessarily correlated to one another. Whether a given subject occupied a relatively general or relatively specific position within the hierarchy of subjects to which it belonged, information about it was likely to consist of both facts and generalizations: after all, writers on commercial matters could make generalizations about cotton gins or Chile no less than they could state specific facts about agricultural machines or South America. Now it is unclear to what extent Kaiser distinguished between the two. On one hand, he entered "specific information" and "specific term" as separate lemmata in the index to *Systematic Indexing*, with virtually no overlap between the paragraph numbers given as references thereto (Kaiser 1911, § 664, s.v. "Specific Information" & "Specific Term").³²¹ On the other, one cannot read §§ 74, the nominal subject of which was term—that is subject—specificity,

³²¹ The paragraphs listed under the entry for "Specific Information" (which included one subdivision in the index) were §§ 79, 93, 333, 348, 445, while those under "Specific Term" (which had no fewer than five subdivisions in the index) were §§ 74, 198, 290, 320, 333, 417, 423–424, 433–434, 590.

and 79, which clearly had to do with inductive specificity, without noting the strong verbal similarity between the two.³²² Viewed in this light, the passage from § 74 cited *in extenso* at the beginning of this section seems to invoke a valorization of the utility of specific information in an (inductively) inferential sense to make a case for the value of information about specific subjects. It would appear, then, that, while Kaiser was aware of the distinction between subject specificity and inductive specificity, he tended to conflate the two.

Perhaps contributing to Kaiser's tendency to conflate inductive and subject specificity were his experiences at the PCM's Bureau of Information, where both forms of specificity came into play in the mobilization of information that his work as librarian and indexer helped to support. As we saw in Chapter 3, Section 2, the Bureau dispensed specially compiled information to subscribing members of the PCM about international market conditions in their line of trade. According to one contemporary observer,

[t]his information was in the shape of an exhaustive report on the possibilities of and the method to be adopted for selling a specific article in a particular foreign market; for instance, sheep shears in Wellington, New Zealand, or machine belting in Bombay (Betts 1900, 228).

Needless to say, to prepare a report on information about a *specific* commodity in a *particular* market was to operate at a high level of subject specificity. The kind of information given about these subjects included the following:

Character and variety of the article already on the market the competition of which would have to be faced; names and addresses of the manufacturers now supplying the market, with special reference to those characteristics of their goods which had procured them favor; all available statistical information regarding the quantity imported, with reference to their countries of origin, declared values, etc.; prices of the article in question at the manufacturer's, and the terms of payment generally demanded of and granted by him; price at which the article is being sold by the importer to the consumers on the market in question; information regarding facilities of transportation and the market, as compared with the rates paid by rival countries; customs charges and regulations as to invoices, marking, declaration, etc.; recommendations as to wrapping, labeling, marking, and packing, as governed by

³²² Compare "From the point of view of the user information on both the specific and the general may represent desirable material upon which to work, but the specific is indispensable. The general contains deductions from specifics which may be acceptable to one and not to the other, but given the specifics, we may generalise from our individual standpoint" (§ 74) with "A supply of facts—so far as articles give them—on which to generalise will always be welcome and useful, for while the facts may for the time being be regarded as indisputable, generalisations based on them will always show individual tendencies" (§ 79). It is evident that the notion of "fact" at § 79 is analogous to that of "information on ... the specific"—that is to say, information on a specific subject—at § 74.

climatic conditions, transportation facilities, and handling, etc.; names and addresses of the most reliable importers already trading in the article in question; the field of distribution controlled by the market under review; any useful supplementary information not included in any of the foregoing (p. 228).

As this imposing list suggests, the reports were largely composed of statements of specific facts about various aspects of the trade conditions surrounding the commodity in question in the market of interest to the subscriber: in this, they clearly reflected the PCM's mission to provide facts about international commerce to its members (See Chapter 3, Section 2 & Section 1 of the current chapter). Such reports manifestly combined a high level of subject specificity with a high degree of inductive specificity in their informational content: it is tempting to conjecture that Kaiser's first-hand knowledge of these reports and the manner in which they were created may well have led him insensibly to link the two kinds of specificity together in his mind.

Whether Kaiser's conflation of inductive and subject specificity was informed by his knowledge of the kinds of subjects and contents with which the Bureau's reports dealt must ultimately remain a matter for speculation. However, there can be little doubt that his time at the PCM impressed upon him the importance of subject specificity. We have seen that, for much of his tenure at the PCM, Kaiser was responsible for overseeing the maintenance of the card index from which the reports were prepared and so was well placed to observe how the index was being used by the researchers compiling the reports (See Chapter 3, Sections 3.2 & 3.3, above). Of this experience, he later recounted that "[i]n reporting, generally, only the most specific information was of any use. General subjects would practically never be called for" (Kaiser 1926, 22, § 8). Observations such as these laid the groundwork for Kaiser's firm conviction that information about specific subjects was, as a rule, of greater utility than information about general ones, at least within the world of business (cf. Kaiser 1911, §§ 320, 333).

Kaiser's valorization of subject specificity directly affected the protocols for SI in several ways. For one thing, it underlay one of the criteria that he formulated for determining what was to count as indexable information. As was noted in Section 1 of this chapter, Kaiser held that one of the major functions of indexing was to distinguish those elements of documentary information to be incorporated into a card index from those that were to be excluded from its purview. To this end, it was necessary to establish criteria for selecting pieces of information: in Kaiser's (1911, § 89) words, "[i]t is ... of great importance in indexing to discriminate, to have a reason either for indexing or for rejecting a given

information". The most fundamental criterion, of course, was that of relevance to the informational needs of the business organization for which an intelligence department was managing the index: only those items of information touching upon subjects of interest to the organization were to be included within its ambit (§ 311). Within the limits of the domain of interest set by the intelligence department's parent organization, specificity became a factor in selection, for, as Kaiser stated, "we may discriminate against the general and in favour of the specific information on the ground that the more general the information the less is it likely to be of direct use" (§ 93). With this assertion, he reaffirmed, albeit in a negative way, his judgment that specific information had greater value than general information and turned it into a justification for formulating a guideline for selection: given the choice between indexing information on a relatively specific subject or that on a relatively general one, it was advisable to opt for the first alternative and index at the higher level of subject specificity.

Kaiser's injunction to prefer information on specific subjects for the purpose of indexing carried through to his protocols for selecting index terms. We have already seen that he expected such terms to be, for the most part, directly derived from the texts being indexed (See Section 2.2.3 of the current chapter). Within the general limits set by this expectation, he stipulated rules and recommendations regarding specificity for the two categories of terms in which it came into play—namely, terms of concretes and terms of countries. For terms of countries, this did not extend beyond a general exhortation to favor terms for specific countries (e.g., "France" or "United Kingdom") over ones for broader geographical units (e.g., "Europe") on the familiar grounds that "[e]xperience will soon show that where a specific country is given, the information is more likely to be of more use than in cases where the country is more or less a collective term" (Kaiser 1911, § 333). In the case of terms of concretes, however, matters were somewhat more involved.

"The term for the concrete should always be as specific as possible, for the more general the term is the less use as a rule the information" (Kaiser 1911, § 320): such was Kaiser's basic rule for specificity with regards to terms of concretes. To this he immediately added the rider that "[n]ames should not be cut down ... nor should a class name be substituted for a specific term given". In this context, to cut down a name meant to remove from a multiword term the adjectival modifier(s) qualifying the noun (e.g., to alter "artificial indigo" to "indigo"): insofar as such modifiers tended to indicate the attribute differentiating a specific term (*in casu*, "artificial indigo") from the superordinate generic one (*in casu*,

“indigo”), truncation of this sort constituted a special case of the more general practice of substituting a class name for a specific term. Kaiser’s interdiction of this practice clearly dovetailed with his more general instruction that “[i]n all cases the name of the concrete should be taken as it is found” in the text being indexed (§ 318; cf. §§ 317, 348, Point 4). The prohibition against substitution also guarded against characterizing a given item of information with an index term that designated it as being about a more general subject than it actually was: in other words, it enforced, albeit in a negative way, what librarians called specific entry (See Glossary, s.v. “Specific Entry”).³²³ There were, however, also cases in which considerations of specificity moved Kaiser to take a diametrically opposite approach and advocate for the substitution of new terms for those found in the text. Observing that “[c]ollective terms like *goods, apparatus, merchandise, ware, generator* etc are in most cases quite useless for indexing”, he counseled that “[i]f the collective only is given, the specific can in nearly all cases be supplied from the text of the information, thus: *hardware, rubber goods, music instrument, acetylene generator* etc.” (Kaiser 1911, § 320 [emphases his]). In other words, if the terms occurring in a text were too general to serve as useful index terms, the indexer was within his rights to replace them with sufficiently specific ones that he was to supply on the basis of his understanding of the text. In short, if the rule demanding fidelity to the terms used by the author of a document came into conflict with the rule enjoining use of specific terms, the latter could override the former—a telling indication of the significance that Kaiser attached to the notion of subject specificity.

The measure of freedom that Kaiser allowed to indexers in replacing overly broad terms with more specific ones was in part symptomatic of the pragmatic flexibility that he sought to build into his system of indexing as a whole. However, it also reflected his recognition of

³²³ Although Kaiser did not develop this idea further in *Systematic Indexing*, he did state, in a later exposition of SI, that “[d]irect access [sci., to information within a card index—TMD] ... means filing under specific subjects rather than under collectives” (Kaiser 1926, 22, § 9)—a formulation that is, on the surface at least, reminiscent of Cutter’s (1904, 66, Rule 161) famous statement of the rule of specific entry: “Enter a work under its subject heading, not under the heading of a class which includes that subject”. Unlike Cutter, though, Kaiser did not formulate this tenet with respect to “works”—that is to say monographic books, some polytopical books, and, occasionally, significant essays forming parts of books—but to specific pieces of information culled from within various kinds of documents. Interestingly, Kaiser (1926, 22, § 9) went on to suggest that specific entry was a means of reducing the number of entries per index term, claiming that “the cards are much better distributed because of the smaller range of specifics; large accumulations of cards occur less frequently”. On this view, specific terms functioned as virtual subdivisions, so to speak, of collective terms, breaking up what would be a large number of card entries, if filed under a collective, into smaller, more manageable chunks. Here, again, we are confronted with an eloquent example of a recurrent theme in Kaiser’s thought: namely, the control of quantities.

the fact that judgments of specificity—and hence decisions as to what terms to extract from a text or, as the case might be, to read into it—were in large part contingent upon the particular domain of interest of the business organization for which a given card index had been created and was being maintained: as he put it, “[t]he terms general and specific must be defined relatively according to the nature of each business” (Kaiser 1911, § 93; cf. § 74). One effect of such contingency was that a given term might assume different degrees of specificity within different subject domains. For example, the term “Boiler” would be very general from the perspective of a firm specializing in the manufacture of a variety of boilers, but fairly specific from the vantage point of a small dealer in machinery and other appliances whose shop sold only a single kind of boiler: whereas it would probably be too broad a term to be useful in an index prepared for the former (one would require specific terms for each kind of boiler such as “Watertube Boiler”, “Firetube Boiler”, and so on), it might well be sufficiently specific for an index kept by the latter (where it would, in effect, denote the single kind of boiler in which the dealer was interested).³²⁴ Another effect was that, within a single business organization’s domain of interests, some areas would be more salient than others and so require more detailed subject coverage than others. As Kaiser observed,

[e]ach business has its special sphere and accordingly will index more minutely information lying within its boundaries. On the other hand each business also has a good deal of what may be called secondary information which will be treated less minutely and perhaps more collectively (§ 312; cf. § 654).

Subjects located within the central region of the domain of interests would require highly specific indexing and, accordingly, the use of specific index terms, whereas those falling into its peripheral areas would demand less extensive indexing so that an indexer could make do with more general index terms: for example, Kaiser observed, “[w]e may be interested in *chemicals* ... and we would have to make it our business to use the most specific terms in this branch, but for our purpose it may be waste of time to go into the finer distinctions of machinery” (§ 418 [emphases his]). The distinction between the core and the periphery brought general, or collective, terms back into the picture, according them a legitimate place within the index. Even so, once one had made the necessary adjustments for the contours of

³²⁴ For a more complex and somewhat obscurely formulated example, on which the present one is loosely based, see Kaiser 1926, 25, § 15. A comparable argument about domain effects on subject specificity would be presented thirty years later within the discourse of general library cataloging by Lilley (1955, 4), albeit without any reference to Kaiser. Lilley’s example has not been without influence in later discussions of specificity; see, e.g., Svenonius 1976, 177.

the particular domain of interest for which one was indexing, preference was to be accorded to specific terms in keeping with the general principle that “[i]n systematic indexing direct access requires that we concentrate on specific terms rather than collectives” (Kaiser 1926, 30, § 31; cf. 1911, § 348, Point 3).

Kaiser’s enunciation of specificity as an ideal and his protocols for achieving it, then, represented a confluence of several different factors. His understanding of subject specificity was grounded in the relational semantics of terms of concretes and for countries, whereby the generic and partitive relationships between terms and the hierarchical chains formed therefrom allowed the indexer to gauge the relative generality and specificity of the subjects that they designated. Kaiser’s preference for specific over general terms evidently derived in part from his own observations of index use at the PCM, which appears to have impressed upon him the utility of high subject specificity in indexing. Additional theoretical motivation came from his association of subject specificity with the separate notion of inductive specificity, according to which facts constituted “the specific” and the generalizations derived from them counted as “the general”: his epistemological individualism led him to favor the specific because facts could be readily articulated in accordance with one’s individual viewpoint, whereas generalizations bound one to the opinions of others. On the basis of his firm belief that the more specific the information (in both the subject and inductive senses), the more useful it would be for business purposes, he developed guidelines for encouraging subject specificity in indexing, in which the selection of terms was to be based on such factors as their presence in the texts being indexed, their hierarchical relationships to other terms, and, more broadly, their place within the nexus of subjects forming the particular organizational domain of interest represented in the index in which they were to be used. Selection based on these considerations was to be conducted in a pragmatic spirit.

For Kaiser, subject specificity was a core element in index design, one that was subject to a number of factors but which had its ultimate basis in hierarchical relationships between terms. As noted in Section 2.2.2.4 of this chapter, the particular kind of hierarchical relationships that could be established between given terms depended their membership within one of three categories: terms of concretes contracted generic relationships with one another; terms of countries, partitive relationships; and terms of processes, no hierarchical relationships at all. Setting constraints on hierarchical interterm relationships, however, was only one aspect of the rôle that these categories played within Kaiser’s system of

indexing. More fundamentally, they provided the conceptual elements on the basis of which Kaiser formed rules for the creation of the complex index terms that both defined and indicated the contents of the pieces of information selected for inclusion within an index (See Section 2.1 of the present chapter, end). It is now time to turn to a closer examination of these categories and the category system that they formed.

7.3. Categories, Statements, and the Categorical System of Systematic Indexing

The categories of concrete, country, and process lay at the very heart of Kaiser's method of analytical indexing.³²⁵ As we have already noted, he believed that documentary texts falling under the rubric of business literature could ultimately be resolved into terms of concretes, terms of countries, and terms of processes (See Section 2.2.2.4 of the current chapter). Inasmuch as they represented basic kinds of objects of knowledge about the world,³²⁶ these three classes of terms formed "the constant elements" of "the information conveyed by Literature" (Kaiser 1911, §§ 298, 302, 452, 574, 625). Invoking what was, in effect, a literature-based ontological warrant, Kaiser deemed the categories of concrete, country, and process to be eminently suitable for structuring the central component of an indexing system: its vocabulary. Any system of organization, he argued, must be founded on

³²⁵ A point of terminology requires brief comment here. Whereas modern commentators routinely speak of Kaiser's concretes, countries, and processes as "categories" (e.g., Dousa 2011; Straioto & Guimarães 2004; Svenonius 1979; Vlasák 1967), Kaiser himself did not use this term. Generally, he spoke of them simply as "terms of concretes", "terms of countries", and "terms of processes" or, in more abbreviated fashion, "concretes", "countries", and "processes" without characterizing them collectively as a classificatory kind; on the rare occasions when he did so, he designated them as "classes" (e.g., Kaiser 1926, 23, §§ 10–11, 25, § 16, & 28, §25). There are, however, good grounds for using the term "category" with reference to SI. The term originally derived from Aristotelian logic, where it referred to the most general kinds of predicates that could be applied to the subject of a proposition and the most general classes—the *summa genera*—of things that have being (Joseph 1906, 35–46; Meiland 1999; Owens 1985 [1963], 143–144; Thomasson 2009, § 1.1): thence, it came into general English usage as a synonym for "class" or "group", especially one that was broad in extent (Adamson & X. 1910, 508). Within the discourse of KO, the term rose to prominence with Ranganathan's (1944) postulation of "fundamental categories" as a basis for structuring complex class concepts for bibliographic faceted classification; thence, it has come into common use to refer to class-concepts of great generality (e.g., Barité 2000; Cheti 1990), especially among researchers working within the tradition of facet analysis (e.g., La Barre 2010, 250–253). Given that concretes, countries, and processes did constitute classes of great generality and that such classes have been styled categories both in popular usage and in the technical terminology of KO, it is surely justifiable to use the term "category" with reference to Kaiser's term classes, even if the term is not his own.

³²⁶ More precisely, Kaiser made this claim explicitly only for concretes and processes; see Section 2.1 of this chapter, esp. 299–300, above. However, as we shall see in Section 3.2 of this chapter, he attempted to subsume countries into his ontologically-grounded theoretical schema by considering them as a special kind of concrete. Moreover, as we shall argue in Section 3.4 of this chapter, he had good *practical* reasons for considering countries to constitute objects of knowledge important to commercial men.

“fixed points”—that is to say, elementary architectonic elements on the basis of which the formal structure of the system was to be built up (§§ 29, 635, 663, s.v. “Fixed Points”): “[t]here is no organisation which does not rest on some fixed points, fixed points and their utilisation are as universal as cause and effect” (§ 631), he averred. With regard to his own indexing system, he considered “concrete, country and process terms” to constitute the “fixed points” of SI and, indeed, to serve as the very “foundation” of its organizational scheme (§ 645).

The structuring activity of the categories began with classification. In his last published exposition of SI, Kaiser (1926, 28, § 25) described them as constituting a small set of mutually exclusive and jointly exhaustive classes into which the stock of terms forming the vocabulary of an index was to be distributed: each and every term admitted into the vocabulary was to be assigned to one, and only one, of the categories on the basis of the general kind of entity that the specific (kind of) object or phenomenon which it named was. Viewed in this light, the categories comprised a constitutive classification for terms not dissimilar in its formal structure from Kaiser’s scheme for document classification, albeit having a more restricted number of classes than the latter and, obviously, serving as a framework for organizing quite different semantic content (See Chapter 6, Section 3.1, above). We have already had a brief foretaste of the kinds of terms included within each of the component classes of the classification (See Section 2.2.4 of the present chapter): in the following pages, we shall examine in greater depth Kaiser’s formal definitions of the categories and probe their semantic boundaries. For the time being, it is sufficient to observe that every term used in a given index obligatorily belonged either to the class of concretes, that of countries, or that of processes: a term that could not be accommodated within one of these classes could find no place within the vocabulary of an index designed according to the principles of SI.

The categories, then, were a mechanism for dividing an index vocabulary on the basis of the general entity types to which the objects or phenomena denoted by index terms belonged. Grounded in semantic considerations, this classification of terms had syntactic consequences (Svenonius 1979, 59–60), for the categories served as the elementary structural units for the construction of complex index terms which Kaiser (1911, § 302) styled *statements*. A statement was a string of terms drawn from different categories, in which the order of the component terms was determined by the categories of which they were members (Svenonius 1978, 137). Kaiser (1911, § 302) stipulated that there were

three permissible sequences of terms for formulating a statement, of which the templates were:

[7.1]. [CONCRETE]–[PROCESS]

e.g., WOOL–SCOURING

[7.2]. [COUNTRY]–[PROCESS]

e.g. BRAZIL–EDUCATION

[7.3]. [CONCRETE]–[COUNTRY]–[PROCESS]

(Var.: [COUNTRY]–[CONCRETE]–[PROCESS])

e.g. NITRATE–CHILE–TRADE

(CHILE–NITRATE–TRADE).³²⁷

The complex index terms constructed on the basis of the foregoing patterns fulfilled several different functions within the context of an index (Kaiser 1911, § 314). Of these, two were of fundamental importance: subject indication and index file organization. First and foremost, the statement served as the standard unit of subject indication in SI. Although Kaiser (1908, §§ 113–114) acknowledged that, in indexes of a very simple sort, a single term might suffice to indicate the subject of an item of information, he considered the statement to be *de rigueur* “for more systematic work” of the kind that SI was designed to support. With regard to the subject-signifying nature of statements, he wrote that

we are not dealing with isolated terms each conveying independent information, but with connected terms all having reference to the same piece of information. The concrete is the main term, the process gives the action stated of the concrete, and the country supplies the locality where the action takes place. Each of the three forms given may be described as the skeleton of the information, it indicates approximately the limits within which the information lies, it is a statement of the information reduced to the smallest compass, hence its name—*Statement* (1911, § 302 [emphasis his])

³²⁷ The conventions for writing both the categorial patterns for statements (i.e., category names written in capital letters, enclosed in square brackets, and joined to one another by en-dashes) and the concrete examples thereof (i.e., terms written in capital letters and joined by en-dashes) are my own. In *Systematic Indexing*, Kaiser (1911, § 302 [emphases his]) used the prose phrases “*Concrete and Process*”; “*Country and Process*”; “*Concretés [sic], Country and Process*”, to refer to these patterns, employing “*Concrete — Country — Process*” on one occasion to indicate the full complement of component units (§ 301). Although statements in actual use were typed on cards in a special format that we shall consider in Section 3.4 of this chapter, Kaiser formulated in-text examples thereof in one of two ways, “Wool—Scouring” or “Wool ... Scouring”, the former being more common. The variant pattern under [7.3] did not occur in Kaiser’s (1911) formal presentation of statement patterns at § 302, but was introduced at § 385: an allusion to it is also found at Kaiser 1908, § 115; for further discussion, see Section 3.5 of this chapter, esp. 480–482, below.

As the first half of this passage makes clear, Kaiser believed that, despite its composite nature, the statement formed a semantic unity, the components of which combined to produce an integrated representation, *in nuce*, of the contents of an item of information. The very name that he accorded it—“statement”—implied that it was an integral unit of subject indication analogous to the sentence in natural language discourse or the proposition in logical reasoning:³²⁸ indeed, he expressly assimilated his indexing statements to sentences, writing that “[t]he method of systematic indexing ... although it considers terms primarily really classes the information by short sentences as contained in the statement” (Kaiser 1911, § 663, s.v. “Concrete and Record”; cf. Svenonius 2000a, 174).

A statement, however, did more than simply represent the contents of an item of information. According to Kaiser (1911, § 304), it set out “the approximate limits of the information” to which it referred: that is to say, it demarcated, on thematic grounds, which elements of the text being indexed would be incorporated into an index. In accordance with his general views regarding the derivation of index terms, Kaiser assumed that the component terms of a given statement would be taken from a given segment of text: the statement resulting from the synthesis of these terms formed the irreducible hard core—“the skeleton”, as he put it—of the information conveyed by that piece of text (§§ 303–304, 349). As such, a statement was a minimal expression of the very information to which it referred (Metcalf 1957, 214): for example, the statement SHEEP–AUSTRALIA–SHEARING would be taken to indicate, at the very least, that sheep were being shorn in Australia and that the information associated with this statement dealt with this phenomenon in some way (Metcalf 1976, 182). Yet if the statement formed the semantic nucleus of the information to which it referred, it did “not give ... the complete information” (Kaiser 1911, § 303): after all, to resume our example, many different kinds of things can be said about the shearing of sheep in Australia and the aforementioned statement does not, by itself, specify

³²⁸ The notions that sentences and propositions were the basic units of ordinary language discourse and logical reasoning, respectively, were common ones among teachers of language and logicians of Kaiser’s day. For a contemporary statement on sentences as the unit of discourse, see Smith & Thomas 1900, 86, 85: “A sentence ... is a group of words so arranged with definite grammatical relations to one another that they convey a complete thought. ... The sentence is the real unit of discourse, the medium of intelligent communication ...”. On the proposition as the standard unit in logical reasoning, see Keynes 1906, 9: “[T]he proposition is the true logical unit, and ... the logical import of terms cannot be properly understood except with reference to their employment in propositions”. Given Kaiser’s own background as a language teacher and apparent acquaintance with at least the rudiments of logic, the analogy between complex subject terms and sentences or propositions that is implied in his use of the word “statement” would have been an easy one for him to make. In modern KO, Svenonius (1979, 59–60; 2000a, 131) has explicitly drawn the parallel between compound subject terms and natural language sentences.

what, precisely, is being said in any given case. A statement, then, required supplementation with other data drawn from the source text, such as a summary of the specific information given in the text, the date(s) to which it pertained, and an indication of the source of the text. Kaiser considered such additional data to constitute an *amplification* of the statement (§ 304). Together, the statement and the amplification made up a single *index item*—that is to say, a single item of information to be recorded on a single unit card and incorporated into a card index (§§ 305, 375). We shall have more to say about the amplification, its interaction with the statement, and the preparation of index items in Sections 4.3 and 4.4 of this chapter. Of crucial importance in the present context is the fact that Kaiser took the statement as the basis on which to build up index items: complex index terms synthesized from terms of concretes, countries, and processes not only indicated the subjects of the items of information to which they referred, they determined the contours of the items themselves.

In addition to demarcating individual items of information and indicating their subject content, statements also functioned as the primary mechanism of organizing these items within an index file. There were two ways in which they did so. The first of these was through the collocation of index items. Whereas statements were derived from individual texts, index items drawn from different texts would frequently contain statements consisting of the same string of terms. This meant that different index items shared a statement in common,³²⁹ but each possessed its own distinct amplification—a situation for which Kaiser (1911, § 304) drew a bold, if somewhat inexact, analogy with classificatory structures when he observed that “[i]f we take a number of items having the same statement, we shall see that as explained under classification, the statements correspond to their common descriptions and the amplifications to their varying degrees”.³³⁰ Statements held in common by different index items thus provided a natural means of collocating those

³²⁹ Or, to put the matter in more precise philosophical terms, albeit ones that Kaiser himself did not use, the instances of the statement found on the different index items constituted tokens of a single type. On the distinction between types (i.e., abstract objects) and tokens (i.e., concrete instantiations thereof), see Frické 2012, 89–90; Wetzel 2006.

³³⁰ In Kaiser’s parlance, it will be remembered, common descriptions were characteristics of division, whereas degrees formed the array of coordinate classes formed by the application of a common description in a classification. For full discussion of these concepts, see Chapter 6, Section 3.2.2, above. Strictly speaking, the analogy was inexact, because the relationship between common descriptions and degrees was between an attribute and its various values, while the relationship between the “same statement” and different amplifications was between a single type (i.e., the statement) and concrete particulars whose only relation was that they were associated with tokens of that type (i.e., the different amplifications).

items or, in Kaiser's words, "collect[ing] together information on like subjects" (§ 303; cf. §§ 297, 663, s.v. "Concrete and Record"). Serving as devices for collocation, statements were themselves amenable to organization through the stipulation of rules for arranging them in a sequence on the basis of the alphabetical ordering of their component terms, which we shall discuss in Sections 5.1 and 5.2.1 of this chapter. This was the second way in which they contributed to the structuring of a card file: as Kaiser noted, "[s]ince we have a separate statement for each item, all that is required is to collect together those with like statements and arrange them [sci., the statements—TMD] in the desired sequence" (§ 306). The organization of index files by means of statements meant, in turn, that the latter were also well placed to serve as central points of reference in search: "[w]hen the index is arranged and we wish to consult it, we again refer to the statement first and from it alone we can decide in the majority of cases whether it gives what we require or not" (§ 306), averred Kaiser. For all these reasons, he accorded the statement a position of cardinal importance in SI, pronouncing it to be "the main feature of this method of indexing" and counseling that "it should be treated with due regard to this fact" (§ 306).

The great significance that Kaiser attached to statements warrants a closer consideration of them and the categorial "fixed points" from which they were constructed. Even a cursory glance at the three statement forms given above as [7.1]–[7.3] reveals certain patterns in the configuration of categories within them. First and most obvious, two of the forms ([7.1], [7.2]) consisted of two terms only, while the third ([7.3]) was composed of three. Second, the categories of concrete and country were positionally interchangeable, either across different statement forms (as in the case of those with bipartite structure) or within a single statement type (as in the case of that with tripartite structure). Finally, the categories of concrete and country, whether occurring alone or conjointly in a statement type, invariably preceded that of process.³³¹ Kaiser (1908, § 114) explicitly acknowledged the latter two patterns with regard to the tripartite form of statement, noting that

In this case the first and second terms [sci., of the statement—TMD] are limited to concretes ... and countries, the third term being the process. The first and second terms are interchangeable, one card being written with the concrete ... as first term

³³¹ *Pace* Broughton (2004, 100), who writes "Kaiser ... suggested that concretes should always precede processes in the heading He identified 'place' as a third common and significant category, also to be placed third in the citation order [sci., sequence of terms—TMD]", the category of [COUNTRY] always preceded [PROCESS] and so never could occur third in the sequence of terms within a tripartite statement.

and the country as second term and one with the country as first and the country as second term

The presence of these patterns irresistibly raises the question of the rationale underlying them: it is natural for the student of KO to ask what factors impelled Kaiser to select these statement types, what justifications he gave for doing so, and what the consequences of the selection were for subject indication and index file organization within SI.

To get a purchase on these questions, however, it is first necessary to consider Kaiser's conceptualization of the categories of concrete, country, and process themselves. There are two reasons for doing so. First, the categories constituted semantically defined building blocks for statement types and the respective meanings that Kaiser accorded to them—that is to say, the kinds of general entity types that he took them to represent—played a decisive rôle in his choice of the syntactic structures that he stipulated for the three statement types. Second, the definition of each category provided the criterion for deciding which terms could be appropriately assigned membership in it. Inasmuch as the categories held particular positions within the statement types, their definitions determined, *on the level of practice*, which terms forming part of an index vocabulary might occupy which positions within statements. In short, Kaiser's category definitions were of foundational importance for both the theory and the practice of statement formation, and so require attention if we are to understand the underlying rationale of this pivotal feature of SI. Especially germane in this regard are questions of what factors helped shape the definitions, how semantically cohesive and theoretically well grounded they were, and how well they worked in practice.

In light of the foregoing considerations, we shall cover the following terrain in this section. First, I shall discuss, in turn, the three categories of concrete, country, and process, examining Kaiser's formal definitions of them both in themselves and with reference to concrete examples of terms that he assigned to them in his own work (Subsections 3.1–3.3, below). Then, I shall turn to his category system as a whole, setting out his theoretical rationale—or, as we shall see, rationales—for the inclusion of the categories within it and for the particular structural forms that the three statement forms could take (Subsections 3.4–3.5, below). Finally, I shall consider some of the semantic and syntactic limitations to which Kaiser's conceptualization of the categories and his category system led, as well as some of the solutions that he proposed for dealing with them (Subsection 3.6 below). As we shall see, his treatment of categories and statements involved a *mélange* of theoretical

notions and pragmatic considerations that were informed, in crucial ways, by both the specific milieu and the general domain within which he developed SI.

7.3.1. The Category of “Concrete”

As we have already seen in Section 2.1 of the present chapter, Kaiser (1911, § 52 [emphases his] chose the name “concrete” to designate “*things* in general, real or imaginary,” knowable by observation and reasoning. At first blush, it would seem that, so defined, the category of concretes extended over an extremely broad—indeed, almost limitless—ontological domain, for the commonplace word “thing” had an exceedingly wide scope of reference. This becomes apparent if one consults the entry for the word in the *Century Dictionary*, one of the leading dictionaries of the English language in Kaiser’s day, which gave such meanings as “that which is or may become the object of thought”; “that which has existence, or is conceived or imagined as having existence”; or “any object, substance, attribute, idea, fact, circumstance, event etc.”—definitions to which was added, for good measure, the stipulation that “[a] thing may be either material or ideal, animate or inanimate, actual, possible, or imaginary” (Whitney & Smith 1911, Vol. 8, 6291, 1 s.v. “thing”).³³² Yet if Kaiser’s characterization of concretes as “things in general” would appear to have made the category virtually all-encompassing, his selection of the term “concrete”, in an uncommon use as a count noun (i.e., “a concrete”; “concretes”),³³³ as the name of the category indicates that there were, in fact, limits to the kinds of entities that might fall within its compass. To see this, it is necessary to consider the lexicographic and conceptual background of the term.

³³² The *New English Dictionary on Historical Principles* was no less expansive in its definitions of the word. Its compilers accorded it, *inter multa alia*, general significations such as “[a]n entity of any kind”, “[t]hat which exists individually (in the most general sense, in fact or in idea)”; “that which is or may be in any way an object of perception, knowledge, or thought”: it could also be “[a]ppplied to an attribute, quality, or property of an actual being or entity” and could denote “[t]hat which is done or to be done; a doing, act, deed, transaction; a fact, circumstance, experience” or “that which is said; a saying, utterance, expression, statement” (Murray et al., 1888–1928, Vol. 9/2, 308, I.3–5 & II.7–7.b s.v. “Thing”).

³³³ In linguistic terminology, count nouns (also known as “countables”) are nouns used to refer to a countable kind of thing and can take both singular and plural forms (e.g., “machines”, “tools”, “engines”, “engineers”): they contrast with mass nouns (also known as “uncountables”) which express uncountable kinds of things, and, in ordinary discourse, typically take only the singular form (e.g., “iron”, “wool”, “yarn”); see, e.g., Matthews 1997, 80, s.v. “countable”, & 389, s.v. “uncountable”. Cf. p. 286, n. 282, above.

7.3.1.1. Lexicographical and Conceptual Background to the Category of “Concrete”

The origins and history of a word sometimes provide valuable clues about its general semantic contours: such is, happily, the case with “concrete”. As regards etymology, it ultimately derived, apparently *via* French, from the Latin word *concretus*, the passive participle of the verb *concrecere*, which bore the literal meaning “to grow together” (Lewis & Short 1987 [1879], 404, s.v. “con-cresco”; Onions, Friedrichsen, & Burchfield 1966, 201, s.v. “concrete”). In classical Latin, this verb was typically used to refer to the condensation, thickening, coagulation, hardening, and agglomeration of material substances, with the underlying notion of unification by the process of coming together or convergence: thence, *concretus*, most frequently used as an adjectival modifier, signified that something had been formed by condensation, coagulation, hardening, agglomeration, or a similar process, while its substantivized form *concretum* referred to firm or solid matter (Ernout 1946, 92; Ernout & Meillet 1959, 150, s.v. “crēscō”; Lewis & Short 1987 [1879], 404, s.v. “con-crescere”). For writers of a more philosophical bent, such as Cicero, the word connoted composition from different elements as well as formation through conglomeration (cf. Barata-Moura 2009, 7, text to nn. 22–25). This nuance of the word would lead to the reinterpretation of the participial form *concretus* by some Late Antique writers, who attached it to another verb *cernere*, which bore the meaning “to mix together” (Ernout 1946, 94–96; Ernout & Meillet 1959, 150, s.v. “crēscō”; Lewis & Short 1987 [1879], 397, s.v. “con-cerno”).

Another Late Antique development had momentous implications for the later history of the word. In the late 5th and 6th centuries, *concretus* was taken up into philosophical discourse by the late Roman philosopher Boethius, who wrote that “incorporeal nature(s)” (*incorporea(e) natura(e)*)—i.e., immaterial forms determining what kind of being a given thing is—that had “grown/mixed together” (*concreta*) with material bodies (*corporibus*) could be intellectually separated from the latter by the mind through a process of abstraction (Boethius, *In Isagogen Porphyrii Commenta* I.11, cited in Aubenque & Oeing-Hanhoff 1971, 35; Barata-Moura 2009, 8). In this way, building on the inherited association of the word *concretus* with the notions of materiality and unification through the composition of different elements, he transposed it into the realm of noetics and metaphysics, engrafting it into the framework of a philosophical tradition extending back to Aristotle, where it corresponded to the notion of a given individual thing or being as a single, subsistent composite whole (*to sunholon*) in contradistinction to the idea of a non-subsistent attribute of a thing conceived through abstraction (*ex aphaireseos*) (Aubenque &

Oeing-Hanhoff 1971, 34; Urmson 1990, 27 & 161). Over the next millennium, Scholastic philosophers following in Boethius's footsteps elaborated the opposition between the concrete (*concretum*) and the abstract (*abstractum*) with regard to objects (in metaphysics), concepts or notions (in psychology), and terms (in logic) (Aubenque & Oeing-Hanhoff 1971, 35–36).

Although discussion of the various ways in which the Scholastics developed the distinction between the concrete and the abstract lies well beyond the remit of this dissertation, one elementary example that both echoes Boethius's statement and sets the stage for later developments merits consideration here. In the course of a discussion regarding naming in the *Summa Theologiae*, the great 13th-century philosopher and theologian St. Thomas Aquinas noted that, in speaking of objects accessible to the senses, “we use abstract names in order to signify simple forms, but we use concrete names to signify subsistent things (*res subsistentes*)” (*Summa Theologiae*, Ia, q. 32, a. 2, cited in Barata-Moura 2009, 8). In this context, a form was a formal principle determining the essential nature (in the case of a substantial form) or some accidental attribute (in the case of an accidental form) of a given being, whereas a subsistent thing was one composed of form and matter that had independent existence and so was complete in itself (*aliquid completum subsistens*; *Summa Theologiae* Ia, q. 13, a. 1, ad 2, cited in Barata-Moura 2009, 8).³³⁴ A noun such as *homo* (i.e., “human being”) was a concrete name, for it could be applied to complete subsistent beings (such as Socrates in “*Sortes est homo*”, “Socrates is a human being”). A word such as *humanitas* (i.e., “humanity”), on the other hand, was an abstract name, for it referred to the formal principle by which individuals are human but not to the matter which the principle informed to make them the kind of being that they are: in other words, it denoted a metaphysical part of an individual being (obviously, one could not credibly assert that “*Sortes est humanitas*”, “Socrates is humanity”, but only “*Sortes habet*

³³⁴ It should be stressed that, in Aquinas's view, composition from form and matter held only for created material beings. He also believed in, and argued for, the existence of created immaterial beings, namely angels or “separated substances”, which were complete, subsistent beings and yet consisted of form alone (Stump 2005, 197–200). To be sure, on this view, angels did not lack all metaphysical composition as such, for their being involved a composition of essence—that is to say, the quiddity or form that determined what kind of creature they were—and of the existence that they received from God: this distinguished them from God, the uncreated immaterial being who was held to be perfectly simple and whose essence was identical to His existence (Wippell 2012, 53–65). Nevertheless, angels were, in contradistinction to all other created things, pure subsistent forms. It may be noted that not all of Aquinas's contemporaries shared this view of the metaphysical composition of angels: St. Bonaventure, for one, held that they were, indeed, composed of form and matter (Keck 1998, 95–99; Wippell 2012, 45–53).

humanitatem", "Socrates has humanity").³³⁵ On this view, concreteness was associated with the notion of composite beings understood to be subsistent, complete wholes, whereas abstractness pertained to forms—in a more modern idiom, natures or attributes—that were simple and incomplete in themselves, existing only as metaphysical parts of concrete beings, though intellectually separable from them by the act of abstraction (Aubenque & Oeing-Hanhoff 1971, 36).

The distinction between the concrete and the abstract survived the supersession of Scholasticism as a dominant mode of doing philosophy in early modern times and continued to be an element in the conceptual armamentarium of philosophers working within different national and intellectual traditions (Aubenque & Oeing-Hanhoff 1971, 38–42; Barata-Moura 2009, 9–11). Of these, especially relevant to our theme is the discourse of traditional logic in the English-speaking world in the 19th century. One branch of this discourse, especially prominent in the writing of philosophers and educationalists working broadly within the stream of tradition of Scottish Common Sense philosophy, in Scotland and the United States during the first three quarters of the 19th century (Redekop 2004, 314–318, 324–334), viewed the distinction largely in noetic, psychological terms. For example, one eminent Scottish-American representative of this school distinguished between concrete and abstract *notions*, characterizing them as follows:

A Concrete Notion is of objects as they are with an aggregate of qualities. An Abstract Notion is of part of an object as a part, more technically of an attribute of an object. In order to comprehend this distinction we must look at the nature of the original cognitions or apprehensions which we have by the power of intuition which looks immediately on things. In all such we contemplate objects with qualities more or fewer, and the notions there formed are said to be concrete. The word is derived from *con* together, and *cresco* I grow, and means literally grown together. Some have derived it from *con* and *cerno*, when it means seen together. Either derivation brings out its meaning: in a Concrete Notion the objects with their qualities as it were grow together, and are perceived together. We cannot look on that table without perceiving it at one and same time as colored and extended: we never can view the color without the colored surface, or the surface without seeing it as having color of some kind. Nor can we by any mechanical or chemical process separate the one from the other. But ... we can in thought consider the one without taking the other into account. This process is called Abstraction, from *abs* from, and *traho* to draw, and signifies a drawing off; and an Abstract Notion is a part or a quality or qualities drawn off from the rest of the object (McCosh 1883, 9–10).

³³⁵ The *homo-humanitas* example is adapted from John of St. Thomas, *Ars Logica seu de forma et materia ratiocinandi*, 1.1.4, cited in Barata-Mouro 2009, 8.

Although this passage was written within a philosophical framework quite different from that of the Schoolmen, points of continuity were not lacking. If the concrete no longer had to do with composite wholes of forms unified with matter, it now dealt with a composite of attributes or qualities forming part of a unitary, perceptible object,³³⁶ while the abstract still was the result of a mental separation of a given attribute or attributes from the object in question. No less significant was the invocation of the etymology of “concrete”, which again foregrounded the idea of composition from different elements into an aggregate whole.

The preceding quotation may give the impression that concrete notions pertained only to particular objects *hic et nunc*. This, however, was not the case, for, according to the same author, concrete notions could result from either perception or abstraction. At one level, the “Singular Concrete Notion”, or “Percept”, was formed from the perception, or direct observation of a single, individual object (McCosh 1883, 30–31). The process of perceiving different objects, comparing them, identifying and isolating those attributes that they had in common (i.e., abstracting), and taking those attributes as the basis for defining a class (i.e., generalizing) led to the constitution of a “General Concrete Notion” based on “the aggregate of qualities found in all the objects” (pp. 20–23; 32–33). Through such a process, a hierarchy of general concrete notions, based on higher and higher levels of generalization could be formed (pp. 27–28): in other words, there were, so to speak, gradations of concreteness, with some concrete notions (e.g., “animal”) formed at higher levels of abstraction than others (e.g., “dog”). In short, concrete notions were taken to encompass both notions of individual objects *qua* individuals and notions of the classes of things, at different levels of abstraction and generalization, to which individuals could belong as members of a kind.

In contrast to writers working within this noetic tradition, most late 19th- and early 20th-century English logicians tended to downplay the mental, or psychological, aspects of reasoning in favor of its discursive features, preferring to speak of names or terms rather than general notions or concepts. Accordingly, largely in the wake of John Stuart Mill’s influential discussion of names in his *System of Logic* (first published in 1843), the standard distinction between the concrete and the abstract was formulated as one between concrete and abstract terms, wherein concrete terms named *things*, while abstract terms denoted the *attributes* of things considered in separation from the things of which they were attributes (e.g., Jevons 1881, 20; Joseph 1906, 18; Keynes 1906, 16; Mill 1874, 33; Read 1896, 27–28;

³³⁶ Cf., in this regard, the definition of “concrete notion” given in a contemporary dictionary of philosophy of Scottish origin: “A *concrete* notion is the notion of an object as it exists in nature, invested with all its qualities” (Fleming 1890, 80, s.v. “Concrete” [emphases his]).

Ryland 1900, 23; Stock 1888, 20 & 26, §§ 80–81, 95–96; Venn 1888, 188): examples of the former might include “human being”, “living being”, or “white (thing)”, and whereas the latter might include “humanity”, “life”, and “whiteness”.³³⁷

Crucial to maintaining the distinction between concrete names as names of things and abstract terms as that of attributes was the need to specify what was to count as a thing. Some authors defined thinghood in largely formal terms as “whatever is regarded as possessing attributes” (Keynes 1906, 16). On this view, a concrete name was “the name of anything which is regarded as possessing attributes, i.e., as a *subject of attributes*”, while an abstract name was “the name of anything which is regarded as an attribute of something else, i.e., as an *attribute of subjects*” (p. 16 [emphases his]). This, however, led to difficulties, for an attribute might well be regarded as having attributes of its own, thus making it a subject of attributes and a thing in its own right.³³⁸ Other writers took a less abstract, more ontologically committed approach, positing the primary criterion for being a thing to be the capacity of being conceived of as existing as a discrete, independent whole. According to one statement of this position, a thing was “any object of thought which can be conceived of as having an individual existence, whether in the world of perception or in the world of imagination”, it being understood that such objects did *not* include “mere abstract qualities or relations” (Ryland 1900, 25).³³⁹ A more expansive variant of this view defined a thing as being “any person, object, fact, event, feeling or imagination, considered as capable of having (or consisting of) qualities and a determinate existence” (Read 1898, 27), where “determinateness” was understood as “being at any given time in some place and related to other objects”, conditions deemed necessary for the individuation that qualities, or

³³⁷ One should note that Mill (1874, 34) and most later writers on traditional logic (e.g., Jevons 1881, 21; Ryland 1900, 23) included adjectives—a grammatical category known in traditional grammar as “noun-adjectives” (cf. Mason 1890, 17, n, †)—among concrete terms, though some dissenting voices preferred to class them separately as “attributive” terms (e.g., Joseph 1906, 25–26, Stock 1888, 23–26, §§ 87–94). Although Kaiser seems not to have considered adjectives to constitute concrete terms in themselves, they played a not insignificant rôle as elements of multiword terms of concretes, as we shall see in Section 5.2.2.2 of the present chapter.

³³⁸ The solution to this was to displace the distinction from one between concrete and abstract names to one between “the concrete and the abstract use of names”, whereby one and the same term could be used as a concrete term when treated as a subject of attributes and as an attribute when treated as an attribute of a subject (Keynes 1906, 18–19; cf. Read 1898, 27).

³³⁹ For a similar distinction couched in different terms, see Stock 1888, 20–21, 26, §§ 79–81, 84, 96, 100–101. In the view of this author, things—defined as “objects of thought”—comprised both substances and attributes, with substances being those things that could be conceived of as existing by themselves, and attributes, those things dependent upon substances for their existence: in other words, the category of “substances” was equivalent to that of “things” under discussion here.

attributes, were taken to lack.³⁴⁰ In definitions such as these, the familiar traditional themes of concreteness again stood at the fore: to be accorded a concrete name, something had to be conceived of as a unity possessing different component attributes and having a individual, subsistent, determinate existence.

Ontologically, then, things eligible to bear concrete names were entities capable of being conceived as possessing attributes and existing as individual, subsistent wholes. As such, any thing could be viewed purely in terms of its individuality—that is to say, as a unique being possessing innumerable attributes that, conjointly, distinguished it from all other individuals. Yet, as one commentator noted, “a thing has a character which may be the same in other things” (Joseph 1906, 18; cf. p. 21): that is to say, different individual things might coincide in possessing certain common characteristics that, taken together, rendered them things of a certain kind. Thus, any thing could be regarded both as an individual unto itself and, at the same time, as a specimen of a certain kind of thing. This, of course, had consequences for the naming of things, for a single thing might bear a name that designated it as an individual being (e.g., “Lassie”) and also be appropriately called by names that indicated the kind of thing that it was (e.g., “border collie”, “dog”, “mammal”, “animal”, and so on). At this point, the category of concrete terms intersected with those of general and singular terms (see Section 2.2.4 of the current chapter, esp. pp. 354–355, above), for a concrete term could be either singular (and so refer to a thing *qua* individual) or general (and so refer to a thing as a member of a kind) (Concrete 1911; Joseph 1906, 21): examples of concrete individual terms might include “John Stuart Mill”, “New York City”, “The current king of the United Kingdom”, and “Clever Hans”, while those for concrete general terms include “philosopher”, “city”, “king”, and “horse”. Needless to say, concrete singular terms corresponded to the singular concrete notions of the noetic tradition, whereas concrete general ones were the correlates of general concrete notions, or, simply, general notions of things. As a consequence, the kinds of things to which concrete general terms referred might differ in degrees of concreteness.

³⁴⁰Citing the attribute of weight, Read (1898, 27) gave the following example of the existential indeterminateness of qualities: “Weight, you observe, is not something with a determinate existence at a given time; it exists not merely in some particular place, but wherever there is a heavy thing; and, as to relation, at the same moment it combines in iron with hardness and in mercury with liquidity”. As this (negative) example makes clear, a criterion of thinghood, not entirely brought out in Read’s definition of a thing, was that determinateness include a certain spatio-temporal *unity* on the part of an entity *as a whole*.

These, then, were the primary aspects of the concept of the concrete in the logical discourse of Kaiser's day: concrete terms referred to things, or entities conceived of as subsistent objects, unifying within themselves a host of attributes, the possession of which both individuated them and provided the basis for grouping them into various kinds on the basis of sets of attributes shared with other things. Elements of this concept made their way into other, closely allied fields of discourse, such as that of grammar, where they appeared in the guise of the concrete noun. In many cases, the transfer from logic to grammar was attended with only minimal changes to the concept: for example, the definition of a concrete noun as "a common noun that denotes an object or a class of objects by a union of qualities" (Maxwell 1891, 79) enunciated by the American author of an advanced grammar-school textbook of English was a simplified adaptation of the logician's definition of the concrete name as "[a] name given to an individual thing in virtue of special qualities which it possesses, or to a class of things in virtue of some quality or set of qualities which they have in common" (Keynes 1887, 14).

Some grammarians' definitions of concrete nouns, however, placed their accent on a somewhat different side of concreteness. One early 20th-century British educationalist, writing that "[a] concrete noun is the name of a concrete thing", went on to specify that "[c]oncrete things are, for the most part, things which can be touched or might be touched, if we were near them" (Gow 1907, 62), while American contemporaries variously defined concrete nouns as "names of substances", that is to say, "things ... which are known to us by the impressions they make on our senses" (George & Murphy [1896], 101); or, as the name of "anything that has substance", with the stipulation that "anything having substance occupies space, and can be seen and touched and weighed and measured" (Firman 1910, 81). Most bluntly, perhaps, a prominent British linguist stated in his scientific grammar of English that substances were to be equated with "material things" which were named by "substance-words", adding that, "[i]n grammar substance-words are generally called *concrete*" (Sweet 1900, 12 [emphasis his]). Common to these definitions was a notion of the concrete as that which, in principle, has a determinate existence in time and space and is perceptible through the senses. This distinctly materialist interpretation of the adjective "concrete" reflected semantic undercurrents already present in the word's etymology that found wide circulation in the late 19th and early 20th centuries: indeed, according to one leading contemporary dictionary, "the ordinary current sense" of the word was one that made it applicable to things "combined with, or embodied in matter, actual practice, or a

particular example; existing in a material form or as an actual reality, or pertaining to that which exists” (Murray et al. 1888–1928, Vol. 2, 776, A.5 s.v. “Concrete *adj.*”). Contrary to the view of logicians that a concrete name could apply to things immaterial and imaginary (e.g., Stock 1888, 20, § 80, 27–28, § 100 & 29, § 103), the popular understanding of concreteness kept it firmly tethered to the realm of determinate existence defined by space, time, and extended matter.

Another domain in which the concept of the concrete came to be thematized was that of general librarianship and documentation, where the distinction between the concrete and the abstract figured in discussions of subject cataloging and classification alike. Given the broad parallels between those fields of endeavor and Kaiser’s own work on subject indexing, it is appropriate to pass in review the main lines of these discussions.

As regards cataloging, one of the earliest and most extensive presentations of the distinction between the concrete and the abstract came from the pen of Jacob Schwartz (1846–19??). Perhaps best known today as the developer of a shelf classification scheme, the Mnemonic Classification, and a vigorously polemical critic of rival classifications, especially that of Dewey, Schwartz served as librarian at the Apprentices’ Library in New York City between 1871 and 1900 (LaMontagne 1961, 188–191; Miksa 1974, 533–539, 569–574; Vann 1978). The Mnemonic Classification was an attempt to apply the principles of the alphabetic-classed (see Glossary) ordering of subjects to shelf classification: indeed, throughout his career, Schwartz manifested an interest in combining alphabetical and classificatory orders within a single subject indication system, be it a catalog or a shelf classification.

In 1876, Schwartz published a brief account of his library’s catalog, which featured both classified and alphabetical sections, in the special report on public libraries in the United States of America issued by the Department of Education.³⁴¹ In describing his catalog, he invoked first principles to justify the presence of both a small “systematic” section based on a division of “the whole field of knowledge into a system of classes or departments, with subdivisions in each”—what present-day KO researchers would call disciplines and sub-disciplines (Miksa 1992, 101, n. 1)—and an alphabetical section arranged by authors, titles, and subjects. He put his argument in the following terms:

³⁴¹ For another, more critical contemporary description and discussion of this catalog, see Cutter 1876a, 541–543; for a later discussion, see Ranz 1964, 72–73.

The objects upon which human knowledge is based, whether appertaining to the external world of the senses, or to the internal world of thoughts, can be viewed from two standpoints.

In the first place, each object may be viewed as complete in itself, as standing alone, or as a totality—as a concrete unit;

Secondly, objects may be viewed in their relation to other objects, or as parts of an abstract unit.

Now, it is evident that classification is nothing but the formation of abstract units, by abstracting from concrete objects characteristics they have in common and uniting them in groups or classes. Classification is, therefore, necessarily abstract, and demands for its exhibition an abstract method. If we then unite the different abstracts or classes in higher abstractions, and arrange the whole in the order of its various genera and species, we get a systematic scheme of all our abstractions or classes ... (Schwartz 1876, 657).

Emphasizing the subsistent nature of concrete objects, Schwartz argued that, although the systematic part of the catalog allowed the librarian to “indicate what books there are on certain classes, and to arrange these classes in systematic order”, it could not cater for books on such “concrete objects” as “horses, plants, tobacco, iron, England, etc.” (p. 658). To his mind, “[c]lassification ... concerns itself only with abstract parts of objects, and for this reason, an object necessarily falls within numerous classes”,³⁴² not to mention the fact that “because the classification being [*sic*] based on abstract principles, the subdivisions are necessarily abstract also and so rarely coincide, in name even, with individual objects” (p. 658): in other words, not only would books dealing with different aspects of a given concrete object be dispersed throughout a broad discipline-based classification, but their presence would not be easily discernible in a classificatory structure in which the names of the classes were those of “abstract” classes such as “Botany” and its subdivisions—in

³⁴² In another article published a decade later, in which he set forth “a dozen desultory denunciations of the dictionary catalogue”, Schwartz (1886, 471) expanded upon this point with a concrete example worth citing *in extenso*: “Looking at a subject from a concrete stand-point is to consider it as a *whole*—as complete in itself; whereas a class is made up of *parts* abstracted from concrete wholes. Take, as an example of a concrete subject, Tobacco. If we arrange all the books and essays in a library on this subject under one head, we shall find that some of them treat of the physiology and structure of Tobacco as a plant; others on the mode of its cultivation; others on its physiological effects; others on its manufacture into snuff, cigars, etc., and others on various other features. If we desire to arrange our books on Tobacco in a systematic scheme of classes, the first kind of books would go under Botany, the second under Agriculture, the third under Medicine, and the fourth under Useful Arts, for these reasons: Botany is the science that deals with that aspect only of plants that concerns their culture; Medicine, with another aspect, that concerns their effect on the human system; and Useful Arts deal with that aspect of all objects that concerns their transformation from a crude state to an artificial one to serve some human want. All sciences and classes are made up in this way by considering one aspect common to many objects.”

essence, the problem of class entry (see Glossary, s.v. "Specific Entry"). There was, in Schwartz's estimation, only one way in which to deal adequately with concrete objects:

There being no bond of union between individual topics when they are viewed as wholes standing alone, or as concrete units, it is necessary to arrange them in some arbitrary way in order to find them readily, and this can be best done by selecting the names of the individuals and placing them in alphabetical order (p. 658).

The "dictionary catalogue", he averred, provided an ideal mechanism for dealing with concrete objects, for it "views every subject as a concrete whole" (p. 658). Schwartz would go on to argue that, taken by themselves, neither a systematic or dictionary catalog was sufficient and that "[a] perfect catalogue should ... have two parts, the one systematic or classed, and the other alphabetical" (p. 659). What is of interest here is his conceptualization of concrete objects as representing discrete, subsistent wholes; his contrast of these to the departments of knowledge, or disciplines, which he took to be abstract in nature; and his identification of the alphabetical arrangement of the dictionary catalog as the most apt vehicle for dealing with "concrete topics" (Schwartz in *A Library Symposium* 1878, 146).

The opposition between the concrete and the abstract also informed the thought of a librarian whose works exercised a far greater influence in the field of cataloging than that of Schwartz, namely Charles A. Cutter. In his *Rules for a Dictionary Catalog (RDC)*, first published in 1876 and subsequently going through three further editions, the last of which appeared in 1904 (Metcalf 1976, 84; Miksa 1977, 198), Cutter set forth a code of rules for dictionary cataloging based on current best practices and especially his own experience in compiling such a catalog for the Boston Athenaeum.³⁴³ The manual became a standard point of reference for librarians in the United States (e.g., Lane 1896, 835) and was read and admired, if not always followed, by their British counterparts (e.g., Clarke 1906, 19–20; Hulme 1906, 37–38; Quinn 1899, 10; Wheatley 1889, 7). Among other things, the *RDC* included the first detailed discussion of rules and principles for subject cataloging, some of which, *mutatis mutandis*, are still considered as touchstones for catalogers to this day (Hodges & Chan 2010, 5067; but cf. Miksa 2012). It was in this sector of Cutter's cataloging system that the distinction between the concrete and the abstract came into play.

In an explanatory gloss to the definition of the word "subject" in the *RDC*, Cutter succinctly outlined a general categorization of subjects:

³⁴³ For discussion of Cutter's Boston Athenaeum catalog, which appeared in five parts between 1874 and 1882, see Miksa 1974, 272–368; Ranz 1964, 73–75.

[i]t is worth noting that subjects are of two sorts: (1) the individual, as *Goethe*, *Shakespeare*, *England*, the *Middle Ages*, the ship *Alexandra*, the dog *Tray*, the *French Revolution*, all of which are concrete; and (2) general, as *Man*, *History*, *Horse*, *Philosophy*, which may be either concrete or abstract (Cutter 1876b, 15, s.v. "Subject"; 1904, 23, s.v. "Subject" [emphases his]).

This scheme was based on the interlacing of two oppositions that we have already encountered within the logical tradition: individual *versus* general and concrete *versus* abstract. Individual subjects included persons (Goethe and Shakespeare), animals (in this case, a fictional one: the dog Tray), countries (England), objects (the ship Alexandra), and events (the French Revolution), whereas general subjects included kinds of things (Man and Horse) and departments of knowledge (History, Philosophy): all individual subjects were concrete, while general ones were either concrete (in the case of kinds like Man and Horse) or abstract (in the case of departments of knowledge such as History and Philosophy).³⁴⁴ Resulting from this cross-classification was a threefold distinction between concrete individual subjects, concrete general subjects, and abstract general subjects (Miksa 1983a, 25–26)—a schema in which the distinction between concrete individual subjects and concrete general subjects is virtually identical to that between individual concrete notions and general concrete notions in the noetic tradition of logic discussed above. This resemblance was not adventitious, for, as the foremost modern biographer of, and commentator on, Cutter has shown, Cutter's thought had, in large measure, been shaped by the version of Scottish Common Sense philosophy taught at Harvard College, where he studied and worked as a librarian in the 1850s and 1860s (Miksa 1977, 32–34; 1983a, 40–

³⁴⁴ Under abstract subjects, Cutter (1876b, 12, n. ‡; 1904, 17, n. ‡ [emphases his]) further differentiated between "concrete classes" such as "*Natural History*, *Geography*, *Herpetology*, *History*, *Ichthyology*, *Mineralogy*" and "abstract" ones, such as "*Mathematics*" and "*Philosophy*". In this, he adapted a distinction formulated by the French positivist philosopher August Comte (1798–1857) and developed, in various ways, by philosophers and scientists participating in contemporary discussions about the classification of sciences (on which, see Dolby 1979; Flint 1904, 162–340; Miksa 1998, 33–35, 40, 47–49). This distinction divided the sciences into "concrete sciences", which sought to describe the various (kinds of) particular objects and events comprising the phenomena of the world, and abstract sciences, which investigated the principles and natural laws underlying these phenomena. For contemporary accounts giving overviews of some of the principal ways in which the distinction was articulated, see, e.g., Bain 1870, 24–28, 231–241; Flint 1904, 177–178, 229–244, 273–283, 292–301; Masaryk 2001 [1885], 31–33, 41–45, 126–131. Noteworthy in the case of Cutter was the willingness to bring fields of knowledge such as history and philosophy, often left out of account by commentators focused upon the natural and social sciences, into consideration. On the whole, however, Cutter's differentiation of the departments of knowledge into concrete and abstract ones did not affect the more general distinction between concrete individual, concrete general, and abstract subjects, for, in the framework of the latter, "Filosofy" and "History" were both "founded on abstract conceptions (Cutter 1882, 168), even though, within the spectrum of departments of knowledge *qua* classes, the former was "abstract" and the latter, a "concrete one".

41 & 419, n. 33): as we have already seen, this school of philosophy was one of the primary vectors of the noetic tradition of logic in the 19th century.

Cutter's distinction between concrete individual, concrete general, and abstract general subjects ultimately appears to have been based on a form of the Scottish Common sense version of traditional philosophical psychology, according to which concrete individual subjects derived from notions of objects directly apprehended in perception; concrete general subjects arose from the processes of abstraction, generalization, and conception; and abstract general subjects reflected the highest stages of abstract thought, which took the form of the sciences (Miksa 1977, 53–54; 1983a, 41–44).³⁴⁵ Correlated with different stages of this noetic process, the three kinds of subjects stood in hierarchical relationships to one another, relationships that were determined by degrees of abstraction: various concrete singular subjects were included in various classes comprising concrete general subjects, which, in turn, were encompassed by the various abstract general subjects that represented the domains of knowledge of which concrete subjects were the objects of interest (Miksa 1983a, 26–30, 35).

Conceived in this manner, Cutter's understanding of the hierarchical classificatory structure of the universe of subjects, which represented a more developed and articulated form of the kind of structure posited by Schwartz, had wide-ranging, systemic consequences for his approach to subject cataloging. Most important, perhaps, was the fact that the gradation of subjects on a scale of concreteness and abstraction could, in turn, be correlated with a gradation of specificity and generality: as one recent commentator has noted, to Cutter's mind, "specificity or the degree of narrowness in any particular subject was a function of the relative degree of concreteness or abstraction that the subject term represented. ... [G]reat specificity meant greater concreteness whereas great breadth referred to greater abstractness" (Miksa 1983b, 116; cf. Miksa 2012, 29, n. 5). In a subject cataloging system predicated on the notion of specific entry (see Glossary), according to which information about books was to be entered into a catalog directly under the most specific subject heading expressive of the subject of the book as a whole (Cutter 1876b, 37–38, Rule 66; 1904, 66–67, Rule 161), the scale of concreteness *qua* specificity and abstractness *qua* generality provided a general framework within which to determine what,

³⁴⁵ Interestingly, this tripartite division seems to have underlain the distinction between "proper names" (i.e., concrete individual subjects), "concrete subjects" (i.e., concrete general subjects), and "the various arts and sciences" (i.e., abstract general subjects) that Cutter set forth in the context of a critical discussion of the structure of Poole's Index (Cutter in A Library Symposium 1878, 149).

in the case of a given book, might count as the most specific subject (Miksa 2012, 15): thus, for example, a book about cats was to be entered under the most concrete and specific subject heading—namely, CATS applicable to it—rather than the relatively more abstract concrete subjects MAMMALS, DOMESTIC ANIMALS, or the purely abstract subject ZOOLOGY (Cutter 1876b, 37; 1904, 61).

The distinction between concrete specific subjects, concrete general subjects, and abstract subjects also provided guidance in how to enter books dealing with complex subjects, such as “the Ornithology of New England” or “The History of Railroads”, in which a choice had to be made under which of two or more possible subject headings a book was to be entered (ORNITHOLOGY or NEW ENGLAND in the first case; HISTORY or RAILROADS in the latter).³⁴⁶ For this, Cutter applied what a modern commentator has termed a “significance order”, wherein, in consonance with the principle of specific entry, subject headings denoting concrete specific subjects were to be given precedence over those expressing concrete general subjects and abstract general subjects, while subject headings referring to concrete general subjects were to be given precedence over those naming abstract general subjects (Miksa 1983a, 30–35). Thus, in our examples, a book on the Ornithology of New England would be entered under NEW ENGLAND on the grounds that “New England” named a concrete individual subject (in this case, a determinate geographical region) and so had precedence over “Ornithology”, which was the name of an abstract general subject (i.e., the department of knowledge pertaining to birds), whereas one on the History of Railroads would be entered under RAILROADS, since “Railroads” referred to a concrete general subject and “History”, an abstract general one (cf. pp. 45–49). Although Cutter lay out the rationale for this decision procedure in *RDC* in piecemeal fashion and with only minimal and oblique reference to his three categories (cf. Cutter 1876b, 39, discussion to Rule 38; 1904, 68, discussion to Rule 165), the distinction between concrete individual, concrete general, and abstract general subjects implicitly underwrote a number of rules for making such choices in specific kinds of cases (Miksa 1983a, 127–131 & 132–133, Figure 8).

Cutter’s distinction between the concrete and the abstract, then, formed the (largely unspoken) theoretical background to his principle of specific entry, the uniform application of which to *all* subjects, be they individual or general, was the feature that, to his mind,

³⁴⁶ Both of these examples are taken from Miksa 1983a, 33, Figure 2, nos. 1–2. The same figure gives further examples, as does his Figure 4 at p. 48.

distinguished the dictionary catalog from its classed and alphabetico-classed counterparts (Cutter 1876b, 13, s.v. "Dictionary and other alphabetical catalogues", & 39, discussion to Rule 38; 1904, 19, s.v. "Dictionary and other alphabetical catalogs", & 68, discussion to Rule 165). A telling indication of the importance that he accorded to the notion of concreteness *qua* specificity is that, in a note contributed to the introduction to the first general subject heading list ever to be appear in published form, the American Library Association's *List of Subject Headings for Use in Dictionary Catalogs*,³⁴⁷ in which he alluded to a disagreement between himself and the other members of the committee overseeing the compilation about the formulation of a certain class of subject headings, he stated a preference for "the principle of *concrete cataloging*, which brings together what relates to a thing, a country, a period, rather than all works belonging to a class or form, such as Geography, History" (Cutter, in A Committee of the American Library Association 1895, "Preface", [ii] [emphases his]).³⁴⁸

Both Schwartz and Cutter situated the concepts of the concrete and the abstract within the framework of classification as a noetic process of progressive abstraction from particulars and so envisioned them as concomitants of classificatory structures *tout court*. It is thus unsurprising that the distinction between the concrete and the abstract also came to feature in late 19th- and early 20th-century discussions of subject-based shelf classifications. Cutter, who, from about 1887 until his death in 1903, devoted much of his attention to the elaboration and promotion of a classification scheme that he named the Expansive Classification (EC),³⁴⁹ was a protagonist in the use of the distinction in this domain as well. In a late article on the EC, he observed that

³⁴⁷ On the (pre)history of the initiative leading to the compilation and publication of the list, Cutter's involvement in the project, his contributions thereto, and the way in which the list failed to embody his rules, see Miksa 1974, 441–445; 472–473; 1983a, 160–162.

³⁴⁸ In light of the fact that the *List* was published in 1895, the year before the PCM opened its library to the public and Kaiser began work there, Metcalfe (1976, 178) has speculated that a copy thereof "very likely ... was acquired and discussed in the Philadelphia Commercial Museum at the time Kaiser was a new man on its staff": this experience, he goes on to insinuate, may have led Kaiser to adopt the term "concrete". Ingenious as this suggestion is, there is no concrete evidence, so to speak, to support it and so one cannot help but agree with Metcalfe's additional comment that "there appears to be nothing to disprove mere coincidence", which sits closer to his earlier opinion on the matter (cf. Metcalfe 1973, 310). Miksa (1983a, 432, n. 4) also notes the similarity between Cutter's use of the term "concrete cataloguing" and Kaiser's use of the term "concrete" in SI, but refrains from drawing any inferences regarding influence.

³⁴⁹ The scheme was so called because, in Cutter's (1898, 84) words, it consisted of "seven tables of classification of progressive fullness designed to meet the needs of a library at its successive stages of growth". The size and complexity of the schedules increased with each table in the series, while

there are two opposite tendencies in classification makers, which, for want of a better name I may call, the one a tendency towards the abstract and general, the other a tendency towards the concrete and individual. The first divides everything into general subject classes or form classes, such as Philosophy, Theology, Biology, Philology, Literature, Poetry, Drama, and scatters all that relates to individuals among these. The second has the same general classes, but also has a number of concrete and even of individual classes, like Woman, Books, Shakespeare, etc. (Cutter 1899, 47).

Here, the binary partition between the “abstract and general” and “the concrete and individual” followed much the same lines as those that Schwartz had laid down. Just as Cutter valued the specific entry of individual subjects in dictionary cataloging, so he considered some provision of classes for concrete or individual subjects to be a virtue in subject-based classification schemes as well. Thus, he argued, it spoke well of his own scheme that “[i]n the E. C. this individualizing tendency is recognized in a number of classes”, including not only “Bible and Woman”, but also “sections for Children, and for the Book”, as well as in the development of notations for “special collections of Shakspeare, Dante, Goethe, Moliere, Milton” and other writers (p. 47)—all examples of classes for concrete individual or concrete general subjects. The high point of the tendency toward the concrete was the provision of a separate table with a distinct notation for indicating geographical regions and countries, which Cutter (1898, 85–86; 1899, 48–49) named the Local List. The presence of the Local List in the EC allowed the classifier to combine any country class with any subject class to create composite classes consisting of geographical main classes subdivided by subject classes or, conversely subject classes subdivided by geographical classes (LaMontagne 1961, 213): in this regard, it functioned as a geographical facet *avant la lettre*. In Cutter’s conceptualization, then, a bibliographic shelf classification paid due regard to both the broad abstract classes of departments of knowledge and forms of literature that served as main classes (and subdivisions thereof) and to narrower concrete subjects, although the latter were, as a rule, distributed across the former.

efforts were made to correlate the notation of each new schedule to that of its predecessors so as to obviate the need for reclassification. Thus, Cutter wrote, “The first table has few classes and no subdivisions. ... The second has more classes and some subdivisions, but retains all the old classes with their previous marks. ... In this way we go on, gradually increasing the number of classes and sub-classes, and yet in each transition from the simpler to the more complex scheme preserving all the old notation; so that there is only the absolutely necessary amount of notation. Passing through the third, fourth, fifth, and sixth [tables], it [sci., “the rapidly growing library”] comes finally to the seventh, which is full and minute enough for the British Museum From this adaptation to growth comes the name *expansive*” (p. 84). For a brief modern description of the seven expansions, see Miksa 1974, 578–582.

Another contributor to classification theory who drew upon the tension between the concrete and abstract was the documentalist Paul Otlet, who, in the decade between 1895 and 1905, was engaged in developing an augmented form of Dewey's Decimal Classification (DDC) for use in conjunction with the IIB's Universal Bibliographic Repertory (RBU), which he named the Universal Decimal Classification (UDC) (See Chapter 1, Sections 1 & 5.2.3; Section 1 of the current chapter, above). In a brief programmatic tract outlining "rules for the developments to bring to the decimal classification" published under the aegis of the IIB not long after work had commenced on this project, he discussed, *inter alia*, the general features of classification as such. With regards to the content of classifications, he noted that

[o]bjects of knowledge are, either material entities (*êtres matériels*) belonging to the physical world, such as minerals, plants, scientific instruments, written languages, etc., etc., or intellectual entities (*êtres intellectuels*), ideas, concepts. These two kinds of objects can be envisaged from two points of view. From the first point of view, one envisages them as complete in themselves, as autonomous, like a totality, as a concrete unity (*unité concrète*). From the second point of view, one envisages them in their relations with other objects or as parts of an abstract unity (*unité abstraite*) (Institut International de Bibliographie 1896, 7).

Otlet, whose own philosophical culture was decidedly eclectic, though broadly rooted in the 19th-century tradition of positivism represented by Comte and Spencer (Rayward 1975, 25–28; cf. Ducheyne 2009), here articulated the relation of the concrete and abstract in a manner analogous to that of Schwartz. Whereas the objects of classification themselves could be material or intellectual, the concrete and the abstract represented different viewpoints from which these objects could be considered: insofar as an object was considered as an autonomous whole, it was concrete, while to the degree that it was considered in its relation to other objects, it was implicated in higher, abstract units. Much as Schwartz had argued, Otlet held that classification "always begins from the abstract point of view and envisages objects in their mutual relations" (Institut International de Bibliographie 1896, p. 7). Nevertheless, he claimed that, in practice, "the two points of view are constantly intermingled" (p. 7). To illustrate this, he gave examples of how (kinds of) objects—that is to say, (kinds of) entities viewed as concrete wholes—were considered from abstract points of view: "plants", he observed, "are envisaged from morphological, physiological, economic, geographical point[s] of view", while "a country is envisaged from the point of view of its climate, its geography, its administration" (p. 7). Conversely, he also noted how a single vantage point could be applied to a range of concrete (kinds of) objects: "biology studies the same phenomena in the entire series of beings (*toute la série des êtres*),

plants, animals, man” (p. 7). Taken together, these examples show that Otlet deemed the sciences to represent the abstract points of view from which various aspects of concrete objects might be studied, a point that he explicitly made in a later essay on “the bibliographical sciences and documentation”:

Sometimes the mind takes as the base of its study the material and concrete object (*l’objet matériel et concret*), and examines it from all points of view; sometimes, on the contrary, it considers the ideal and abstract conception (*la conception idéale et abstraite*), the law or the theory and it follows the examination across objects of every form and every nature where they can be discovered (Otlet 1903, 128).³⁵⁰

On the basis of these considerations, he drew the general conclusion that

To be complete, a classification ought ... to enumerate simultaneously [both] the objects and the points of view and to choose as a basis of classification the series of the former or the series of the latter as the case may require (Institut International de Bibliographie 1896, p. 7).

In other words, a classification—*in casu*, a bibliographical classification— should include both abstract and concrete subjects within its purview but its general structure should adopt either an abstract (i.e., scientific discipline-based) or a concrete (i.e., object-based) point of view. With regard to the UDC, Otlet followed the approach of the classification on which it was based, the DDC, which covered “[t]he field of knowledge” as a whole (Dewey 1894, 6) and so took broad departments of knowledge or kinds of sciences as the ultimate points of reference for its structure, in which concrete subjects were distributed within broader, abstract classes representing various (groupings of) sciences. In this respect, Otlet’s approach to classification was comparable not only to that of Dewey but to that of Cutter and virtually all other creators of bibliographical classifications of his time.

The distinction between concrete objects and the different perspectives from which they might be viewed underpinning Otlet’s discussion of classification also occupied a place in the thought of the librarian James Duff Brown. In the 1890s and the first years of the 20th century, Brown stood in the vanguard of a movement among British public librarians to admit patrons to library stacks, which, in public library practice up to that time, had been solely the appanage of librarians and their assistants (Black, Pepper, & Bagshaw 2009, 211–240; Munford 1968, 22–38, 41–43). In conjunction with his program of open access, which

³⁵⁰ One will note that both in this passage and, implicitly, in the case of the examples given in the “rules”, Otlet moved from considering the “concrete” and “abstracts” as points of view to viewing them as kinds of entities, namely material and physical vs. intellectual and ideational: this slippage from an epistemological to an ontological framing of the opposition was not a difficult one to make.

he implemented at posts that he held in Clerkenwell and Islington Boroughs in London and for which he tirelessly advocated in the British library press, Brown took a vivid interest in shelf classification (Beghtol 2004a, 704; Sayers 1926, 201–202). Under the old closed access system, most public libraries used shelf classifications consisting of a few main classes based on broad departments of knowledge (e.g., Philosophy, The Sciences, History, Fine Arts) and literary form (e.g., Fiction, Poetry) under which books were filed in numerical order, typically that of accession (Bowman 2005, 143–146; Brown 1897, 146–146; 1898, 13, 15–18; McKnight 1906, 291–292). In the new dispensation based on open access, there was a manifest need for finer-grained shelf classifications that would allow for the collocation of books on related subjects within the broad classes. Although schemes from the United States, such as the DDC and the EC, were available and the DDC, at least, came to be increasingly taken up in British libraries prior to the First World War (Bowman 2005, 149–155), Brown, who harbored no warm feelings for things American, sought to fill the gap with classifications of his own, developing no fewer than three shelf classification schemes in the period between 1894 and 1906: the Quinn-Brown Classification (1894), the Adjustable Classification (1898), and the Subject Classification (1906) (Bowman 2005, 146–149, 155–160; Brown 1898, 59–61, 97–160; 1906; 1914 [1916]. 48–49; 75–76, 79–88; Quinn & Brown 1895). Of these, by far the most original, sophisticated, and widely applied was the Subject Classification (SC) (Bowman 2005, 146–149, 155–160; cf. Beghtol 2004a, 704–705; 2004b, 1; Munford 1968, 47–48, 70–71).

It was in connection with the SC that Brown that elaborated his account of the contrast between subjects and standpoints. Taking as his point of departure that “any attempt to classify human knowledge from particular standpoints” was fraught with difficulties, he noted that “[e]very subject is capable of being treated from a large number of standpoints, and each of these may be the centre of an enormous literature, and form an important study” (Brown 1906, 8). To illustrate this, he offered the following example:

I shall assume that there are some thousands of books existing, which have for their theme the Rose in every conceivable aspect. This subject may be considered from any of the following standpoints :—

Biological, Botanical, Horticultural, Historical, Geographical, Ethical, Decorative, Legal, Emblematical, Bibliographical, Poetical, Musical, Sociological, and so on, to any extent.

Works about the Rose may assume the form of Dictionaries, Periodicals, Societies, Catalogues, and so forth; while it may also be considered in reference to Costume, Perfumery, Therapeutics, and similar subjects (p. 8).

The basic distinction between a given subject (*in casu*, the rose) and the various standpoints from which it might be treated in books bore a strong resemblance to that drawn by Otlet between objects and the points of view from which they might be considered: to this, Brown added further detail by identifying literary form and the relation of the subject to other subjects as ways in which to differentiate its treatment in literature. To his mind, the fact that a single subject could be approached from so many different perspectives raised a question of central importance to the classification-maker: within the framework of a bibliographical classification, “[i]s it better to assemble at a specific place, or at a more general place, the literature of a concrete subject?” (p. 8). Underlying this question was the premise that one could either take specific, concrete subjects such as the rose as one’s primary point of reference and concentrate all the literature about them in one class within a classificatory hierarchy, treating the various standpoints from which the might be treated as subsidiary subdivisions thereof, or, alternatively, one could take main classes representing the departments of knowledge or literary forms as primary points of reference and scatter the literature pertaining to individual concrete subjects among those main classes representing the perspectives from which it was treated in the literature. The designers of most contemporary bibliographical classifications such as the DDC, the UDC, and the EC inclined toward the second of these options, though, as we have seen, Cutter did claim some balance between the general and the concrete for the EC. Brown, on the other hand, favored the first option. Assuming that most library patrons would benefit from having books for on concrete subjects together (cf., already, Quinn & Brown 1895, 76), he took the position that, “in book classification, the constant or concrete subject should be preferred to the more general standpoint or occasional subject” (Brown 1906, 9). Thus, he argued, in the case of a book entitled *The Bibliography of the Rose*, “[t]he topic Rose is concrete”, whereas “that of Bibliography is standpoint, and should remain subordinate whenever possible in Classification” (p. 9). Such considerations led Brown to espouse “a “one place” classification, in which every concrete subject had only one constant place and would subsequently be subdivided by its various aspects” (Beghtol 2004a, 707; Brown 1906, 9–10; cf., already, Brown 1898, 85): it was this principle that he strove to realize in formulating the structure of the SC (Batty 1976, 6–7; Beghtol 2004b, 2; Bowman 2005, 155).³⁵¹ It lies beyond the scope of the present discussion to follow through in detail how

³⁵¹ It may be noted that the very name of the classification—the “Subject Classification”—was intended to reflect its focus on the specific, concrete subject: As Brown (1916 [1914], 79) explained,

design of the SC reflected this principle in practice. For our purposes, it is enough to note that, in Brown's view, concrete subjects—which he did not define (Beghtol 2004a, 707), but which were evidently analogous to those of Schwartz, Cutter, and Otlet—provided the “constant” element in classification whereas general classes representing the various standpoints from which a given concrete subject might be viewed constituted “occasional” subjects: favoring the constant over the occasional, he developed various mechanisms to give concrete subjects pride of place in a classification scheme that did not, however, abandon the traditional use of departments of knowledge as main classes.³⁵²

With Brown, we have reached the end of our survey of the ways in which the concept of the concrete informed the discourse of cataloging and classification within general librarianship in the final decades of the 19th and the opening years of the 20th centuries. It is evident that, as limned by writers contributing to this discourse, this concept possessed, *mutatis mutandis*, many of the features that it had within the logical tradition whence it was imported. For example, Schwartz's and Otlet's insistence that concrete subjects were ones that could be considered as wholes reflected the traditional idea that concrete notions and names represent, in the mind and in language, respectively, independently existing, subsistent (kinds of) entities. Similarly, Cutter's distinction between concrete individual and concrete general subjects was ultimately rooted in logical lore, as were Schwartz's and Otlet's respective invocations of the place of abstraction from concrete particulars to broader classes in the process of classification. Yet, all of the writers reviewed here also adapted the tradition to suit their own needs as theoreticians of cataloging and bibliographical classification. Most significantly, they framed the contrast between the concrete and the abstract primarily as one between specific (kinds of) subsistent entities in the world (i.e., persons, objects, countries, and events) and the various ways in which these entities might come to be known by human beings and treated in literature (i.e., departments of knowledge and literary forms): as we have seen, this form of the distinction

the SC was “so called to express as nearly as possible its main principle, the placing of subjects under concrete or specific heads, and not simply at the standpoint or other qualifying feature of such subjects. For example, books on the human heart are all together at one place, whether treating of that organ from an anatomical, physiological, pathological, or therapeutical point of view. All through the scheme the same principle has been observed, as far as the complications and intersections of human knowledge would allow, while ample provision is also made for general as well as special aspects”.

³⁵² For overviews, and assessments, of the structural features of the SC, see Beghtol 2004a, 704–711; 2004b, 1–4; Bowman 2005, 155–158; Mills 1968, 103–116; Sayers 1926, 184–196.

ultimately informed, to a greater or a lesser degree, their respective rationales for the designs of the KOSs that they created.

To what extent Kaiser was influenced by this discourse is difficult to discern. It is little likely that he was familiar with either Schwartz's or Otlet's writings on the concrete and the abstract. Schwartz and his writings had largely sunk into oblivion by the late 1890s and early 1900s, when Kaiser was beginning to forge own his ideas about indexing and classification, while evidence is lacking that Kaiser read the essays in which Otlet dealt with the theme. With regard to Cutter, Kaiser (1911, §§ 275–277) certainly was acquainted with the schedules of the EC. However, the introduction to these did not invoke the distinction between concrete or abstract subjects, while the article in which Cutter (1899) discussed the distinction in connection with the EC had as its theme the suitability of the classification for use in academic libraries, a topic that fell outside of the scope of Kaiser's own sphere of interests: there is thus is little reason to believe that he read it. As for the *RDC*, Kaiser did not cite or otherwise mention this seminal cataloging manual in his writings, a circumstance that has led some modern commentators to suppose that he never read it (e.g., Metcalfe 1957, 235; Olding 1966, 141, cited in Svenonius 1978, 134, with n. 9). To be sure, the *argumentum e silentio* does not, of itself, prove that Kaiser had no acquaintance with Cutter's *opus magnum*: given that he drew a sharp line between cataloging and indexing, and was primarily concerned with the latter (See Section 1 of the current chapter), he may well have read the *RDC* but simply had no incentive to discuss it (Metcalfe 1965, 44–45). By contrast, there can be no doubt that Kaiser (1911, §§ 278–283) read Brown's (1906) introduction to the SC, passages of which—albeit not those dealing with concrete subjects—he quoted with approval in *Systematic Indexing*. All in all, then, the scanty positive evidence available leads to the tentative conclusion that, insofar as Kaiser came into contact with the discussion of concrete subjects in the literature of general librarianship and documentation, he did so primarily, perhaps exclusively, through Brown's discussion of the topic with reference to the SC, almost a decade after he had begun to develop SI. What impact, if any, this had on his own conceptualization of the category of the concrete or the choice of his name for the category is unknown; at any rate, it is interesting that, *mutatis mutandis*, both formed part of the general theoretical background of contemporary knowledge organization.

7.3.1.2. Kaiser's Category of "Concrete"

Having reviewed the lexicographical and conceptual background to the term "concrete", we are now in a position to consider Kaiser's own conceptualization of the category to which he gave this name. We turn first to his initial definition of concretes as "things in general, real or imaginary", knowable by observation and reasoning (See Section 3.1 of the current chapter). In light of the foregoing discussion, it is apparent that Kaiser's choice of the word "concrete" to designate things was not without significance. We have seen that, in the contemporary discourse of textbooks on traditional logic, the notion of the concrete was used with reference to entities that were, or could be conceived of as being, subsistent, individual wholes (e.g., Ryland 1900, 23, 25; Stock 1888, 20, 26, §§ 80, 96). We have likewise noted that this idea diffused into other fields of discourse, such as that of classification and cataloging, where Schwartz (1876, 657) and Otlet (1896, 7) explicitly spelled it out. While Kaiser did not expressly speak of things as (kinds of) entities having independent existence, his characterization of them as concretes suggests that his understanding of what a thing is ran largely along the lines staked out in the logic manuals. The supposition that he drew upon a source of this kind for the definition is strengthened by his stipulation that concretes *qua* things might be either real or imaginary (Kaiser 1911, §§ 52, 107), for the inclusion of imaginary (kinds of) beings, such as fairies or centaurs, among the (kinds of) entities to which concrete terms might be applied was likewise a *topos* in handbooks of logic (e.g., Ryland 1900, 25; Read 1898, 29; Stock 1888, 20, 26, 29, §§ 80, 96, 103). In short, Kaiser's definition of concretes as "things in general" appears to have been based on a stream of tradition that restricted the realm of things to those (kinds of) entities that could be conceived of as unitary, independently existing objects that were, in principle, observable (or imaginable as such) by human beings: this precluded the bestowal of the status of thinghood to "an attribute, quality, or property of an actual being or entity", as was sometimes done in everyday language (Murray et al. 1888–1928, II.7.b s.v. "Thing").

Although Kaiser included imaginary things within the purview of concretes, actually existent material objects perceivable to the senses appear to have been for him, as for so many of his contemporaries, the very prototype of the concrete thing. "The ... term *things*", he declared, "implies a substance, a concrete article" (Kaiser 1911, § 299 [emphasis his]): that is to say, it carried the connotation of bounded physicality. As we have already seen in several different contexts, this notion underlay much of the discussion of concretes in *Systematic Indexing*. For example, according to Kaiser, an intelligence department could, in

theory, collect two kinds of sources of information about a given commodity: samples of the commodity and literature about it (See Chapter 6, Section 2.4, above). Of the two sources, samples represented commodities “in concrete form”, whereas literature did so “in abstract form” (Kaiser 1911, §§ 38, 39; cf. § 107): here, the notion of the concrete was bound up with the sample *qua* physical object. Similarly, when Kaiser discussed concretes as objects of classification, he presented them in expressly physical terms (See Chapter 6, Section 3.2.2, above). In this context, the cardinal feature of concretes was that “they occupy a space, they have a form” (Kaiser 1911, § 108): their materiality and spatial extension allowed the would-be classifier to demarcate their boundaries with ease, with the result that “[e]ach concrete represents something definite to handle”. Physicality likewise hedged books and other documentary materials. Insofar as these were physical items, Kaiser considered them to be concretes “by their form” (§ 115), even as the texts they bore rendered them records, or linguistic representations of knowledge, about (other) concretes (§ 107) as well: as we have seen, it was the tension between the physical unity of books *qua* concretes and their heterogeneity with regard to their informational content *qua* records that led him to reject subject-based shelf classifications as a means of organizing documentary materials (See Chapter 6, Section 3.2.2, above) and provided one of the theoretical motivations for the development of SI (See Chapter 6, Section 3.3; Section 1 of the present chapter, above). In short, physical objects formed the core of Kaiser’s conceptualization of the concrete. Given this emphasis, it is unsurprising that, when, in 1914, a French translation of *The Card System* appeared, the translator rendered “concretes” as “*matières*” (Kaiser 1914, § 114), a word whose primary meaning, according to a contemporary dictionary, was “everything that is tangible and has body and form” (*tout ce qui se touche et a corps et forme*; Beaujean 1900, 690, s.v. “*matière*”).

In most general terms, then, concretes were things in the world—above all, objects perceived, or conceived, to have determinate physical form and features. Alongside this broad definition of concretes, however, Kaiser presented another, more limited one. In *The Card System*, he defined concretes as “any saleable commodity, goods, etc., but also including persons whose labour is a saleable commodity” (Kaiser 1908, § 366, s.v. “Concretes”). Similar statements would recur in *Systematic Indexing*. There, in his introductory adumbration of terms of concretes, Kaiser (1911) spoke of “concretes” as “being the commodities with which we are concerned” (§ 73), while, in a fuller characterization of these terms later in the book, he defined them as follows: “[t]he term ... *things* implies a

substance, a concrete article. In business there is but one kind of articles—commodities having exchange value. ... [C]ommodities we shall call *concretes* simply” (§ 299 [emphases his]). As the latter statements show, Kaiser adopted an expressly domain-specific understanding of terms of concretes as terms referring to commodities of interest to businessmen. The genesis of his equation of concretes with commodities is not far to seek. One of the sections of the alphabetical card index at the PCM’s Bureau of Information was organized “by lines of goods”—that is to say, by kinds of commodities (Philadelphia Commercial Museum 1897, 18; cf. Chapter 3, Section 3.2, above): thus, from the very beginning of his career as an indexer, he dealt with card indexes in which the names of (kinds of) commodities formed a major category of index terms. In a later retrospective account of the origins of SI at the library of the PCM, Kaiser (1926, 22, § 7) would note that “terms for commodities” had constituted one of the categories in his nascent system: this, it seems, was a point of continuity between the PCM’s original index and the proto-version of SI that he developed there (See Chapter 3, Section 3.3, above). Kaiser’s subsequent work at the CIB, British Westinghouse, and the Tariff Commission—institutions that were, in one way or another, concerned with collecting information about commodities—doubtless reinforced his tendency to view commodities as concretes *par excellence*.³⁵³ Indeed, there is good reason to believe that the category of concretes that Kaiser set forth in his writings represented an *a posteriori* theoretical extension of what had originally been a category of commodities.

In *Systematic Indexing*, then, Kaiser propounded what was, in effect, a two-tiered definition of concretes: a general one according to which the category encompassed things in the world and a domain-specific one, in which it was restricted to a specific subset of things, namely commodities trucked and bartered in the realm of commerce. Taking the domain-specific interpretation of concretes *qua* commodities as his point of departure, he went on to introduce a further, threefold division into *movable*, *immovable*, and *abstract concretes* (Kaiser 1911, §§ 299, 316, 664, s.v. “Abstract Concrete”, “Immovable Concrete”, &

³⁵³ For example, the CIB prepared and printed cards containing “extracts from home and foreign literature” about “raw materials, tools, and accessories, as well as “finished goods”—that is to say, commodities (*Commercial Intelligence*, 21 July 1900, p. 11 [“British trade.”]). As for the Tariff Commission, some of the special indexes to the summaries of evidence prepared for inclusion in its reports on individual sectors of industry (See Chapter 5, Section 3, esp. p. 172, n. 200 above) included analytical guide cards listing the kinds of terms making up the index. Holding pride of place among such guides (and constituting, by far, the greatest number of terms in the indexes) were terms for commodities: see, e.g., TCP 5/2/10, Index to Lace Summary, Guide cards for [COMMODITIES], n.d.; TCP 5/2/16, Index to Silk Summary, Guide cards for [COMMODITIES], n.d.

“Movable Concrete”). This division, it should be noted, did not play a formal rôle in the structuring of statements *per se*. Kaiser claimed that its “only object” was “to help the indexer to determine what is a concrete” (§ 316), thus according it a purely heuristic function in the indexing process (cf. § 452). It would be wrong, however, to dismiss the division as a secondary feature of SI, for, as we shall see in Sections 3.2 and 3.4 of this chapter, it had far-reaching consequences for Kaiser’s theoretical articulation of category system as a whole.

Kaiser’s first two subdivisions of concretes *qua* commodities—movable and immovable—were doubtless inspired by the traditional legal distinction between things movable and immovable. In the law of property, this distinction was variously taken to pertain to “things corporeal”—that is to say, those things in the world capable of being “handled, and either occupied by man or delivered by one person to another” (so Robinson 1900, 118)—or, more simply to “material things” (so Salmond 1907, 396) or “permanent sensible objects” (so Austin 1873, Vol. 2, 805), although, by means of various legal fictions, it was often extended into the realm of things incorporeal or immaterial (e.g., rights) as well (Robinson 1900, 121; Salmond 1907, 398). Within the realm of things corporeal, movable things were understood to be “such as can be moved from the places which they presently occupy, without an essential change in their actual natures”, whereas “such [things] as cannot be moved from their present places; or cannot be moved from their present places without an essential change in their actual natures” were defined as being immovable (Austin 1873, Vol. 2, 805),³⁵⁴ though here, too, legal fictions sometimes allowed things that were, in practice movable, to be treated, for legal purposes, as immovable (Austin 1873, Vol. 2, 805; Robinson 1900, 120).

Kaiser adapted this distinction for his own purposes. Movable commodities, he stated, “include merchandise in the widest sense” (1911, § 316): the examples that he provided to illustrate the concept—“silk”, “hardware”, “paper”, “money”, “gold”, and “machine[s]” (§§ 299, 316)—indicate that such commodities were, of course, transportable from one locality to another. Immovable commodities, on the other hand, he took to “consist mainly of what is called physical features of countries” (§ 316), prototypical examples of which included “land,” “rivers”, “resources”, and “harbour[s]” (§§ 299, 316). Although movable and

³⁵⁴ For a formulation in slightly different language, see Robinson 1900, 120: “Things corporeal are movable when they can be transported from one place to another without losing their identity. Things corporeal are immovable when they are permanently attached to one locality or can be removed only by disintegration and destruction”.

immovable commodities were, in principle, mutually exclusive subdivisions of the category of concretes, Kaiser noted that “[s]ome immovable commodities may be changed to movable commodities by the application of labour” (§ 299). Presented as an *obiter dictum*, this observation was apparently intended to cover cases such as that of mining or quarrying, in which natural resources such as minerals or rocks, which fell under the category of immovable concretes while forming part of the earth’s crust, became movable once they had been extracted from the ground. Of comparatively little practical consequence for Kaiser’s protocols for indexing, it nevertheless reflected an effort on his part to square the legal distinction that he had adapted with the economic fact that some commodities could belong, at different stages of their life cycles, to either of the two subclasses that he had adopted.

The third and last subdivision of concretes *qua* commodities, which bore the paradoxical name of abstract concretes, was an outgrowth of Kaiser’s (1911, § 299; cf. 1908, § 366, s.v. “Concretes”) firm belief that “[l]abour is undoubtedly an exchangeable commodity”, despite the fact that it was not a thing in the sense of being a physically bounded object possessing a form but rather a kind of activity. “Labour ... has an exchange value”, he argued, because “the use of the energy which the individual possesses can be bought at a price” (§ 326). On this view, a worker exchanged his or her labor—that is to say, the expenditure of his or her energy on a given task—in return for the money that made up his or her wage (§ 325). Kaiser was careful to distinguish between labor and other kinds of commodities, noting that “it cannot be disposed of by its owner in the same way as merchandise is”, for “[t]he possessor only enjoys the use of it” (§ 299). In other words, the energy that a worker expended in paid labor could not be transferred directly to his or her employer in the way that a physical object could: at best, the employer could direct the worker to engage in a certain form of work and so have use of the energy that the latter put into carrying out the directive. Kaiser also took pains to make clear that the commodity in question was not the worker himself, but rather the energy which he or she applied to his or her work in the course of labor: as he somewhat cold-bloodedly put it, “[t]he only case where the individual himself is a commercial commodity, is that of the slave, but even in this case his energy is the real commodity, just as with working animals” (§ 326). To his mind, then, the class of abstract concretes was “mainly concerned with the various forms of human energy” (§ 316). Yet, for the purposes of indexing, this form of energy, taking the form of “labour, mental and manual”, was to be represented either by the term LABOUR

itself or by terms designating the different kinds of workers in which it was embodied, such as COMMERCIAL TRAVELLER, DESIGNER, ENGINEER, FOREMAN, MANAGER, or TYPIST (§§ 299, 316, 326, 479, 496, 515, 524; cf. 1908, § 366, s.v. “Concretes”).

In its most general sense, the term “labour” meant “[e]xertion of the faculties of body or mind” or “bodily or mental toil” (Murray et al., 1888–1928, Vol. 6, 5, 1 s.v. “Labour”). Insofar as it signified an action intellectually separable from the individual beings engaged in it, it counted as an abstract term from the logical point of view (e. g., Hyslop 1892, 37; Stock 1888, 26, § 95 & 28, § 101), though, as some contemporary economic theorists observed, it was susceptible to being used in a concrete sense (Perry 1891, 183), much as Kaiser sought to do when he reduced it to human energy. The logico-linguistic classification of labor as an abstract term may explain why Kaiser chose to designate the subdivision of concretes of which it was the paradigm case as abstract concretes. Some latter-day commentators have suggested that this subclass was intended to include other commodities designated by “abstract terms not signifying actions or processes” (Coates 1960, 39; cf. Straioto & Guimarães 2004, 111; Vlasák 1967, 153). On the face of it, Kaiser’s (1911, §§ 299, 316, 452) discussions of abstract concretes in *Systematic Indexing* do not support this supposition, for all of them concentrated on labor and all of the examples of terms falling into the subcategory were designations of labor itself or classes of commercial workers such as those cited in the previous paragraph.³⁵⁵ Nevertheless, in stating that abstract concretes were “*mainly* concerned with the various forms of human energy” (§ 316 [emphasis mine]), he gave himself some leeway for including other abstract terms among concretes.

One such term was INFORMATION (Kaiser 1911, §§ 73, 611; cf. Section 2.2.2.4 of the present chapter), to which Kaiser attached a meaning that was complex and not without ambiguity. We have already seen that, with regard to written communication, he considered information to be knowledge expressed in, and conveyed by, language (See Sections 2 & 2.1 of the present chapter). Yet, he also spoke of information as something that was decidedly more tangible than knowledge. As we saw in Section 1 of this chapter, his notion of information analysis was premised on the assumption that information was “contained” in

³⁵⁵ In this connection, it is worth noting that “labour” was one of the categories that Kaiser gave in the analytical guides listing the terms used in the special indexes to the summaries of evidence prepared for inclusion in the Tariff Commission’s reports (cf. p. 404, n. 353, above): See, e.g., TCP 5/2/10, Index to Lace Summary, Guide card for [LABOUR], n.d.; TCP 5/2/16, Index to Silk Summary, Guide card for [LABOUR], n.d. The fact that, in this special context, labor was a category unto itself, distinct from that of commodities, lends credence to the notion that Kaiser’s subcategory of abstract concretes developed out of what had originally been a distinct category for labor.

documents but could be “dissociated” from them (Kaiser 1911, § 83). Transference of information from an original document to card records, either for a register or an index, was carried out by the act of transcription, with information being written or disposed on the surface of an index card (1908, §§ 91, 97, 112, 113; 1911, §§ 375, 399, 647, 626): by the same token, it could be collected and (re)arranged in a card index (1908, § 241; 1911, §§ 47, 295, 364, 544). As for documents such as newspapers or journals from which the information was originally extracted, Kaiser (1911, § 305; cf. §§ 89, 304, 306, 308) proposed using the term “information” as a count noun—i.e., “an information” in the singular and “informations” in the plural—to refer to the individual “article[s] or piece[s] of literature” that they contained.³⁵⁶ Such *façons de parler* indicate that Kaiser oscillated between a conceptualization of information as “information-as-knowledge” and an understanding of it as “information-as-thing” and so invested the notion with both abstract and concrete traits (Buckland 1991, 3–4, 43, 45–6; Dousa 2014, 302–303). His tendency to treat information as something that could be individuated, rendered discrete, and handled as an object doubtless provided an opening for treating INFORMATION as a term for a concrete. Yet, as with LABOUR, the decisive factor appears to have been Kaiser’s (1911, §§ 6, 621) conviction that information constituted a commodity—a telling indication of the weight that he accorded to this domain-specific criterion for including a given type of entity within the realm of concretes. Similar considerations presumably motivated the inclusion of PATENT (§ 522) among terms of concretes: although patents were, strictly speaking, “exclusive right[s] acquired by law and registry to the manufacture and sale of any substance or article” (A Dictionary of Law Terms ... 1891, 183) and, as such, abstract in nature, they could be bought and sold, and so could be construed as a kind of commodity.

As noted earlier, Kaiser’s (1911, § 299) partition of concretes into movable, immovable, and abstract ones was predicated on their being commodities: thus, terms of concretes were

³⁵⁶ Although Kaiser’s proposed locutions “an information” and “informations” make strike the modern reader as unusual, it should be noted that there was some precedent in English for their use. According to the first edition of the *Oxford English Dictionary*, published under the title *A New English Dictionary on Historical Principles*, the use of “information” as a count noun is attested from the early 16th through the first half of the 19th century with the meaning “[a]n item of information or intelligence; a fact or circumstance of which one is told: in earlier use, it could also refer to “[a]n account, relation, narrative (*of something*)”. By Kaiser’s day, however, this was considered obsolete, though a comparable usage of the word could still be found in the rarefied realm of legal jargon to refer to charges brought against a person in court for the purpose of initiating criminal proceedings without a criminal indictment (Murray et al., 1888–1928, 5/2, 274, I.3.b & 4 s.v. “Information”). The use of count noun terms for vocabulary relating to information was more common in continental European languages such as French (cf. p. 286, n. 282, above): it is possible that Kaiser’s knowledge of these languages may have inspired him to suggest the usage.

to denote entities falling into one of these three classes of concretes *qua* commodities. For movable concretes, this definitional assumption was, as a rule, unproblematic: terms as heterogeneous as ACETYLENE (§ 487), AGRICULTURAL MACHINERY (1908, § 118), AIR BRAKE (1911, § 517), AUTOMATIC SWEEPER (1908, § 185), BEER (1911, § 482), BENZINE FUEL (§ 531), BOOT (§ 478), BUTTER (§ 489), CATTLE (§§ 492) CINNAMON (§ 514), COTTON (§§ 468–469, 480), DRAPERS' GOODS (§ 457), ELECTRIC TRACTION MOTOR (§ 386), GRANITE (1908, §§ 235–236), HARDWARE (1911, § 473) INDIGO (§ 495), IRON ORE (§ 520), JEWELLERY (§ 474), LIQUID AIR (§ 518), NEWS PAPER (§ 498), OSTRICH (§ 497), RUBBER (§§ 484, 501–502), SHEEP (§ 503), SILK PURSE (1908, § 118), SODA NITRATE (1911, § 450), STEEL (1908, § 118), TIMBER (1911, § 508), TOBACCO (§ 509), WATCH (§§ 394–395), and YERBA MATE (§ 533) all denoted kinds of transportable physical items that were objects of commercial exchange. As regards the more specialized subcategory of abstract concretes, we have seen that it derived whatever coherence it had from the fact that the terms belonging to its purview signified something that was not, *sensu stricto*, a physical thing but could be treated as an item of commercial exchange, with human energy expended in various forms of labor being the cardinal—indeed, the only explicitly identified—example thereof: within the limits of its definition, this subcategory clearly satisfied the domain-specific notion of concretes *qua* commodities. More difficult to accommodate in this respect, however, was the subcategory of immovable concretes, which likewise encompassed a fairly narrow range of terms. Some terms for this subclass of concrete, such as RAILWAY (§§ 470–472, 511), denoted entities that could be objects of commercial transactions and so fell within the realm of commodities. Others, however, such as RIVER (§ 500) or MARKET (§ 452), referred to features of a country that might be implicated in the cultivation, transportation, or distribution of goods for exchange but did not themselves constitute commodities in the narrow commercial sense that Kaiser imputed to the term (§ 299).³⁵⁷ Similarly, COMMERCIAL MUSEUM (§ 526) denoted a locale-bound institution that, as we saw in Chapter 3, collected and displayed samples of various kinds of commodities and provided information about them: however, commercial

³⁵⁷ To be sure, the term “commodity” could be construed more broadly to signify “a thing of use or advantage to mankind”, a meaning that covered not only “useful products” but also the “material advantages” and “elements of wealth” found in a given country or region” (Murray et al., 1888–1928, Vol. 2, 687, 5 s.v. “Commodity”). On such a general definition, it would have been possible to speak of a river as a useful natural resource, or commodity, for traders or inhabitants using it for transportation or for fishing its waters: however, markets were not considered to be commodities even in this broad sense.

museums were not exchanged on the market and were not considered commodities themselves. In cases such as these, the definition of concretes *qua* commodities began to break down.³⁵⁸

With regards to yet other kinds of terms, Kaiser considered both his general definition of concretes as things and his domain-specific one of them as commodities to be overly limiting. In such cases, he made provisions for extending the category of the concrete beyond the definitional limits that he had laid down. This was most conspicuously the case with terms connected with money. MONEY itself he assigned to the subcategory of movable concretes (Kaiser 1911, § 316), most likely because it was a medium for commercial exchange that took definite physical form in coins and banknotes. However, associated with it were terms such as CREDIT, DIVIDEND, CAPITAL, DEBENTURE, EXPORT DUTY, BOUNTY, and SURCHARGE, which referred not to money as a concrete object but rather to its abstract functions as an instrument for certain kinds of payment (e.g., CREDIT, DEBENTURE), to its rôle as a mode of wealth (e.g., CAPITAL), and to the kinds of payments that could be made with it (e.g., BOUNTY, DIVIDEND, EXPORT DUTY, and SURCHARGE) (§ 325). Manifestly uncomfortable with the categorial status of these terms, Kaiser nevertheless decreed that “[a]ll terms of money ... are concretes and should be treated as such” (§ 325). This declaration, which justified such terms of concretes as LOAN (§ 344), NITRATE BILL (§ 455),³⁵⁹ and SHIP BOUNTY (§ 488),³⁶⁰ was not accompanied by any theoretical explanation,

³⁵⁸ The indexes to summaries of evidence prepared under Kaiser’s supervision for the Tariff Commission yield even more difficult cases. To take but one example, the index to the Commission’s Wool industry questionnaires included statements featuring as concretes the terms WOOLLEN TRUST, WOOLLEN CLOTH TRUST, and WOOLLEN CLOTH COMBINE, referring to wool manufacturing companies acting in combination to derive advantages over competitors (See, e.g., TCP 5/2/19, Index to Woollen Questionnaires, Index cards, WOOLLEN CLOTH COMBINE-EFFECT ... F10269/10; WOOLLEN CLOTH TRUST-ADVANTAGES ... F4512/7; WOOLLEN TRUST-METHODS ... F2772/14, n.d.). Combinations or trusts, a subject of great interest to the Tariff Commission so that terms for them cropped up, *mutatis mutandis*, in other of its indexes as well (e.g., COTTON TRUST, in TCP 5/5/5, Oddments, Index card, COTTON TRUST-UK-FORMATION ... E7425, n.d.; JUTE TRUST, in TCP 5/2/7, Index to Questionnaires for Hemp, Jute, and Linen Fibres, Index card, JUTE TRUST-EFFECT ... F3471/14, n.d.; JUTE KARTEL, in TCP 5/2/7, Index to Questionnaires for Hemp, Jute and Linen Fibres, Index card, JUTE KARTEL-AUSTRIA-POLICY ... F10607/10, n.d.), clearly were not commodities in any meaningful sense of the term but rather associations of producers of commodities. It is thus unclear how Kaiser would have dealt with them within the definition of concretes *qua* commodities that he gave in *Systematic Indexing*, though one suspects that he might have viewed them as extensions of the concept of labor and, thus, a form of abstract concrete. For other, even more problematic cases, see p. 442, n. 387, below.

³⁵⁹ NITRATE BILL referred to a bill of exchange—i.e., a type of negotiable instrument frequently used in international commerce to transfer monies for payment, wherein the writer, or “drawer”, issued an order to the addressee, or “drawee”, to pay a certain sum of money on a given date either to the

though there is slight circumstantial evidence that Kaiser counted terms for kinds of monetary instruments as terms for movable concretes, while terms for kinds of payments formed a class apart from the three subcategories of concretes (cf. § 452).³⁶¹ Here, at any rate, Kaiser manifested a pragmatic willingness to compromise the purity of his definition of concretes in order to ensure the inclusion of terms denoting what he understood to be subjects of interest to commercial men within the compass of a card index.

Kaiser's formal definition of the category of the concrete, then, was multilayered and somewhat protean. At a general level, he identified concretes with things *simpliciter*, though his idea of things appears to have been primarily that of entities perceivable, or at least conceivable, as discrete, subsistent wholes having form and extension. At the more restricted, domain-specific level of commerce, he defined concretes not only as objects but also as commodities possessing an exchange value: indeed, the category as a whole may have developed out of one originally restricted to commodities alone. For heuristic purposes, he sought to render the domain-specific version of the category more precise by dividing it into three subclasses: movable, immovable, and abstract concretes. Movable concretes, which covered transportable material objects and substances, could readily be accommodated to the more general definition of perceptible things *qua* concretes. Immovable concretes did not fit the profile of concretes *qua* commodities quite as easily, for they seem to have included localizable institutions as well as natural resources of countries: whereas resources could be considered as commodities in a broad sense of the term, one had to extend the notion of commodity well beyond its accepted meaning if it were to be applicable to some commercial institutions. The subcategory of abstract concretes, on the other hand, served as a means of bringing persons into the realm of concretes *qua* commodities by treating one of their attributes—energy expended in labor—as a commodity: it also may have provided warrant for extending the realm of concretes to

drawer or to a third party named on the bill, or “payee” (Murray et al., 1888–1928, Vol. 1, 861, 9 s.v. “Bill”; cf. Hooper & Graham 1903, 110–132)—made in relation to nitrate *qua* commodity.

³⁶⁰ SHIP BOUNTY referred to governmental subventions to promote the merchant marine of a given country. Such subsidies ranged from mail subsidies, wherein shipping companies were paid by a government to carry overseas mail, to construction bounties, whereby domestic shipbuilders were paid to construct vessels in accordance to certain specifications and navigation bounties, wherein shippers received subsidies for making runs along certain kinds of specified routes (Baldwin 1900, 794–795). For a survey of the various forms of such subsidies granted by different nations, see Bacon 1911.

³⁶¹ Mills 1968, 184 gives the terms CREDIT, DIVIDEND, and EXPORT DUTY as examples of Kaiser's abstract concretes. Whereas there can be little doubt that such terms do, in fact, refer to abstract notions, it is not entirely clear whether Kaiser himself formally assigned them into that subcategory.

encompass such kinds of abstract commodities as information and patents, which might be represented by objects having form and extension but did not, *sensu stricto*, constitute objects as such. In addition, Kaiser made allowance for the inclusion of terms referring to the abstract features of money that, to his mind, did not easily fit into the category of concretes as such. In fine, the category of the concrete displayed considerable definitional elasticity: within limits, this offered scope for the pragmatic adaptation of its conceptual contours, albeit not without some cost to its theoretical consistency.

Although Kaiser's formal definition of concretes was not free of theoretical difficulties, it offered a fairly unproblematic guide for the practical selection of terms. Terms of concretes *qua* commodities were easy enough to identify and might range from fairly simple one-, two-, or three-word terms (e.g., MACHINE, WINE, THERMOMETER; SEWING MACHINE, MOTOR CAR, CARD CABINET; WROUGHT IRON ORNAMENT, WATCH HAND CASE) in general commercial indexes to very long ones in more specialized technical indexes (e.g., HYDRO ELECTRIC POWER PLANT; DIRECT CURRENT ENGINE TYPE GENERATOR; HIGH TENSION UNDERGROUND ELECTRIC TRACTION MOTOR) (Kaiser 1911, § 317). Similarly, the identification of terms for labor (and the classes of workers embodying it) and money-associated terms posed few challenges for the indexer. One conspicuous feature of the examples of terms of concretes given in *Systematic Indexing* was that they referred, without exception, to *kinds* of commodities, labor(ers), and other commercial entities rather than to particular commodities or individuals (See Section 2.2.4 of the present chapter, esp. pp. 353–355, above): that is to say, they consisted exclusively of what logicians called concrete general terms (or, in the case of terms such as LABOUR and INFORMATION, abstract terms treated as if they were concrete general ones) (See Section 3.1.1 of the current chapter). To be sure, the protocols of SI did not expressly proscribe the inclusion of concrete individual terms: in fact, in special cases, names of particular individuals might be allowed.³⁶²

³⁶² For example, in some of the Tariff Commission's indexes to summaries of oral and written evidence, the names of persons or firms mentioned in the evidence occasionally were treated as concretes. For example, in the index to the summary on engineering evidence, Andrew Carnegie, the Carnegie Steel Company, the Great Western Railway, and the Leeds Forge Company received such treatment; see, e.g., TCP 5/2/9, Index to Iron and Steel Evidence, Index cards, A. CARNEGIE ... E3378; ANDREW CARNEGIE ... E1193–1196; CARNEGIE CO. ... E1174; CARNEGIE STEEL COY. ... E1135; GREAT WESTERN RAIL[WA]Y-UK-TRAFFIC COMBINATION ... E385; LEED'S (sic) FORGE-UK LEEDS-EQUIPMENT ... E1907, n.d. Moreover, in *Systematic Indexing* itself, Kaiser (1911, §§ 331, 364, 479, 547, 558A) discussed a special form of index featuring author entries, also modeled on ones used at the Tariff Commission, in which the name of the author of a given item of information could be prefixed to the initial term of its statement (i.e., [AUTHOR] [CONCRETE]-[COUNTRY]-[PROCESS]) and so be "treated as a concrete" (§ 664, s.v. "Author"). Yet, he also made it clear that he deemed such

Nevertheless, by example rather than by precept, Kaiser clearly indicated that the norm in SI was to limit terms of concretes to concrete general terms alone. It was only among terms of countries, to which we now turn, that concrete individual names found a constant place within SI (cf. Section 3.1.1 of the current chapter, esp. pp. 386–387, above).

7.3.2. The Category of “Country”

Unlike the category of concretes, the definitional boundaries of which, as we have seen, were not entirely determinate, that of countries had fairly fixed limits. Kaiser (1911, § 73, 302) described terms of countries as those “indicating the localities with which ... concretes are connected” or in which “action[s]” associated with concretes “take[] place”. To speak of localities was to refer in general, undefined terms to the “geographical place or situation” in which a given concrete might be associated or a given activity occur (Murray et al., 1888–1928, Vol. 6/2, 380, 4.a–b s.v. “Locality”). Needless to say, the category had a more finely-grained inner articulation, which Kaiser specified in the following terms: “[t]he country is in most cases a political division of territory having an independent government, at least independent enough to frame its own customs tariff but sometimes it is a continent or a number of disconnected territories” (§ 332). This detailed characterization of the referents of terms of countries is worth unpacking, for it reflects both the domain-bound nature of Kaiser’s conceptualization of the category and the historical context in which he formulated it.

In stating that “[t]he country is in most cases a political division of territory having an independent government” Kaiser (1911, § 332) presented a slightly more constrained definition of the term “country” than that of contemporary lexicographers, who defined it not only as “[t]he territory of a nation” or “an independent state” but also as “a region once independent, and still distinct in name, population, or institutions, as England, Scotland, and Wales in Great Britain, the several states of the Austrian and German empires, etc.” (Whitney & Smith 1911, Vol. 2, 1307, 2 s.v. “country”; cf. Murray et al. 1888–1924, Vol. 2, 1078, 3 s.v. “country”). Kaiser’s motivation for defining countries primarily in terms of current political independence becomes evident with his additional stipulation that a country be “at least independent enough to frame its own customs tariff” (Kaiser 1911, § 332): counting as a country meant having a government possessing the capacity to

author-based indexes to be the exception rather than the rule, arguing that, in general, author entries were more appropriate to “a book catalogue” than to an analytical card index, the proper focus of which was on the subject of the information (§ 364).

formulate and enact its own official trade policies. In this respect, Kaiser clearly had internalized the perspective of the Tariff Commission, which, during his tenure there, conducted research, and published memoranda, on such topics as *Foreign Tariffs* (1904), *The Tariff Systems of Europe and America* (1905), *The New Continental Tariffs* (1906), *The New Australian Tariff* (1907), *The New Tariff of New Zealand*, and *The Proposed Japanese Tariff and Its Effect on British trade* (1910) (Tariff Commission 1922, 16–17). The notion of politico-economic sovereignty, it might be added, was one that Kaiser was willing to follow through in some detail: for example, he noted that sailing ships belonging to the German merchant marine were to be “regarded as floating territory” and so information on their activities, if indexed, was ideally to be filed under the country term GERMANY (Kaiser 1911, § 453).

The country *qua* political-economic entity thus provided a basic unit of analysis around which to structure the category of countries for the purpose of indexing. However, as Kaiser recognized, different business organizations might vary in their need for information on commercial conditions abroad and so the degree of granularity in coverage of geographical units might differ across indexes. “In some cases no countries at all may be required,” he wrote, “in others it will be sufficient to take each country as a whole, but there are others which may even require minute divisions of each country” (Kaiser 1911, § 334): ultimately, he averred, “[i]t must be left to each business to make its own choice”. For those indexes requiring subdivision of countries into yet smaller geographical units, he formulated a few basic guidelines. Terms of countries could be subdivided by cities—e.g., FRANCE, PARIS and UK, DUBLIN—or by districts or counties—e.g., GERMANY, FRANKFURT DISTRICT (§ 335). As these examples indicate, subdivided terms took the form of a sequence of two names separated by a comma (§ 377), in which the first name indicated the country *qua* nation-state and the second, the subdivision thereof. The “individual states of a federation” were not to be “treated as countries, but as divisions” (§ 336), as was also the case with islands: thus, for instance, Ohio was to be entered as a division of the United States (i.e., USA, OHIO) (§ 486) and Bavaria as a division of Germany (i.e., GERMANY, BAVARIA) (§ 487), while the Isle of Man was treated as a division of the United Kingdom (i.e., UK, ISLE OF MAN) (§ 340); Formosa (present-day Taiwan), a Japanese possession in the early 20th century,³⁶³ as a

³⁶³ Taiwan fell under Japanese control following the conclusion of the Sino-Japanese war of 1895: at the time that Kaiser wrote, it was “treated as an outlying territory ... not brought within the full purview of the Japanese constitution” (Formosa 1910, 670). It would remain in Japanese hands through the end of World War II.

division of Japan (i.e., JAPAN, FORMOSA) (§ 495); and the Philippine Islands, an American possession in that same period,³⁶⁴ as a division of the United States (i.e., USA, PHILIPPINE (*sic*) IS[LANDS]) (§ 474). If there was need, terms for “countries which are federations” could receive a second subdivision so that the term as a whole comprised of the name of a country, the name of one of its states, and the name of a city within the state: examples might include USA, NY, NY for New York City and GERMANY, BAVARIA, MUNICH for Munich (§ 336). Kaiser, however, did not encourage this level of detail, noting that “[f]or an ordinary index division into two [sci., terms—TMD] seems adequate” (§ 336): virtually all of the examples of terms of countries that he gave in *Systematic Indexing* were either undivided—e.g., BRAZIL (§§ 465, 482, 483), CHINA (§ 515), CUBA (§§ 506–508), ITALY (§ 467), PARAGUAY (§ 533), RUSSIA (§ 490), UK (§ 479), and USA (§ 492)—or had a single division—e.g., AUSTRIA, PRAGUE (§ 494); BRAZIL, RIO DE JANEIRO (§§ 468–469); CANADA, YUKON (§ 478); MEXICO, TABASCO (§ 500); and RUSSIA, SIBERIA (§ 525).

Whereas subdivisions allowed the indexer to specify particular regions or cities within a given country, they took the country *qua* political-economic entity as their base unit. However, other terms of countries designated yet larger geographical units, which Kaiser (1911, § 332) described as “continent[s]” and “a number of disconnected territories taken together”. The former set of terms comprised the names of continents, such as AFRICA, EUROPE, and SOUTH AMERICA, as well as names of subcontinental regions, such as CENTRAL AMERICA, and the term CONTINENT itself, not in its generic sense of a large landmass but as a designation for “the mainland of Europe, as distinguished from the British Isles” (Murray et al., 1888–1928, Vol. 2, 904, II.4.b s.v. “Continent”).³⁶⁵ The justification for including such terms lay in the fact that they frequently served as the main classes in geographical classifications of international commerce; for example, the British authors of a textbook on this subject subdivided “the import and export trades” in which their country was involved into such branches as “The Continental Trade”, “The North American Trade”,

³⁶⁴ The Philippine Islands were ceded to the United States by Spain in the Treaty of Paris concluding the Spanish-American War in 1898 and occupied in the face of Philippine opposition between 1898 and 1901 (Bingham 1911, 399–400). They would remain an insular possession of the United States until 1935, when they became a commonwealth, and would achieve independence only in 1946.

³⁶⁵ For AFRICA, see TCP 5/2/16, Index to the Silk Summary, Guide Card for [GEOGRAPHICAL DIVISIONS], n.d.; for EUROPE, see Kaiser 1911, § 332; for SOUTH AMERICA (var., S. AMERICA), see Kaiser 1911, §§ 332, 542; TCP 5/2/10, Index to the Lace Summary, Guide Card for [COUNTRIES], n.d.; TCP 5/2/16, Index to the Silk Summary, Guide Card for [GEOGRAPHICAL DIVISIONS], n.d.; for CENTRAL AMERICA, see TCP 5/2/10, Index to the Lace Summary, Guide Card for [COUNTRIES], n.d.; for CONTINENT, see TCP 5/2/10, Index to the Lace Summary, Guide Card for [COUNTRIES], n.d.; TCP 5/2/16, Index to the Silk Summary, Guide Card for [GEOGRAPHICAL DIVISIONS], n.d.

“The Central American Trade”, “The South American Trade”, and others (Hooper & Graham 1905, 2). As for terms for “a number of disconnected territories taken together”, they could signify general geographical units such as AUSTRALASIA (Kaiser 1911, § 332), which, according to one contemporary source, covered “all the insular groups which extend almost continuously from the south-eastern extremity of Asia to more than halfway across the Pacific”, including Malaysia and the Philippines, Australia and associated territories, Melanesia, Micronesia, and Polynesia (Australasia 1910). Moreover, they could also refer to those complex late 19th-century geopolitical and economic formations known as colonial empires, such as the British Empire, the territories of which, centered in the British Isles, extended across parts of Africa, Asia, Australasia, Europe, North America, and South America (See, e.g., Pitman’s Commercial Readers [ca. 1903], “Map of the World showing the British Empire”, between pp. 8 & 9). Such agglomerations of non-contiguous territories falling into the ambit of a great power could be designated simply by the collective term COLONIES (Kaiser 1911, § 332).

Kaiser adopted a twofold approach to the treatment of colonial territories within SI. On one hand, to the extent that individual colonies could be conceptualized as distinct administrative-*cum*-economic units, he tended to treat them as separate countries rather than as subdivisions of the mother country under whose governance they fell: examples included BRITISH CENTRAL AFRICA (Kaiser 1911, § 340), B[RITISH] E[AST] AFRICA (§ 513), CAPE COLONY,³⁶⁶ CEYLON (§ 514), COMORO ISLANDS (§ 516), DUTCH EAST INDIES (§ 332), GERMAN SOUTH WEST AFRICA (§ 332), GOLD COAST (i.e., present-day Ghana) (§ 457), JAMAICA (§ 475), INDIA (§§ 307), MACAO (§ 332), MALTA,³⁶⁷ NATAL (i.e., today, a region in south-eastern South Africa) (§§ 470–472, 485), and TRINIDAD (§ 527).³⁶⁸ Yet, the need might arise to collect information about a given nation’s colonies *en bloc* so as to track

³⁶⁶ TCP 5/2/10, Index to the Lace Summary, Guide Card for [COUNTRIES], n.d.; TCP 5/2/16, Index to the Silk Summary, Guide Card for [GEOGRAPHICAL DIVISIONS], n.d. In *Systematic Indexing*, Kaiser (1911, § 340) noted that this British colony could be designated either as CAPE COLONY or CAPE OF GOOD HOPE: in practice, he preferred the shorter name.

³⁶⁷ TCP 5/2/10, Index to the Lace Summary, Guide Card for [COUNTRIES], n.d.

³⁶⁸ The attentive reader will note a certain discrepancy in Kaiser’s handling of islands belonging to empires in the examples cited above: whereas he dealt with some, such as Ceylon (then a British colony), the Comoros Islands (then a French dependency, parts of which were under direct colonial rule and parts of which were under French protection), Malta (a British colony), Jamaica (a British colony), and Trinidad (a British colony), as individual, country-level units, he treated others, such as Formosa and the Philippines, as subdivisions of the great powers governing them. The rationale for this inconsistency is unknown: it is possible that judgments of the relative independence, or lack thereof, of a colonial island region’s customs tariff régime *vis-à-vis* the imperial power to which it belonged may have played a rôle here, though other explanations, of course, cannot be excluded.

its “Colonial Trade” as a whole (e.g., Tariff Commission 1905, §§ 1434–1436). For such cases, Kaiser (1911, § 337) advised that “[t]he term COLONIES applied collectively, i.e. where the specific names of the colonies are not given, is best treated as second term with the parent country”: this yielded terms such as UK, COLONIES or FRANCE, COLONIES. The protocols for SI thus reflected, in their own way, the tensions of empire: just as a colony was simultaneously a distinct political-economic unit possessing its own interests and part of a broader politico-economic formation that shaped its administrative and economic horizons, so an index could include both terms for colonies as individual politico-economic units and terms for aggregates of colonies subsumed under the aegis of the great power to which they belonged.

The category of countries, then, encompassed terms referring to a wide spectrum of geographical units, ranging from cities and districts, treated as subdivisions of countries, through countries *qua* politically and economically independent units, to broader territorial regions such as continents and colonial empires. Whereas some of the collective terms, such as those for continents or broad territorial regions, had strictly geographical significance, Kaiser’s emphasis was manifestly on countries understood as political, legal, and economic units. Indeed, these aspects of the idea of country served as the basis for his formal definition of the category. This definition merits close attention not only on account of its content but also because of the manner in which Kaiser formulated it. For, as he presented it in *Systematic Indexing*, the category of countries did not have the same theoretical status *qua* category as those of concretes or processes: whereas the latter two were primordial ontological categories that, between them, exhausted the domain of objects of knowledge (See the opening of Section 2.1 of the current chapter), the category of countries was secondary in nature, deriving from that of concretes. Kaiser’s reasoning regarding this took the following course. We have already seen that concretes *qua* commodities could be subdivided into subcategories of movable, immovable, and abstract concretes, and that, among these, immovable concretes were concretes *qua* commodities connected to the land, typically comprising kinds of topographical features or resources (See Section 3.1.2 of the present chapter). From this starting point, Kaiser (1911, § 300 [emphases his]) proceeded to set forth the claim that

[i]mmovable commodities include one kind of special importance—*countries* in the political sense. Their peculiarity is to be sought not so much in their territories, but more especially in the authority exercised within each territory as expressed in their laws etc. In addition there are the peculiarities of the inhabitants as expressed

in their language, customs and habits. For these reasons we are obliged to treat the political divisions called countries as a distinct class. We now have

<i>Concretes</i>	}	movable
		immovable, except countries
		abstract

Countries

which two terms comprise all the *things* named in our literature.

In other words, countries formed nothing other than a subclass—more precisely, a subclass of a subclass—of concretes that Kaiser deemed distinct enough in its content to warrant elevation to the rank of an autonomous category essentially coordinate to the one from which it had been derived.

Kaiser’s derivation of the category of countries from that of concretes was an audacious move, albeit one bristling with theoretical difficulties of various kinds. On a purely formal level, the manner in which he shifted the position of countries from a subclass of a category to a full-fledged category in its own right was methodologically unorthodox. The structural manipulation involved has been a source of scandal to some: the one latter-day scholar to comment directly on the passage in which Kaiser presented the derivation judged it “to be internally inconsistent” since it “stat[ed] on the one hand that countries form a subclass of concretes and, on the other hand, that they form a distinct, nonoverlapping class” (Svenonius 1978, 137). This criticism requires some refinement, for Kaiser did not make the claim that countries were *both* a subclass of concretes and an entirely distinct class from the latter, which would, indeed, be a *contradictio in adiecto*. Rather, he stated that they were a subclass of concretes that, because of its distinctive content, “we are obliged to treat ... as a distinct class” (Kaiser 1911, § 300). He thus presented the promotion of countries from a subclass to a class as a pragmatic structural move, one that, in fact, bore some resemblance to what later theorists of bibliographical classification would dub “telescoping in array”:³⁶⁹

³⁶⁹ Telescoping in array was a technique formally defined by Ranganathan (1967a, 277–281), in which a given class and its subclasses were treated notationally as if they were members of a single array of coordinate classes, despite the fact that the subclasses were conceptually subordinate to the class of which they were subclasses: as he put it, a “[t]elescoped [a]rray” was an “[a]rray of classes in a schedule of classification, made of co-ordinate and subordinate isolates, as viewed from the Idea Plane, but whose class numbers appear to be co-ordinate, as viewed from the Notational Plane”. Although Kaiser did not use notation as a means of referring to his categories, his treatment of a

although it violated the hierarchical configuration of the simple classificatory structure that he had outlined, it was a deliberate transformation thereof that did not involve a logical inconsistency in the strict sense of the term.

Much more problematic was the semantic basis for the derivation. Immovable concretes were, by Kaiser's (1911, §§ 299–300) own definition, commodities. Whereas land *qua* property and the resources that it contained obviously constituted an exchangeable commodity and the physical features of a given country could be considered as commodities in a general sense of the term (See Section 3.1.2 of the current chapter, esp. p. 410, n. 357), the extension of the status of commodity to countries viewed as a "political divisions", distinguishing features of which included "an independent government ... at least independent enough to frame its own customs tariff", politico-legal "authority ... exercised within [a] territory as expressed in [its] laws", and the socio-cultural traits of "inhabitants as expressed in their language, customs and habits" (Kaiser 1911, §§ 300, 332), entailed stretching the meaning of the word "commodity" beyond all recognition: one might well speak of countries as *having* commodities but hardly as *being* commodities themselves. To be sure, state territories—sometimes quite substantial ones—could be objects of exchange for monetary payments: the history of the United States of America alone yields such notable examples as the Louisiana Purchase (1803), the Gadsden Purchase (1853), and the Alaska purchase (1867), wherein the United States paid 15 million dollars to France, 15 million dollars to Mexico, and 7.2 million dollars to Russia for, respectively, 529 million acres of land to the west of the Mississippi river, 79 million acres in present-day Arizona and New Mexico, and the 375 million acres comprising present-day Alaska, respectively (Northrup 2003, Vol. 2, 429). Such transactions, however, involved state territories defined purely as tracts of land, not as territories embodying independent political, economic, and socio-cultural units, as Kaiser envisioned countries to be: thus, they do not strengthen the claim that countries *qua* politically defined entities might constitute a kind of immovable commodity. In fact, Kaiser offered no explicit rationale for his identification of countries as a kind of immovable commodities. The only clue to his thinking on this score is his remark that the class of immovable concretes "consists mainly of what is called physical features of countries" (Kaiser 1911, § 316), from which it appears that it was the association between land *qua* property and countries *qua* (politically bounded) territories that connected the

hierarchically subordinate subcategory as a category coordinate with the broader category of which it was a subcategory implicitly followed the same principle that Ranganathan would later formalize.

two in his mind. At any rate, Kaiser's characterization of immovable commodities as primarily physical features of countries indicates that his definition of this subcategory of concretes in fact presupposed the existence of a category of countries: this meant that the derivation of the latter from the former involved circularity in definition. Few present-day readers of *Systematic Indexing* are likely to find such a rationale persuasive;³⁷⁰ one may well wonder if any of Kaiser's contemporaries did.

Kaiser's argument for deriving the category of countries from that of concretes, then, was decidedly weak, primarily because he sought to build the derivation on a domain-specific notion of concretes *qua* commodities that simply couldn't accommodate his concept of countries as political-*cum*-territorial units. Arguably, he would have been on somewhat firmer ground had he invoked his more capacious definition of concretes as "things in general, real or imaginary" (See Section 3.1.2 of the current chapter) as his basis for the derivation: after all, countries could be conceived of as wholes having form and extent, albeit in a manner analogical, rather than identical, to that of physical objects such as cattle, coins, cotton gins, or card indexes. An even simpler alternative would have been to forgo deriving the category of countries from that of concretes altogether and to establish it as an independent category in its own right. The fact that Kaiser did not take this route of least resistance but sought to find a semantic basis for viewing countries as a type of concrete indicates that he considered it necessary to make a theoretical linkage between the two. We shall consider the underlying reason for this in Section 3.4 of this chapter. Yet, before we do so, it is necessary to examine Kaiser's conceptualization of the third and final fixed point of SI—the category of processes.

7.3.3. The Category of "Process"

Names have consequences. In adopting "process" as the designation for his third category of terms, Kaiser selected a word that carried certain connotations for his intended readership, namely persons interested in the indexing of commercial and technical information. Inasmuch as these connotations explain his choice of the term and so shed light upon what he took to be the most salient definitional features of the category to which

³⁷⁰ Those latter-day commentators who have noted the derivation of countries from immovable concretes with apparent equanimity (Mills 1968, 184; Rodríguez 1984, 165; Straioto & Guimarães 2004, 112) have been able to do so only by leaving out of account the inconvenient fact that, in his arguments for the derivation, Kaiser specifically spoke of "immovable commodities" rather than "immovable concretes".

he applied it, it is appropriate to open a discussion of his notion of processes by briefly considering the word “process” and its most characteristic uses in the ordinary language of the late 19th and early 20th centuries, especially in the discourse of business and economics where it came to take on special significance.

7.3.3.1. Lexicographical and Conceptual Background to the Category of “Process”

As with concretes, etymology provides an initial clue regarding the semantic lineaments of the word “process”. The English noun derives, *via* French, from the Latin noun *processus*, itself formed from the past participial root of the verb *procedere* “to go forward” and carrying such meanings as a going forward, an advance, a progress, or a lapse of time (Murray et al., 1888–1928, Vol. 7, 1408, s.v. “Process *sb.*”; Onions, Friedrichsen, & Burchfield 1966, 712, s.v. “process”). This etymological heritage, developed by usages of members of anglophone populations over the course of several centuries,³⁷¹ set the tone for the meaning that it carried in Kaiser’s time.

At a basic level, “process” conveyed the notion of an activity occurring over time: as the compiler of the article on the word in the *New English Dictionary on Historical Principles* (the first edition of what would come to be known as the *Oxford English Dictionary*) recorded, one of its meanings, enshrined in such locutions as “in process (of)”, was “[t]he fact of going on or being carried on, as an action, or a series of actions or events” (Murray et al., 1888–1928, Vol. 7, 1408, 1 s.v. “Process *sb.*”). Covering the field of activities, actions, or series of events, processes were understood to be dynamic in nature and, as such, to stand in contrast to those comparatively static and stable entities known as things. An especially eloquent example of this conceptual opposition is found in a passage from a contemporary textbook of psychology written by an eminent American scholar of English origin who, arguing that psychology was to be understood as “the *science of mental processes*”, found it necessary to specify that

[a] *process* is any object of scientific knowledge which is not a ‘thing’. A ‘thing’ is permanent, relatively unchanging, definitely marked off from other things. A process is, by etymology, a ‘moving forward.’ It is a *becoming something*,—a continuous operation, a progressive change, which the scientific observer can trace throughout its course. It melts into and blends with operations and changes which follow and precede it. Thus the chemist speaks of the ‘process of decomposition.’

³⁷¹ According to the *Oxford English Dictionary*, the earliest documented attestations of the word in written documents date back to the first half of the 14th century; see Simpson & Weiner 1989, Vol. 12, 545–547, citations under 1.a, 2, 4.a, 5.a, 7.a, s.v. “Process”.

The changes which constitute decomposition are the 'process'; the final products of decomposition are 'things.' The wearing away of a cliff by the action of water is a process, the rock itself is a thing. The thing 'is' here or there; the process 'takes place' (Titchener 1902, 7 [emphases his]).

On this view, processes and things represented mutually disjoint, albeit interacting, sectors in the domain of being: things were subsistent beings possessing relative permanence, whereas processes constituted the actions or activities—the “becomings”, if one will—in virtue of which things underwent, and enacted, change. Ultimately rooted in the hoary philosophical distinction between being and becoming, this contrast between things and processes, as we shall presently see, was not confined to the discourse of sciences but also found application, albeit in a slightly different sense, in the domain of business.

To be a process meant to be “[s]omething that goes on or is carried on”—that is to say, “a continuous action” of some sort (Murray et al., 1888–1928, Vol. 7, 1408, 5 s.v. “Process *sb.*”). Inasmuch as actions *qua* processes were continuous, they had duration—after all, one of the subsidiary meanings of the word was the “passing or elapsing” of time—and, in virtue of their having duration and involving change, they were understood to have a trajectory over time—a notion consonant with the meaning of “process” as “[t]he act or state of proceeding or moving forward” (Hunter et al. 1901, Vol. 7, 3250, I.2 & I.1 s.v. “process”). Thence, it was only a short step to construing a process as a continuous action having an internal structure resolvable into “series of actions or events” or “series of motions or changes”, over the course of which the object(s) involved in the process underwent alteration of some sort (Murray et al., 1888–1928, Vol. 7, 1408, 5 s.v. “Process *sb.*”). Now sequences of actions, events, or changes, whether occurring spontaneously in nature or designed and performed by human beings, often exhibited regularities in their structure and effects: hence, the term “process” could also take on the nuance of a “[n]ormal or regular manner of activity” (Hunter et al. 1901, Vol. 7, 3250, I.7 s.v. “process”). All these aspects of the concept of process were folded into what the compilers of the *New English Dictionary* identified as “[t]he chief current sense” of the word: “[a] continuous and regular action or succession of actions, taking place or carried on in a definite manner, and leading to the accomplishment of some result” (Murray et al., 1888–1928, Vol. 7, 1408, 6 s.v. “Process *sb.*”).

Defined in the foregoing manner, processes could be either as natural or as artificial. A natural process was one in which the sequence of activities constituted “[a] natural or involuntary operation” wherein “a series of changes or movements [took] place” without

any intentionality governing the ultimate outcome of the process (Murray et al., 1888–1928, Vol. 7, 1408, 6.a s.v. “Process *sb.*”; cf. Guthrie 1882, 40): the growth of vegetation in a forest or the decomposition of a dead body were examples thereof (cf. Hunter et al. 1901, Vol. 7, 3250, I.6 s.v. “process”). An artificial process, on the other hand, was “an artificial or voluntary operation” typically comprising “a systematic series of actions, physical or mental, directed to some end”: rooted in purposive intentionality, it constituted “a course or method of operation” or “a way of doing something by rule or established method” (Murray et al., 1888–1928, Vol. 7, 1408, 6.b s.v. “Process *sb.*”; Whitney & Smith 1906, Vol. 6, 4746, notes s.v. “process *n.*”; cf. Guthrie 1882, 40). Prototypical models of artificial processes were manufacturing processes, in which prescribed sequences of actions were applied to given raw or half-manufactured materials in order to transform those materials, according to a certain specifications, into products (cf. Hunter et al. 1901, Vol. 7, 3250, I.5 s.v. “process”). Indeed, from the second quarter of the 19th century, the term “process” came to take on the further nuance of “a particular method of operation in any manufacture” (Murray et al., 1888–1928, Vol. 7, 1408, 6.c s.v. “Process *sb.*”). Often, such specific processes took on the name of the persons who discovered them, as in the well-known case of the Bessemer process, a method “for decarbonizing and desiliconizing pig-iron so as to convert it into steel or malleable iron, by passing currents of air through the molten metal” that revolutionized heavy metallurgical industry in the latter half of the 19th century, named after its creator, the engineer, inventor, and entrepreneur, Sir Henry Bessemer (1813–1898) (e.g., Murray et al., 1888–1928, Vol. 1, 823, s.v. “Bessemer”; Whitney & Smith 1906, Vol. 6, 4746, notes s.v. “process *n.*”). This onomastic practice reflected the fact that a process, understood as “an art or method by which any particular result is produced” could, under certain well-defined circumstances, become the object of a patent (Bouvier 1897, 613–614; Sewall 1910).

For late 19th and early 20th century businessmen, then, a process was an activity conducted methodically to achieve a particular productive end. In the realm of manufacture, processes typically took the form of mechanical, chemical, or other technical operations on physical materials, or things: on this view, the process of manufacture as a whole consisted of a series of smaller, well-defined, and self-contained processes, each of which altered the material in question in a specific way that contributed to the realization of the final

product.³⁷² Underlying this model of manufacture, of course, was the classical political-economic principle of the division of labor, which, in the words of one contemporary British writer on the subject, consisted in “the separation of the total labour required for the manufacture of a single product into various distinct processes and the allocation of each of these processes to a particular labourer or body of labourers” (Davidson 1894, 608). Viewed in this light, a process became, so to speak, the unit of analysis of the kinds of productive activity in which a business was engaged and thus a factor of great importance in conceptualizing the organization of a business as a whole. For example, the American author of an article on classification in business management proclaimed that

[b]usiness activity is made up of three elements—materials, processes, and relations between individuals, the latter usually called organization. If you want to know what you are doing in your business ... you must reduce to order and identify every element of labor, every bit of material, and every detail of organization about your place ... (Thompson 1912, 589).

On this view, which was not untypical of its day, processes, which as kinds of activity constituted “element[s] of labor”, stood alongside materials, which included not only the things upon which operations were performed but the equipment that enabled them to be carried out, and personnel, whose members stood in certain organizationally defined relationships to one another, as the basic component units for anatomizing a business.

According to writers on business management and economics, the activities of all manufacturing businesses could be resolved into the processes on which their workers expended their labor. The work of a small manufacturer might involve relatively few processes. For example, wrote one commentator on business management, in a small cigar factory consisting of only a few workers and selling its wares to local retailers, “[t]he process consists of removing stalks [sci., of tobacco plants], arranging filler and wrapper in parallel lines, rolling, cementing the tip, cutting off, packing, delivering” (Thompson 1912, 589): in this case, such operations as stalk removal, arrangement of filler and wrapper, rolling, affixing the tip, cutting, packing and delivering each constituted a separate process that, together, made up a general process of small-scale cigar manufacture and distribution. In larger industrial enterprises engaged in the mass-production of goods, the number of

³⁷² For a good example of how the manufacture of a single product could be conceptualized as a series of self-contained processes, see the description of “the manufacturing processes of steel pens” in Bore 1890, 37–49.

processes in manufacture alone was greatly increased. As one contemporary British economist commenting on the increased size of business concerns remarked,

Adam Smith's famous pin manufactory, with its ten separate processes, has been left far behind. In a modern shoe factory in the United States there are sixty-four distinct processes. Grain, in the elaborate machinery of a steam flour mill, passes through a score of different stages, cleaning, winnowing, grinding, etc. The American machine-made watch is the product of 370 separate processes. The organization of a modern textile factory provides a dozen separate processes contributing to the spinning or weaving of cotton or silk. New processes of cleaning, finishing, and ornamenting are continually being added (Hobson 1904, 94).

Within large firms, analysis of a business's many activities into processes, organizing labor around these processes, and coordinating the processes was one of the central tasks of management. "It is the duty of the manager to separate his business processes and to constitute them into separate processes", wrote one American author of a treatise on business organization, "[h]e must group those operations of a similar kind into one department" (Sparling 1906, 28). Serving as the functional basis for forming departmental units, processes were a key structural element in the organization of business enterprise (cf. Chapter 6, beginning of Section 2.2, above).

The fact that the process of manufacture for a single kind of product might comprise a considerable number of smaller processes carried out by specialized staff using specialized machines and tools also had consequences for the physical organization of manufacturing enterprises. Most visibly, it was taken into account in the layout of factories, in which the workspaces, or shops, wherein the different processes were to be performed were ideally disposed in such a way that the materials forming the objects of the processes might pass through them in a single order "without redoubling" (Galloway 1910, 135; cf. pp. 138-140). As the British author of a paper on "economic principles in factory design" explained,

[t]he arrangement in relation to each other of the various shops or buildings where the processes are to be carried out, should be such that the operations performed on the materials form a continuous progress from the first stage to the last. Thus the shop nearest the point where the materials enter the works should be that where the first process is carried out; the next should be for the next process, and so on. The path taken by the material in transit from shop to shop, should be as short and direct as possible; circuitous or zigzag routes should be avoided, and on no account should the material have to return and go twice over the same line. The aim is to secure a steady continuous "flow" of the work in one direction" (Thuillier 1908, 90).

Such, for example, was the design that British Westinghouse adopted for its large, multi-building plant at Trafford Park (See Chapter 4, Section 2, above), where, according to the admiring words of contemporary visitors,

[t]he whole works are arranged on the most logical method of progression, for the raw materials from their arrival are passed gradually forward from process to process until they leave the machine shop in their finished state ready for delivery (The Manchester Geographical Society 1902, 178).

In this way, the concept of a process as a series of individual operations, or processes, each contributing, in its turn, towards the accomplishment of a final goal (*in casu*, a vendible product), found concrete and practical expression in the realm of industrial production.

Within the discourse of economics and business organization, the term “process” originally seems to have been used primarily to refer to manufacturing operations: however, by the final decade of the 19th century, it was no longer confined to this area alone. The so-called extractive trades, or industries—namely, agriculture, mining, fishing, lumbering, and so on, which produced raw materials both for consumption and further use in manufacture—were characterized by some commentators as carrying out “extractive processes” (e.g., Hobson 1894, 34, 70–71; 1910, 26; Ross 248). Similarly, the various activities involved in the buying and selling of goods, be they raw materials or finished products, comprised “distributive” or “commercial processes” (e.g., Hobson 1894, 70; 1910, 21–22; Pope 1905, 4; Sparling 1906, 17), while the various forms of transportation facilitating the manufacture and distribution of goods constituted “processes of transport” (Hobson 1894, 70–71; 1910, 24). In the second decade of the 20th century, office activities, such as the production of correspondence; the receipt, sorting, and routing of mail; filing and indexing; and copying and duplicating, which had previously been called methods (e.g., International Correspondence Schools 1910, 288–331), also came to be characterized as processes (e.g., Schulze 1919, 97; The Editors 1919, 148). By 1920, then, virtually every form of business activity had come to be viewed as a process.

7.3.3.2. Kaiser’s Category of Process

Such, then, was the conceptual background to the use of the word “process” in the discourse of business organization in the years when Kaiser was developing his account of SI. This discourse had a palpable influence on his general conceptualization of processes. For one thing, he fully embraced the idea of the process, or operation, as an analytic unit in the division of labor within a large-scale business enterprise and sought to apply it to the

realm of office work. Indeed, he viewed that sector of office work in which he was especially interested—the design and maintenance of card systems—as an embodiment of the notion of division of labor, or, as he preferred to call it, specialization, an idea upon which he expatiated in *The Card System*:

The development of the card system and its more universal adoption within recent years is undoubtedly due in the main to the development in modern business and factory organisation; it may be regarded as an offspring of *manufacture in quantities*. (Massenfabrikation, Grossindustrie). The recognized principle in manufacture in quantities is *maximum of output with minimum of labour*. The means to attain this end is *specialisation*, which in turn yields greater precision and accuracy as its result. (Kaiser 1908, § 60 [emphases his]).

“[S]pecialisation”, argued Kaiser, “enables each worker to become an expert in his assigned operations” (§ 61). Among the ways in which the card index embodied this principle was “the separation of the various operations, recording, filing, indexing, compiling etc. with similar divisions of the staff of workers” (§ 62)—in other words, the analysis of the general process of creating and maintaining a card index system into its component operations and the assignment of each of these to “expert labour” (§ 61).

For Kaiser, specialization required not only the decomposition of a general process into its component processes, but also the ordering of the latter in such a way that they would be carried out as efficiently as possible: in his words, “[t]he most insignificant process is ... important enough to be systematized and linked up with others in a carefully thought out chain of operations which collectively performs the work required in the most expeditious manner” (Kaiser 1908, § 160). As an example of this, he presented a brief description of the processes involved in sending out a mass circular mailing and preparing a special card register to record the recipients thereof—a task that doubtless reflected the experiences of those members of the Tariff Commission’s office staff charged with preparing its forms of inquiry, or questionnaires, for distribution by mail (See Chapter 5, Section 2, above):

To give a better illustration of linking up processes, let us suppose that we desire to send out 20,000 circulars with covering letters to addresses we have, and that we wish to have a card register of these for following up the first by a second circular etc. We make up a sample exactly how the circulars are to go out and ascertain postage. Next we go through all the processes necessary, from the addresses to the affixing of the postage stamps, and reduce them to “units of labour”. We are now in a position to apportion the various processes (or sets of them) among the staff, and if that is done properly the work will be turned out as if by machinery. There will be (1) the writing of the cards from the addresses; (2) the addressing of the envelopes from the cards; (3) the covering letters. These are passed on to others who attend to (4) the filling in of names on the covering letters; (5) the getting ready of enclosures;

(6) comparing names on envelopes and letters, folding and putting up letters; (7) sealing the envelopes and counting; (8) affixing stamps and recounting. Meanwhile (9) the cards are being filed roughly, and (10) strictly.³⁷³ All these processes are going on simultaneously until the entire work is completed (§ 163 [footnotes omitted]).

This mode of analyzing processes into their component parts informed Kaiser's account of his own methods of registering and indexing. In discussing how to deal with different kinds of documentary materials in *The Card System*, he adopted the expository technique of breaking down a single work process into its various subsidiary operations and ordering them into a sequence, which he presented in the form of "summaries" enumerating in detail the various steps to be followed of treating a given type of documentary material (1908, §§ 219–223, 23, 244, 256–257, 265–266), while in *Systematic Indexing*, he provided comparable step-by-step lists of the operations involved in card indexing and book indexing (1911, §§ 447, 597). The notion of processes thus was deeply embedded in the very protocols for SI.

Kaiser's association of the idea of specialization with that of manufacture in quantities suggests that his view of processes as individual operations concatenated to form a single workflow for the purpose of achieving a certain result was in large measure inspired by the organization of production in factories. Another indication thereof occurs in a passage of his discussion of classification in *Systematic Indexing*, in which he drew a contrast between concretes and processes as objects of classification. There, he noted that, insofar as concretes generally took the form of spatially extended objects, they could readily be arranged into groups (Kaiser 1911, § 108; cf. Chapter 6, Section 3.2.2; Section 3.1.2 of the present chapter, above). On the other hand, he wrote, "[c]lassification of the processes of concretes, i.e., their actions, is generally limited to that of their names" (Kaiser 1911, § 109). The reason for this, he explained, was that

[a] classing of processes *in concreto* would presuppose an exhibition of a number of processes simultaneously at work. That may be seen at many of the large factories for instance, the concretes—commodities—being made in quantities, the processes

³⁷³ To file roughly was to separate the cards out into broad divisions and to file strictly was to arrange the cards in each division into a strict order. In the filing of cards by the alphabetical order of the names of recipients, rough filing would mean dividing the cards up into groups by the initial letters of the names (i.e., A, B, C, and so on), while strict filing would be to place the cards in each group by the alphabetical sequence of the following letters of the names; in filing by numerical order, rough filing would mean dividing the cards into broad numerical divisions (i.e., into thousands) and strict filing would involve ordering the cards by numerical sequence under each of the divisions. See Kaiser 1908, §§ 161–162, 366, s.v. "Filing roughly".

through which they have to pass may be seen at work at the same time. Their proper classification and distribution play a very important part in the economics of production in quantities (§ 109 [italics his]).

Processes, unlike concretes, were not relatively permanent objects with a definite form extended in space, but rather activities involving such objects. Thus, within the framework of an intelligence department, they could not be collected, stored, arranged, and displayed according to a certain classificatory order in the same manner as physical objects: one could not put a process on a shelf or in a cabinet compartment next to another process as one could do with a material object such as a commodity sample, much less present collections of continuously occurring processes for viewing.³⁷⁴ Classified groups of processes could only be enacted, organized, and viewed at sites where the physical preconditions for their joint, continuous occurrence had been secured. To Kaiser's mind, the prototypical *locus* for a directly observable arrangement of processes was the factory, where the fact that the commodities—or rather, the materials from which they were produced—had to pass through a series of processes to reach their final state as vendible products required that the preconditions for the performance of those processes—namely, machines and the men operating them—be disposed in such a manner that the materials pass from one process to another in an appropriate order. In this, he echoed contemporary ideas about industrial organization, which, as we have already seen, prescribed that the layout of a factory be based on the progression of processes needed to manufacture a (kind of) product as efficiently as possible (See Section 3.3.1 of the current chapter): it was in this way that the “proper classification and distribution” of processes could be said “to play a very important part in the economics of production in quantities”.

Embedded in Kaiser's discussion of the difficulty of preparing displays of processes *in concreto* were two fundamental points that colored his general concept of processes as such. First, he identified processes as *actions*—that is to say, as “what things do or what is done to them” (Kaiser 1911 § 301). This characterization of processes *qua* activities, which he repeated elsewhere in *Systematic Indexing* (§§ 55, 73, 302, 344, 663, s.v. “Concrete and Process”) distinguished them ontologically from concretes, *qua* things, which, as we have seen, were held to have relatively stable being (See Sections 3.1.2 & 3.3.1 of the present

³⁷⁴ On commodity samples as objects of collection and classification in intelligence departments, an idea that Kaiser seems to have derived, at least in part, from his experiences at the PCM, see Chapter 6, Section 2.4. On the difficulties involved in the exhibition of processes within an intelligence department, see also Kaiser 1911, § 44, Point 5.

chapter). Yet, in speaking of “the processes of concretes”, Kaiser (1911, § 109) indicated that, even though processes were ontologically distinct from concretes, they nevertheless stood in intimate relation to them. In this regard, we have already had occasion to note his conviction that the two were indissolubly linked ontologically and epistemologically: processes always took place in relation to concretes and so were dependent upon the latter for their existence, whereas concretes typically came to be known to human observers by means of the processes in which they were implicated (See Section 2.1 of the current chapter). To Kaiser’s mind, processes were a constant concomitant to concretes, at least within the horizon of human experience.

In his account of information analysis, Kaiser took it as axiomatic that the links between concretes and processes observed in the world found linguistic representation in texts. As we saw earlier, he held that “literature names *things* and ... these things are *spoken of* or *described*”, so that “[t]he knowledge conveyed by literature all has reference either to *things* or to *spoken of* (Kaiser 1911, § 298 [emphases his]; see Section 2.2.4 of the current chapter, esp. p. 350, above). The things named in texts, of course, comprised the category of concretes as well as the derivative category of countries (§ 300; cf. Section 3.2 of the current chapter). On the other hand, Kaiser (1911, § 301 [emphases his]) wrote, “[t]he ... term *spoken of* implies an action, i.e. what things do or what is done to them. ... We shall use the term *process* ... to express conveniently the actions implied by *spoken of*”. With this statement, he conjoined two different ideas under the rubric of process. To the semantic notion of processes *qua* actions, he added one that was akin to the logico-linguistic idea of predicates, for, insofar as actions were “implied”³⁷⁵ by what was said about things, they stood in relation to things much as the predicate of a sentence did to its subject.³⁷⁶ This

³⁷⁵ Note that, in this context, “imply” did not express the usual meaning of the word, “[t]o involve or comprise as a necessary logical consequence”, but rather conveyed the somewhat rarer sense “[t]o involve by signification or import; to signify, import, mean” (Murray et al., 1888–1928, Vol. 5/2, 97, 2.[a] & 2.c s.v. “Imply”).

³⁷⁶ Originally derived from the logical tradition, the notion of a predicate as that which is said about a subject was, in Kaiser’s day, a standard feature of syntactical analysis of sentences in school grammars. Thus, for example, one late-Victorian British school grammar-book described the relation between subject and predicate in the following manner: “The Subject and the Predicate are parts of a whole [sci., a sentence—TMD], and cannot be correctly described except by reference to one another. The Subject denotes the person or thing concerning which something is said by means of the Predicate. The Predicate is what is said concerning the person or thing denoted by the Subject” (Cooper & Sonnenschein 1891, 10, § 3). An American counterpart published in the first decade of the new century characterized it so: “A sentence consists of two parts, (1) what the sentence tells about is called the *subject*, and (2) what it tells is called the *predicate*. ... *The Subject of a sentence names that of which something is said or asserted; ... The Predicate of a sentence is that which is said or asserted of*

quasi-grammatical nuance received further reinforcement from Kaiser's insistence that because that which is spoken of a thing "implies" an action, "[i]t must ... in all cases contain the verb" (§ 301). To understand the import of this statement, it is useful to recall that, in contemporary grammatical lore, verbs had two defining features. First, within a sentence, the verb had the function of predication: it was the part of speech by means of which assertions could be made about those things whose names appeared as subjects of sentences (e.g., Emerson & Bender 1908, 34, § 60; Gow 1907, 36; Mason 1890, 62, § 180; Meiklejohn 1901, 34–35; Murray et al. 1888–1928, 10/2, 118, 1 s.v. "Verb"; Turner & Hallidie 1895, 63, § 105; West 1898, § 136). Second, verbs were routinely characterized by grammarians as ascribing actions, states of being, and feelings to the subjects of which they were predicated (e.g., Emerson & Bender 1908, 34, § 61; Mason 1890, 62, § 180; Meiklejohn 1901, 35; Morris 1893, 49, § 55; West 1898, § 136). Kaiser's statement that, in a text, what is spoken of a thing must contain a verb thus reflected the standard grammatical principle that the predicate of a sentence possesses the verb, a principle with which he, as a former schoolmaster and teacher of languages would be thoroughly familiar (see Chapter 2, Sections 2–3, & Chapter 3, Section 1, above). However, in declaring that what is spoken of a thing must contain the verb in virtue of the fact that what is spoken of a thing implies an action, he limited the semantic range of verbs to the signification of actions alone. Kaiser appears to have associated actions and verbs fairly early in his development of SI, for in his retrospective account of the origins of the system, he spoke of "terms of action or verbs" as those that he set in contrast to his original category of "terms of commodities" (Kaiser 1926, 22–23, §§ 6, 7, 11). The close association between actions and verbs provided justification for his adoption of the term "process" as the name of his category: at the same time, however, it imposed a semantic constraint that, as we shall presently see, could only be honored in the breach.

Kaiser's correlation of processes and their relation to concretes to the grammatical notions of verbs and predicates imparted to his categories a decidedly linguistic coloring. Yet, in accord with his tenet that the analysis of literature prescribed by SI was one carried out from the perspective of knowledge rather than that of grammar or logic (Kaiser 1911, § 297; see the end of Section 2 of the present chapter), he did not fully assimilate the categories of processes and concretes to the grammatical categories with which he associated

the Subject ... " (Emerson & Bender 1908, 4–5, §§ 10–11 [emphases theirs]). Examples of comparable statements could easily be multiplied.

them. At the end of the discussion in which he characterized processes as actions predicable of concretes, he added the significant proviso that

[c]are should be taken not to confound the two elements concrete and process with subject and predicate. In the sentences “Synthetic indigo is in great demand,” “There is great demand for synthetic indigo,” “India suffers a great deal through the manufacture of synthetic indigo” the concrete is *synthetic indigo* whatever its position (§ 301 [emphasis his]).

With these remarks, he indicated that, whereas the relation between concretes and processes in an indexing statement was analogous to that of the subject and predicate in a natural-language sentence, it was not identical with the latter. Words denoting concretes could assume different grammatical rôles—e.g., direct objects, indirect objects, or objects of prepositions—within a sentence and so an indexer engaged in analyzing a text in order to construct a statement could not simply equate terms of concretes with the grammatical subjects of statements *per se*; by the same token, words referring to processes might not always appear in the grammatical rôle of predicate. Thus, as one latter-day commentator has neatly phrased it in the idiom of modern linguistics, “the concrete-process distinction [was] not a surface structure distinction, though often it [could], in fact, coincide with the grammatical subject-predicate distinction” (Svenonius 1978, 139; cf. 1979, 67). The categories of concretes and processes were to be deployed to capture the semantic content of a text rather than to recapitulate its grammatical structure.

In a similar manner, Kaiser drew a distinction between terms of processes and verbs as such. We have seen that he considered terms of processes to refer to actions relating to concretes and, in this respect, to have the same semantic function as verbs. However, he did not require that such terms take the grammatical form of verbs as well. “Although the process contains the verb it need not necessarily be expressed in the form of a verb so long as it expresses the action”, he wrote, adding the specification that “it may take the form of a noun or sometimes an adjective” (Kaiser 1911, §§ 344, 663, s.v. “Concrete and Process”). While Kaiser did not set forth his rationale for the stipulation, the grounds for it can readily be reconstructed. In part, it probably reflected his awareness of the elementary grammatical fact that, in natural language, words embodying parts of speech other than that of verbs can convey concepts of action pertaining to a given concrete: for example, in a phrase such as “the manufacture of synthetic indigo”, the noun “manufacture” expresses the idea of activity directed towards the production of a given concrete *qua* commodity—in *casu*, synthetic indigo. Moreover, the conventions of indexing appear to have come into play

as well. Then as now, indexers and subject catalogers expected that headings in an index or subject catalog would take the form of nouns or noun phrases.³⁷⁷ For the most part, Kaiser conformed to these expectations, for virtually all the examples of terms of processes that he set forth in *The Card System* and *Systematic Indexing* were formulated as nouns or, much more rarely, adjectives.³⁷⁸ In short, despite the fact that he considered terms of processes to be verb-like in their semantic content, he dissociated them from verbs *qua* parts of speech, preferring to cast them as substantives (see Section 2.2.4 of the present chapter).

Within the framework of SI, then, terms of processes tended to be nouns referring to actions carried out with respect to concretes. Examples of such terms given in *The Card System* and *Systematic Indexing* included CULTIVATION of coffee in Brazil (Kaiser 1911, § 483), cotton in the Punjab region of India (§ 480), and ginger in Jamaica (§ 475); CULTURE of silkworms in Cuba (§ 506); DISCOVERY of coal in Western Australia (§ 512); FARMING of ostriches in South Australia (§ 497); FISHING for sponges in Venezuela (§ 507); RAISING of dairy cattle in New South Wales, Australia (§ 491); COLOURING of claret in France (§ 529); CURING of rubber in Pará, Brazil (§ 511) and of tobacco in Victoria (§ 509); MANUFACTURE of rubber in Brazil (§ 481); PRESERVING of wood in Germany (§ 510); PRINTING of calico in Russia (§ 490); REFINING of indigo in Formosa (§ 495); SMELTING of iron ore in Elba, Italy (§ 520); SPINNING of cotton (§ 344); COMPETITION with regards to the sale of woolen goods in the United Kingdom (1908, § 118) CUSTOMS CLASSIFICATION of air brakes in

³⁷⁷ Among contemporary writers on book indexing, Wheeler (1905, 471) stated that “[a] heading should be a noun or a substantive phrase”, while, among authorities on subject cataloging, Cutter (1876b, 41–42, discussion to Rule 75; 1904, 71–72, discussion to Rule 174) clearly indicated that the names of subjects were, with very rare exceptions (namely, whole phrases or sentences treated as subjects), to consist of nouns or noun phrases. Other authors (e.g., Clarke 1905; Nichols 1892a; Petherbridge 1904) were silent on the matter, most likely because they took it to be self-evident that headings, or index terms, would be formulated as nouns or noun phrases, a supposition that finds support in the fact that the examples of index terms that they gave routinely took this form. This expectation has not changed in intervening years. Modern standards for the construction of thesauri and other indexing vocabularies specify that indexing terms are, as a rule, to be formulated as nouns or noun phrases, though, in certain highly restricted contexts, they allow for the use of adjectives standing in isolation as well (e.g. Aitchison, Gilchrist, & Bawden 2000, 19–20; ANSI-NISO 2005, 25–27); writers on book indexing also endorse the use of nouns or noun phrases but strongly discourage the use of stand-alone adjectives as indexing terms, especially as main headings (e.g., Mulvany 2005, 79–80, 86, 89; Wellisch 1995, 5–6).

³⁷⁸ The only exceptions to this rule are to be found at Kaiser 1908, §§ 235–236 and Kaiser 1911, § 460, where one finds statements in which the terms of processes are expressed by verbs or verb phrases. The underlying rationale for the first of these examples will be discussed in Section 3.6 of the present chapter; that of the second, later in this section. It may be noted that the same general pattern holds true for the surviving card index files of the Tariff Commission, which were created under Kaiser’s guidance: the overwhelming majority of terms of processes employed in the index statements contained therein are formulated as nouns or, much less frequently, adjectives.

Berlin, Germany (1911, § 517) and watches in Basel, Switzerland (§ 395); EXPORT of rubber from Pará, Brazil (§ 484), skins from British South Africa (§ 513), watches from Switzerland (§ 394), and watch cases from Basel, Switzerland (§ 395); FRAUDULENT TRADING with regard to drapers' goods in the Gold Coast (§ 457); IMPORT of hardware into Florianopolis, Brazil (§ 473); LIQUIDATION of nitrate bills (§ 455); TRADE in jewelry in the Philippine Islands (§ 474), in watches in Switzerland (§ 394–395), in nitrates in Chile (§ 302), and in textiles in Chemnitz, Germany (§ 341); CONSTRUCTION of a railway in Natal (§ 470) or an electric tramway in Stockholm, Sweden (1908, § 117); IMPROVEMENT of a river in Tabasco, Mexico (1911, § 500); PACKING of butter in Australia (§ 489) and raw cotton in the United States of America (§ 528); TOWING of ships in France (§ 504); and TRANSPORTATION of butter in Siberia (§ 525), freight in China (§ 322), and freight to and from Prague (§ 494). Although Kaiser did not present a classification of processes in his writings,³⁷⁹ these examples, which ultimately derived from the index files of the Tariff Commission, show that, in practice, his terms of processes covered the broad sectors of economic processes identified in contemporary economic and business literature, ranging from those connected with the extractive industries of agriculture, mining, and fishing, through manufacturing operations relating to different kinds of products and trade-related processes, to activities connected with the transportation of commodities (cf. Section 3.3.1 of the present chapter, end). Interestingly, when the word “process” itself appeared as an index term in the Commission's files, it was primarily in statements relating to manufacturing processes, such as BESSEMER STEEL–USA–PROCESS and UK–STEEL–BESSEMER PROCESS—a telling indication of the industrial ethos surrounding the term.³⁸⁰

A closer examination of the ways in which the terms of processes given in the foregoing examples were related to the concretes with which they were associated reveals a significant pattern. We have already seen that Kaiser (1911, § 301; cf. § 55) had characterized processes as actions and that, to his mind, actions were “what things do or what is done

³⁷⁹ There is some evidence that Kaiser developed working classifications of process terms for at least some of the indexes that he designed for the Tariff Commission. Thus, for example, among the series of categories employed to sort the terms used in the special index to the Commission's summary of oral and written evidence pertaining to the silk trade, we find [MANUFACT(URIN)G PROCESSES] and [TRADE PROCESSES]: the former included such terms of processes as BLEACHING, DYEING, FINISHING, MANUFACTURE, PRINTING, REELING, WEAVING, and WINDING, whereas the latter had, *inter alia*, DIRECT TRADE, DISTRIBUTION, DUMPING, EXPORT, FOREIGN MANUFACTURE, HOME TRADE, IMPORT, JOBBING, MERCHANTING, and MARKET ORGANISATION. See TCP 5/2/16, Index to the Silk Summary, Guide Cards for [MANUFACT(URIN)G PROCESSES] and [TRADE PROCESSES], n.d.

³⁸⁰ See, e.g., TCP 5/2/9, Index to Iron and Steel Evidence, Index cards, BESSEMER STEEL–USA–PROCESS ... E3422; UK–STEEL–BESSEMER PROCESS ... E1150; n.d.

to them”: in other words, a concrete could be the object of an action or the source thereof. Within most of the index statements given as examples in Kaiser’s writings, the terms of processes signified actions of which the concretes to which they pertained were, in one way or the other, the *objects*. Most typically, perhaps, concretes were presented as objects of a physical process of some sort. For instance, statements such as COTTON–INDIA, PUNJAB–CULTIVATION (§ 480), INDIGO–JAPAN, FORMOSA–REFINING (§ 495), RUBBER–BRAZIL–MANUFACTURE (§ 481), HARDWARE–BRAZIL, FLORIANOPOLIS–IMPORT (§ 473), BUTTER–AUSTRALIA–PACKING (§ 489), and FREIGHT–AUSTRIA, PRAGUE–TRANSPORTATION (§ 494) indicated that the texts to which they were assigned contained information, respectively, about the cultivation of cotton in the Punjab, the refining of indigo in Formosa; the manufacture of rubber in Brazil; the importation of hardware into the Brazilian city of Florianopolis; the packing of butter in Australia, and the transportation of freight to and from the city of Prague. In each of these cases, the concrete in question was depicted as the passive recipient, so to speak, of the physical actions signified by CULTIVATION, REFINING, MANUFACTURE, IMPORT, PACKING, and TRANSPORTATION. All of these actions were the results of intentional human activity directed towards a given manufactory or commercial end and thus could be considered as examples of artificial processes (See Section 3.3.1 of the current chapter).

Other statements presented concretes as the objects of non-physical actions or generic commercial activities. For example, WATCH–BASEL, SWITZERLAND–CUSTOMS CLASSIFICATION (Kaiser 1911, § 395) indicated that information was available about the classification of watches for tariff purposes in Switzerland; WOOLEN GOODS–UK–COMPETITION (1908, § 118) betokened information about woolen goods as the object of commercial competition in the United Kingdom; NITRATE–CHILE–TRADE (1911, § 302) pointed to information that nitrate was the object of trade in Chile, and DRAPERS’ GOODS–GOLD COAST–FRAUDULENT TRADING (§ 457) signaled the existence of information about the fact that drapers’ goods were the object of underhanded dealings in that British colony on the West African coast.³⁸¹ Although to be the object of competition, trade, or fraudulent trading was to be an object in a somewhat different sense than to be the object of the

³⁸¹ “Drapers’ goods”, also known as “drapery goods”, was the equivalent in British English to what Americans called “dry goods”, namely, “[t]extile fabrics, and related articles of trade” such as “cloth, shawls, wraps, ready-made garments, blankets, ribbons, thread, yarn, hosiery, millinery, etc.” (Cole 1892, 115 & 116, s.v. “Dry Goods”). On the Gold Coast, a colony located on the coastal territory of what is present-day Ghana, see Cana 1910; Máthé-Shires 2003.

physical activities of cultivation, manufacture, packing, or transportation, the concrete in question was still the focus of intentional human activity. Different in the latter regard were statements in which the concrete underwent a process that was not the direct result of voluntary human action, such as, for example, COTTON PIECE GOODS-UK-TRADE DECLINE and ALPACA GOODS-UK-EXPORT DECLINE, both of which were correlated with index items from the Tariff Commission's index files.³⁸² In these cases, the statements were correlated with information that British cotton piece goods had suffered decline in trade, and alpaca goods likewise had experienced decline with regard to export: to the extent that cotton piece goods and alpaca goods were represented as the undergoers of trade and export decline, respectively, they could be construed as being affected by those processes and so to be objects thereof.³⁸³ However, the terms TRADE DECLINE and EXPORT DECLINE did not name human activities intentionally directed at the concretes in question; rather they designated processes arising from large-scale market forces that resulted from, yet transcended, numerous voluntary acts on the part of individual manufacturers, merchants, and consumers. In this sense, they referred to something closer to natural processes in that they followed the impersonal laws of the market than to artificial processes stemming directly from deliberate human action (See Section 3.3.1 of the present chapter). Process terms of this type, which do not seem to have been common, did not indicate what was done to a concrete by human agency but rather what happened to a concrete under certain economic circumstances—a distinction that Kaiser seems not to have made.

Much more unusual were statements in which the concrete was presented as the source or cause of a process, although Kaiser included at least one unequivocal example of this in *Systematic Indexing*. In discussing how to index a brief article on the corrosive effects of a certain wrapping paper upon metallic objects such as silverware, he gave WRAPPING PAPER-CHEMICAL ACTION or WRAPPING PAPER-CORRODES as examples of appropriate

³⁸² See TCP 5/5/5, Oddments, Index card, COTTON PIECE GOODS-UK-TRADE DECLINE... F2476/16, n.d.; TCP 5/2/19, Index to Wool Questionnaires, Index card, ALPACA GOODS-UK-EXPORT DECLINE ... F6512/22, n.d.. Alpaca goods were fabrics woven primarily from alpaca wool, the industrial manufacture of which had been developed in the United Kingdom in the second quarter of the 19th century: however, the term "alpaca goods" was also frequently used to refer to cloths fabricated from kinds of wool with qualities similar to that of alpaca, such as mohair, Iceland wool, and even certain kinds of English wool (cf. Barker 1911; Pitman's Commercial Readers [ca. 1903], 159-162).

³⁸³ Strictly speaking, it would be more natural (and correct) to say that it was trade in cotton piece goods in the United Kingdom that had suffered decline and the export of alpaca goods from the United Kingdom that had experienced decline; for further discussion, see Section 3.6 of the current chapter, below. However, as they were formulated, Kaiser's statements clearly reflected an analysis in which the goods were taken as experiencing decline-in-trade.

statements (§§ 459–460). In these cases, the process terms CHEMICAL ACTION and CORRODES referred to an action by the concrete in question—*in casu*, wrapping paper—upon other objects. In fact, in the second example, the rare verbal form CORRODES appears to have been chosen expressly to make it clear that the wrapping paper was the cause of, not the object affected by, the process of corrosion: the nominal form of the name of the process was reserved for use with terms of concretes that were its objects—*in casu*, METALLIC ARTICLE–CORROSION or SILVERWARE–CORROSION (§ 459). Yet, if terms of processes could, in principle, be used to indicate actions performed by the concretes with which they were associated, the general trend in SI was to employ such terms to refer to actions performed on the concretes in question: as Kaiser (1926, 27, § 21) would note in a later exposition of his system, “process terms ... show ... modifications to which [concretes] are subject”.

One may well ask why, within the framework of SI, those statements in which the concrete was the object of the action signified by the process term tended to preponderate over those in which the concrete was the cause of the process. One latter-day commentator has suggested that this feature of Kaiser’s indexing system may reflect a general tendency among creators of indexing systems to treat “entity-activity” combinations in complex index terms as analogous to passive-voice constructions in natural language, a tendency which, he hypothesizes, may be rooted in the differential ease of cognitive processing of passive-voice constructions *vis-à-vis* active-voice ones (Batty 1984, esp. 16–19; cf. Austin 1976, 35–40, 43–44). This hypothesis relies exclusively upon psycholinguistic theory and does not take into account the historical context in which SI was formulated: as such, it offers, at best, only a partial and somewhat speculative explanation for Kaiser’s inclination to treat concretes as the objects of processes. A more historically grounded explanation can be found by considering the conceptual lineaments of Kaiser’s categories and their background. We have already seen that he defined concretes primarily as commodities (See Section 3.1.2 of the current chapter). Inasmuch as commodities were objects of prime interest to manufacturers and merchants alike, it stood to reason that, in an indexing system oriented towards the interests of businessmen, concretes, defined in theory if not always in practice as commodities, should be considered in light of the various processes to which manufacturers, merchants, and markets subjected them. It is presumably for this reason that Kaiser generally tended to favor terms of processes that “expresse[d] the action which the

concrete is undergoing or has undergone” (Kaiser 1911, § 344) rather than those in which the action was one performed by the concrete.

For the most part, then, terms of processes referred to actions performed on, or in relation to, given concretes as described in a given text. However, on occasion, they were applied to the discursive action of the author of the text being indexed rather than to the actions depicted in the text. Kaiser (1911, § 663, s.v. “Concrete and Process” [emphases his]) explicitly alluded to this only once in his writings, in a passage where he stipulated the grammatical forms that a term for a process could take:

Although the process represents the action it need not necessarily be expressed in a verb, it may take the form of a noun or sometimes an adjective, and in the case of the copula the process may be rendered as *definition, description, etc.*

The final clause, which states that DEFINITION, DESCRIPTION, or similar words can be used as process terms “in the case of the copula”, is obliquely phrased and may, upon first reading, seem opaque. To understand its import, it is necessary to recall what a copula is.

The notion of the copula had a place in both logical and grammatical discourse. In traditional logic, where the concept originated, the copula was the word, typically expressed as a form of the verb “to be”, that joined together a subject term and a predicate term so as to form a proposition according to the template “[SUBJECT] [COPULA] [PREDICATE]” (e.g., Fowler 1906, 24–25; Keynes 1887, 53; Ryland 1900, 16; Stock 1888, 53–54, §§ 181, 187): for example, in the proposition “Gold is a yellow metal”, “Gold” was the subject term; “a yellow metal”, the predicate term, and “is”, the copula (Hawkins 1893, 10, § 8). Taking the linguistic form of declarative sentences, propositions, were held to be the verbal representations of judgments, that is to say, mental acts whereby one affirmed or denied a predicate of a subject: on this view, the function of the copula within the proposition was to express the assertion of a judgment (e.g., Fowler 1906, 26; Joseph 1906, 146; Ryland 1900, 16). For the logician, then, the copula was distinct from the predicate of a proposition, for, although it expressed the act of asserting a predicate of a subject, it did not, of itself, indicate the contents of the predicate. In grammar, into which the idea of the copula had been imported from logic, the situation was somewhat different. As was noted earlier, grammarians considered the verb to be the nucleus of the predicate of a sentence; accordingly, unlike logicians, they routinely took the verb “to be” to form part of a predicate (Cooper & Sonnenschein 1891, 10–11, § 3–4; Meiklejohn 1901, 90; West 1898, 177, comment to Question 1). When used as a grammatical copula in a sentence, the verb “to be” was

considered to be a “verb of incomplete predication”, for it simply indicated the fact that predication was taking place: for the predicate of the sentence to be complete, the verb required a complement of some sort—be it a noun (phrase), an adjective, an adverb, a prepositional phrase, or some other construction—that conveyed the content of the predication (Cooper & Sonnenschein 1891, 12, § 6; Meiklejohn 1901, 90–91; West 1898, 172, § 175, point 2). Viewed from this perspective, the aforementioned proposition “Gold is a yellow metal” was amenable to the following grammatical analysis as a sentence: “Gold” was the grammatical subject, while “is a yellow metal” formed the predicate, which consisted of the copula “is” and its complement, the predicate noun phrase, “a yellow metal”.

Despite the differences in their respective analytical points of view, logicians and grammarians agreed that, within the framework of a proposition or a sentence, the copula was an element that expressed the act of predication but did not represent the content of the predication itself. It is against this background that Kaiser’s (1911, § 663, s.v. “Concrete and Process” [emphases his]) remark that “in the case of the copula the process may be rendered as *definition, description* etc.” takes on its full significance. In intimating that a process term could function in a manner akin to a copula, he appears to have meant that, in certain cases, such a term could be used not to designate a specific process predicated of a concrete within the text being indexed but rather to indicate that various assertions were being made about the concrete by the author. In other words, when terms of processes such as DESCRIPTION or DEFINITION were conjoined to a term for a concrete within a statement applied to a piece of text, they referred to a discursive action on the part of the text’s author directed toward the concrete in question or, as one later commentator put it, “the mode of treatment of the subject [sci., the concrete thematized in the text—TMD] by the writer”, not to “an action or process described in the document” itself (Coates 1960, 39, followed by Iyer 1996, 129; Sales & Guimarães 2010, 24; Straioto & Guimarães 2004, 111–112).

Although Kaiser did not explicitly discuss his rationale for including discursively oriented terms such as DESCRIPTION in the stock of terms of processes, it has been plausibly suggested that they were intended for use in contexts in which the text being indexed mentioned multiple processes related to a single concrete and the indexer did not wish to single out any one of the processes in formulating a statement (Coates 1960, 39). Some support for this interpretation can be found in Kaiser’s (1911, § 344) statement that, “if there are several processes for a given concrete [sci., in a text—TMD], they may be

included in one collective process unless specific processes are to be noted separately". Although discursively oriented terms did not designate collective processes in the strict sense of the term, some of them, such as DESCRIPTION, were potentially applicable in virtually all textual contexts and so could, in principle, take on the rôle of serving as general substitutes for clusters of more specific processes. On this interpretation, a discursively oriented process term attached to a term for a concrete served, to a large degree, as a placeholder, assuring that the statement of which it formed part conformed to the models for statements stipulated by Kaiser, in which the presence of a term for a process was obligatory (See Expressions [7.1]–[7.3] in Section 3 of the current chapter), while indicating that the piece of information characterized by the statement discussed the concrete without limiting its treatment to a single, specific process.

Indisputably the most significant discursively oriented process term in SI was DESCRIPTION. Not only did Kaiser (1911, § 73) include this term in his introductory list of examples of terms of processes in *Systematic Indexing* but he also presented several examples of statements featuring it, namely COTTON GIN ROLLER–DESCRIPTION (§ 462), INSULATING MATERIAL–DESCRIPTION (§ 464), BOOT–YUKON, CANADA–DESCRIPTION (§ 478), ELECTRIC RAILWAY–USA, OHIO–DESCRIPTION (§ 486), PARAGUAY–YERBA MATE–DESCRIPTION (§ 533), and COMORO ISLANDS–DESCRIPTION (§ 516). Perhaps the most interesting of these examples is the final one, COMORO ISLANDS–DESCRIPTION, which can be translated into natural language as the noun phrase “description of the Comoro Islands”.³⁸⁴ Now, as we had occasion to see earlier, terms of countries occurring within a statement generally indicated “the locality where the action takes place” (§ 302; cf. Section 3.2 of the present chapter). In other words, they tended to have what a locative function, so that, for instance, the term AUSTRALIA in the statement SHEEP–AUSTRALIA–BRANDING (§ 503) signaled that the branding of sheep took place in Australia. In the case of COMORO ISLANDS–DESCRIPTION, however, the country term COMORO ISLANDS denoted not the place but the object of description, just as the concrete term COTTON GIN ROLLER signified the object of description in the statement COTTON GIN ROLLER–DESCRIPTION, or “description of cotton gin rollers”. In short, DESCRIPTION was one of the few terms of processes—perhaps the only one—with respect to which terms of countries could have the

³⁸⁴ The Comoro Islands are an archipelago of small volcanic islands in the Indian Ocean, situated midway between the upper tip of Madagascar and the coast of present-day Mozambique. At the time that Kaiser wrote, they were under French control; see Bourde 1965, 93; Keller 1901, 159–163.

same semantic rôle as terms of concretes—namely, that of object—and so be semantically, as well a syntactically, intersubstitutable with them within the framework of a statement.³⁸⁵

Thus far, we have seen that Kaiser considered terms of processes to represent various kinds of actions pertaining to concretes, whether these be activities described in business literature or whether they be the discursive action of description itself. However, in several passages of *Systematic Indexing*, he defined the category of process more broadly, characterizing it as covering “the conditions attaching to [concretes]” (Kaiser 1911, §§ 52, 298; cf. §§ 56, 107, 565; see the beginning of Section 2.1 of the present chapter). Kaiser’s choice of the word “conditions” to characterize the content of the category of processes signaled a significant adjustment in the semantic scope of the category. One of the leading dictionaries of English of his day, the *Century Dictionary*, defined “condition” as denoting “[t]he general mode of being of a person or thing ... with reference to internal or external circumstances” or the “existing state or case” of an entity: furthermore, it recorded that the word could refer to a “[q]uality; property; attribute; [or] characteristic” of a given entity (Whitney & Smith 1911, Vol. 2, 1174, 1–2 s.v. “condition”). The no less authoritative first edition of the *Oxford Dictionary* likewise registered the meaning of “condition” as “a particular mode of being of a person or thing” or, more generally, as a “state of being”, though its editors, unlike those of the *Century Dictionary*, regarded the application of the word to “[a] characteristic, property, attribute, [or] quality (of a person or thing)” to be an obsolete usage (Murray et al., 1888–1928, Vol. 2, 786, II.9 & 12 s.v. “Condition”). At any rate, the notion of condition was far more expansive than that of action and so Kaiser’s repeated characterization of the category of processes as one encompassing the conditions connected with concretes opened up the category to the admission of terms referring to states of being other than the dynamic ones of action or activity. Much as the category of concretes could be construed either narrowly as pertaining to commodities or broadly as relating to things in general (See Section 3.1.2 of the present chapter, above), so could the category of processes be understood either as restricted to actions or activities involving concretes or, more expansively, as covering the gamut of conditions relating to things in the world.

³⁸⁵ Note that this held true only in the case of statements formulated on the pattern [COUNTRY]–DESCRIPTION. On all other statement forms, such as [CONCRETE]–[COUNTRY]–DESCRIPTION and [COUNTRY]–[CONCRETE]–DESCRIPTION, the terms of countries retained their locative role. Thus, for example, in the statements BOOT–YUKON, CANADA–DESCRIPTION; ELECTRIC RAILWAY–USA, OHIO–DESCRIPTION; and PARAGUAY–YERBA MATE–DESCRIPTION, the terms YUKON, CANADA; USA, OHIO; and PARAGUAY each denotes the locality of the concrete with which it is associated: thus, these statements referred to the description of boots used in the Yukon, railways located in Ohio, and yerba mate grown in Paraguay, respectively.

The definition of processes as conditions of concretes provided warrant for including under the category of process a wide range of terms that did not refer to actions *per se*. As a number of examples from Kaiser's publications and from the index files of the Tariff Commission show, he did not hesitate to do so in his own indexing practice. Some terms for processes *qua* conditions quite literally referred to them as such, as in the case of CONDITION with respect to labor in Germany (Kaiser 1911, § 496) and TRADE CONDITION with respect to cases for watches in Basel, Switzerland (§ 395) or soda nitrate in Chile (§§ 450–451). Others signified general factors affecting the production or trade of concretes *qua* commodities, such as DEMAND with respect to the demand for automatic sweepers in Australia (1908, § 185), SCARCITY with respect to the scarcity of cotton as a raw material in the United Kingdom,³⁸⁶ SUPPLY with respect to the supply of timber in Cuba (§ 508), and DIFFICULTIES with regard to business on the Gold Coast (§ 457).³⁸⁷ Yet others signaled the results of given policies or activities, such as EFFECT with respect to the effects of import duties on ground white lead in Australia (1911, § 477) or the effects on British manufacturers of export duties on manila hemp from the Philippine Islands.³⁸⁸ Some terms for processes *qua* conditions dealt with quantitative aspects of productive activities relating to commodities, as was the case with OUTPUT in relation to steel in Germany (1908, § 118) or tinplate in South Wales,³⁸⁹ while others did the same with regard to commercial activities, such as PRICE in relation to the price of camphor in Hamburg, Germany (§ 531); COST in relation to the cost of wool lining in the United Kingdom;³⁹⁰ PROPORTION OF COST in

³⁸⁶ See TCP 5/5/5, Oddments, Index card, COTTON(RAW MATERIAL)–UK–SCARCITY ... E7409, n.d.

³⁸⁷ This last example was formulated as the statement BUSINESS–GOLD COAST–DIFFICULTIES, in which the term for the concrete, BUSINESS, did not denote a commodity but rather business activity in general. Needless to say, the use of BUSINESS as a concrete term abrogated Kaiser's official definition of concretes (See Section 3.1.2 of the current chapter) and its presence in our statement provides evidence that, in practice, he was not above bending his own rules for pragmatic purposes. This is not the only instance of such an inconsistency in his writings: for example, in *Systematic indexing* he identified IRON INDUSTRY as an (abstract?) concrete, despite the fact that, in other contexts, the term INDUSTRY was treated as a process (as in the statement COTTON–BRAZIL, RIO DE JANEIRO–INDUSTRY to indicate information on the cotton industry in that Brazilian city (Kaiser 1911, §§ 329, 468–469). For an example from the Tariff Commission's files of another term indicating an activity—*in casu*, DUMPING—treated as a concrete, see Section 3.6 of the present chapter, esp. pp. 504–505, below.

³⁸⁸ See TCP 5/2/7, Index to Questionnaires for Hemp, Jute, and Linen Fibres, Index card, EXPORT DUTY–MANILA HEMP–USA. PHILIPINE [*sic*] ISLANDS–EFFECT ... F5658/7, n.d.

³⁸⁹ See TCP 5/2/9, Index to Iron and Steel Evidence, Index card, UK, S WALES–TINPLATE–OUTPUT ... E3658, n.d.

³⁹⁰ See TCP 5/2/19, Index to Wool Questionnaires, Index card, WOOLLEN LINING–UK–COST ... F2476/16, n.d.

relation to the cost of railway rates for carpets in proportion to their price in the United Kingdom;³⁹¹ DIFFERENTIAL RATES in relation to the differences in railway freight rates for worsted goods in different countries;³⁹² and AMOUNT with respect to the rate of import duties on cotton in Germany, on cotton piece goods in France, or carpets in Rumania.³⁹³ Qualitative aspects of concretes *qua* commodities, on the other hand, were represented by such process terms as QUALITY with regard to cloth for making women’s mantles in Germany,³⁹⁴ SUITABILITY with regard to Egyptian cotton as a material for textile manufacturing in the United Kingdom,³⁹⁵ or INFERIORITY with regard to iron shafting dumped in British markets by German manufacturers:³⁹⁶ in a related but somewhat different vein, DISEASE, used in relation to cattle in Natal, indicated a general bodily condition that affected the quality, and hence, the commercial value of these living agricultural commodities (§ 485). Various terms of processes *qua* conditions were also applied to abstract concretes denoting labor(ers): these included PRICE in relation to the wages paid for work in flax yarn production in France (§ 476), STANDARD in relation to the standards for labor in the jute or the worsted yarn industry of the United Kingdom,³⁹⁷ QUALIFICATIONS in relation to the qualifications required for commercial travellers—that is to say, travelling salesmen—to succeed in China (§ 515), EMPLOYMENT RATIO in relation

³⁹¹ See TCP 5/5/5, Oddments, Index card, FREIGHT(CARPET)-UK-PROPORTION OF COST ... E7006b, n.d.

³⁹² See TCP 5/2/19, Index to Wool Questionnaires, Index card, FREIGHT(WORSTED GOODS)-DIFFERENTIAL [*sic*] RATE ... F10626/11, n.d.. Worsted goods were textiles made from a kind of wool fabric woven with yarn the fibres of which had been combed rather than carded so as to give it a smooth and hard finish. Worsted cloths were used to make, *inter alia*, serges, merinos, and damasks (Cole 1892, 397-398; Hooper 1907, 95-96; Pitman’s Commercial Readers [ca. 1907], 159-160, 165-166, 170-172).

³⁹³ See TCP 5/5/5, Oddments, Index cards, IMPORT DUTY-COTTON—GERMANY—AMOUNT ... E7411/2; IMPORT DUTY-COTTON PIECE GOODS—FRANCE—AMOUNT ... E7452/3; IMPORT DUTY-CARPETS—ROUMANIA—AMOUNT ... E7006a, n.d.

³⁹⁴ See TCP 5/2/19, Index to Wool Questionnaires, Index card, MANTLING—GERMANY—QUALITY ... F10314/5, n.d.. The term for concrete “mantling” here refers to “[a] kind of cloth available for making mantles or the like” (Whitney & Smith 1911, Vol. 13, 3619, 1 s.v. “mantling”).

³⁹⁵ See TCP 5/5/5, Oddments, Index card, EGYPTIAN COTTON—UK—SUITABILITY ... E7391, n.d.

³⁹⁶ See TCP 5/2/9, Index to Iron and Steel Evidence, Index card, DUMPED-SHAFTING—GERMANY—UK—INFERIORITY ... E3578, n.d.. Shafting referred to “the system of shafts [sci., revolving metal bars—TMD] which connects machinery with the prime mover, and through which motion is communicated to the former from the latter” (Whitney 1906, Vol. 7, 5542, 1 s.v. “shafting”).

³⁹⁷ See TCP 5/2/7, Index to Questionnaires for Hemp, Jute, and Linen Fibres, Index card, LABOUR(JUTE)—UK—STANDARD ... F 2536/13, n.d.; TCP 5/2/19, Index to Wool Questionnaires, Index card, LABOUR(WORSTED WOOL)—UK—STANDARD ... F3533/8, n.d.. Jute was a fiber derived “from the bark of two closely-allied species of plants belonging to the lime-tree order” and native to India (Galletly 1901, 382) that was used primarily “in the manufacture of coarse cloths” (Cole 1892, 211). For worsted wool, see n. 392, above.

to labor in the steel trade in the English city of Sheffield,³⁹⁸ and, more ominously, UNEMPLOYMENT in relation to labor in the United Kingdom (§ 479). Interestingly, terms relating to law, legal concepts, and the results of legislation were routinely treated as terms of processes: examples include LAW in relation to laws regarding patents in Japan (§ 522), LIMITED LIABILITY LAW in relation to the effects of such laws on the steel trade in Sheffield, England,³⁹⁹ COMMERCIAL TREATY relating to woolen goods,⁴⁰⁰ OWNERSHIP with regards to railways in Japan (§ 499), CUSTOMS REGULATION of beer in Brazil (§ 482), and REGULATIONS pertaining to commercial travellers in Rumania (§ 524).

Although the foregoing examples do not, by any means, exhaust the stock of terms for processes *qua* conditions used by Kaiser, they bear eloquent witness to the heterogeneity of the semantic content of such terms, which covered, *inter alia*, general circumstantiating conditions relating to concretes (e.g., TRADE CONDITIONS, UNEMPLOYMENT, DEMAND, SCARCITY), qualities (e.g., QUALITY, INFERIORITY), quantitative measures of production (e.g., OUTPUT) or value (e.g., PRICE, COST, AMOUNT), quantitative relationships (e.g., DIFFERENTIAL RATES, PROPORTION OF COST, EMPLOYMENT RATIO), laws and general legal conditions (e.g., LAW, REGULATIONS, CUSTOMS REGULATION), and legal relationships (e.g., OWNERSHIP). To this diversity of content may be added variation in linguistic form. All of the examples quoted above were formulated as abstract nouns or as noun phrases in which the head noun was abstract. In some statements, however, terms of processes *qua* conditions were expressed as adjectives. For instance, in outlining the technique of SI in his writings, Kaiser (1911) suggested that a piece of text containing statements regarding the availability of sailing ships to carry cargo might be characterized by an index statement SAILING VESSEL-AVAILABLE (§ 455), while a brief article recounting fraudulent trading practices perpetrated by someone based in the Gold Coast might be indexed with the statement CREDIT-GOLD COAST-UNDESIRABLE (§ 457). Comparable cases occurred in the index files of the Tariff Commission: for example, a passage from a response to one of the Commission's forms of inquiry in which the writer stated his opinion that trusts or combinations were "hardly possible" in the worsted wool industry "owing to the great variety of goods manufactured, & the manner in which the worsted trade is specialized" was

³⁹⁸ See TCP 5/2/9, Index to Iron and Steel Evidence, Index card, UK SHEFFIELD-LABOUR(STEEL TRADE)-EMPLOYMENT RATIO ... E1982, n.d.

³⁹⁹ See TCP 5/2/9, Index to Iron and Steel Evidence, Index card, UK SHEFFIELD-STEEL TRADE-LIMITED LIABILITY LAW ... E1980, n.d.

⁴⁰⁰ See TCP 5/2/19, Index to Wool Questionnaires, Index card, WOOLLENGOODS [*sic*]-COMMERCIAL TREATY ... F10584/9, n.d.

represented by the index statement WOOLLEN TRUST-IMPRACTICABLE,⁴⁰¹ while another woolen-goods manufacturer's assertion that "[a]s far as I know there are no great combinations in foreign countries for producing the articles we manufacture" received the statement WOOLLEN TRUST-NON-EXISTENT.⁴⁰² Although Kaiser occasionally used adjectival forms to indicate discursive actions as well,⁴⁰³ most instances of adjectival terms of processes indicated a general condition or an attribute of the concrete to which it was applied. In his writings, Kaiser did not address the reason why, in cases such as these, he preferred to use an adjective such as AVAILABLE, UNDESIRABLE, IMPRACTICABLE, or NON-EXISTENT rather than the corresponding abstract noun: whether the consideration that statements like SAILING SHIP-AVAILABLE or WOOLLEN TRUST-NON-EXISTENT could be easily read as telegraphic forms of declarative propositions (i.e., "Sailing ships are available" or "Woollen trusts are non-existent") and so communicated the information that they both embodied and indicated more rapidly than statements with nominal forms (i.e., *SAILING SHIP-AVAILABILITY or *WOOLLEN TRUST-NON-EXISTENCE) informed his thinking on this score must remain unknown.⁴⁰⁴ At any rate, the use of adjectives to represent terms of processes exemplified, on the grammatical plane, the notion of processes as attributes of concretes: in this, it was consistent with Kaiser's more general notion of processes as conditions attaching to concretes.

Ultimately, then, Kaiser's category of processes proved to be even more polymorphous in its semantic configuration than that of concretes. As the name of the category indicates,

⁴⁰¹ See TCP 5/2/19, Index to Wool Questionnaires, Index card, WOOLLEN TRUST-IMPRACTICABLE ... F6660/7, n.d.

⁴⁰² See TCP 5/2/19, Index to Wool Questionnaires, Index card, WOOLLEN TRUST-NON-EXISTENT ... F3332/7, n.d.

⁴⁰³ See, for example, the statement IMPORT DUTY-BOTANY YARN—UK—SUGGESTED, which occurs in an index item from the Tariff Commission's index to wool questionnaires (TCP 5/2/19, Index to Wool Questionnaires, Index card, IMPORT DUTY-BOTANY YARN—UK—SUGGESTED ... F6380/4, n.d.) and finds parallels in other indexes as well. In indicating that the respondent to one of the Tariff Commission's forms of inquiry had suggested that the United Kingdom set in place an import duty upon Botany yarn (i.e., a "[y]arn composed of a fine grade of Australian wool ... used in the manufacture of worsted dress goods" [Ben Yûsuf 1909, 249]), the statement employed the past participial form "suggested" to express the respondent's discursive act of suggestion. Note that, on occasion, the same participle was found conjoined to a noun referring to a process, as in the case of the statement IMPORT DUTY-CARRIAGE LINING—REDUCTION SUGGESTED, taken from the same index, in which the indexer signaled that the act of reducing import duties on carriage lining had only been suggested and had not actually taken place (TCP 5/2/19, Index to Wool Questionnaires, Index card, IMPORT DUTY-CARRIAGE LINING—REDUCTION SUGGESTED ... F2570/8, n.d.).

⁴⁰⁴ One modern commentator has hinted at a "propositional" approach in his observation that "Process ... can also include ... an adjective related to the Concrete as complement to subject" (Coates 1960, 39, followed by Vlasák 1967, 153).

its definitional starting point was the notion of activity: drawing upon the use of the term “process” in industrial and commercial discourse, Kaiser appears, in the first instance, to have conceptualized processes as actions—primarily, though not exclusively, intentional human actions—directed toward concretes. To his mind, processes were indissolubly linked with concretes, an idea that he articulated in different ways. On the level of ontology, processes were dependent upon concretes, which provided, so to speak, the substrates with respect to which processes took place. On the level of textual representations of the world, terms of processes represented that which was said in relation to concretes: in this respect, at least, the relation between the two categories was analogous to that of predicates to subjects in a sentence, although Kaiser was careful to caution that, in practice, concretes and processes were not to be identified as grammatical subjects and predicates *tout court*. This disavowal notwithstanding, Kaiser’s conceptualization of processes retained a strong linguistic coloring. He considered terms of processes to bear an especially close affinity to verbs with regard to their semantic content, if not grammatical morphology: thus, even though terms of processes most frequently took the form of deverbal nouns, they represented various verbal notions relating to physical operations, discursive actions, and other, more general non-physical activities performed in relation to concretes. Indeed, he would later speak of “terms of action or verbs” as the original basis for the category as such (Kaiser 1926, 22, §§ 6, 7).

Although the concept of action lay at the heart of the category of process, it did not exhaust its content, for Kaiser also defined processes much more broadly as conditions attaching to concretes. This definitional move greatly expanded the scope of the category, for the idea of condition, interpreted in its most general sense as a state of being, covered static modes of existence as well as the dynamic ones of action and was, moreover, applicable to the enviroing circumstances of a thing as well as to the mode of being of its attributes. On this latitudinarian basis, Kaiser admitted under the rubric of processes a number of terms—formulated as nouns, noun phrases, or adjectives—that referred to various commercially relevant aspects of concretes ranging from their qualitative and quantitative features to the circumstantiating conditions and factors impinging upon them.⁴⁰⁵ Viewed in the aggregate, these terms manifested considerable heterogeneity in the

⁴⁰⁵ This point was well made by Horner (1970, 150 [emphasis his]) in his statement that, Kaiser interpreted “*process* ... rather more in the meaning of the traditional classification term aspect”. For a similar interpretation of processes as aspects or qualifications of objects, see, e.g., Metcalfe 1957, 239–240; 1965, 45; 1973, 310.

kinds of attributes or concepts that they represented, encompassing kinds of notions as diverse as QUALITY, OUTPUT, EMPLOYMENT, CUSTOMS REGULATION, OWNERSHIP, and NON-EXISTENT.

In *Systematic Indexing*, Kaiser did not attempt to harmonize the diffuse and expansive notion of processes *qua* conditions with the circumscribed and semantically more cohesive one of processes *qua* actions nor did he undertake to develop any inner articulation of the category of processes as a whole as he did for that of concretes. Insofar as the category had an internal structure, it was an implicit one in which the core idea of actions or activities performed in relation to concretes sat alongside a largely undifferentiated corpus of abstract concepts pertaining broadly to attributes of, and environmental circumstances surrounding, concretes: as we shall see, Kaiser (1926, 23 § 11) would, in time, provide a more explicit account of this division (See Chapter 9, Section 4.1, below). The primary bond of union between terms of processes *qua* actions and *qua* conditions was that they represented aspects of the world that did not fall under the category of concretes and yet stood in relation to the latter in some way. Thus, even if the internal structure of the category of processes was not fully determinate, its external boundaries were clear: for the purposes of indexing according to SI, whatever was not a concrete (or a country) counted as a process and *vice versa*. There was, in all this, a pragmatic dimension, for, by characterizing processes broadly as conditions relating to concretes, Kaiser defined the category in such a general way that, within certain limits, it could accommodate as full a range of terms for non-concretes as an indexer might wish to utilize. The expansion of the category, however, came with a tradeoff, for it diluted the definition of the term “process” from its original meaning as a continuous action or a directed operation pertaining to a concrete to any aspect of a concrete’s state of being in the world: in making the category more capacious, Kaiser rendered the meaning of the term fairly indistinct and distanced it considerably from the signification that it bore in everyday usage. On a theoretical level, the definition suffered somewhat in terms of its precision: indeed, in later years, Kaiser (1926, 28 §§ 24–25) would forthrightly acknowledge that his definitions of processes and concretes alike were capable of further refinement (See Chapter 9, Section 4.1, below). Nevertheless, the expanded definition proved sufficiently workable in practice as a means of distinguishing terms of processes from those for concretes that it became the *de facto* norm by which the category of process was constituted within SI.

7.3.4. Kaiser's Category Scheme: Dyadic in Theory and Triadic in Practice

As we have just seen, Kaiser understood processes to be distinct from, yet inextricably linked to, concretes: the two categories thus stood in a relation of complementarity to one another. An important consequence of this was that, in the two versions—epistemologico-ontological and logico-linguistic—of the general theoretical rationale for the categories that he set forth in *Systematic Indexing*, concretes and processes alone appeared as the basic categories of SI. In his account of the structure of the world as it appears in human experience, he argued that “[t]he subjects of our observing and reasoning are *things* in general ... and the conditions attaching to them”, the things being, of course, concretes and the conditions attaching to them, processes (Kaiser 1911, § 52 [emphases his]; cf. the beginning of Section 2.1 of the current chapter). Taken together, concretes and processes made up the totality of knowable types of entities in the world, for knowledge was ultimately grounded in observation and “[o]ur observation is limited to that of concretes and their conditions, there is nothing else to observe” (Kaiser 1911, § 56 [emphases his]; cf. the beginning of Section 2.1 of the current chapter). Similarly, in his description of the manner in which the results of human observation and reasoning are rendered in linguistic form within textual documents, Kaiser (1911, § 298 [emphases his]; cf. the beginning of Section 2.2.4 of the present chapter) averred that “literature names *things* and ... these *things* are *spoken of* or *described*. The knowledge conveyed by literature all has reference either to *things* or to *spoken of*, i.e., concretes and processes”. In both versions, he presented what was essentially a dyadic category system consisting of two primary categories—concretes and processes.

In later years, Kaiser (1926, 22, §§ 6–7; cf. Sections 3.1.2 & 3.3.2 of the current chapter) obliquely intimated that he had based his category system on a division between “terms for commodities”, or concretes, and “terms for actions or verbs”, or processes, thus implying that it was dyadic *ab origine*. Yet, this does not appear to have been the whole story. In *The Card System*, Kaiser's first published discussion of SI, he spoke in terms of three categories: concretes, countries, and processes (Kaiser 1908, §§ 114–115, 142–144; cf., however, § 366, s.v. “Concretes”). Moreover, a number of statements in *Systematic Indexing*, many of which we have already encountered in the course of this chapter, indicate that he conceptualized the category system of SI as being essentially triadic in composition. With regard to textual information, he asserted that “[c]oncrete, country and process may be said to be the elements of the information conveyed by Literature” (Kaiser 1911, § 302; cf. Section 3 of the

current chapter). By the same token, he stipulated that the stock of terms in an index was to be divided into “terms of *concretes*, *processes* and *countries*” (§ 73 [emphases his]; cf. Section 2.2.4 of the present chapter, esp. p. 351). Furthermore, he argued, “[a] statement strictly speaking must always consist of concrete, country and process”, even if, in practice, “experience will show that often no country is given, and sometimes there is apparently no concrete” (Kaiser 1911, § 303; cf. Section 3.5 of the current chapter, below). Finally, and in most general terms, he deemed “concrete, country and process terms” to compose the three “fixed points” that served as “the foundation of the entire index as an organization” (Kaiser 1911, § 645; see Section 3 of the present chapter, esp. pp. 373–374).

In the same work, then, Kaiser set forth simultaneously two different variants of his categorial scheme, one of which featured two categories (i.e., concretes and processes) and the other, three (i.e., concretes, countries, and processes). Since the only difference between the two versions was that the latter added the category of countries to those of concretes and processes, there existed the possibility of harmonizing them: however, this required that the presence of countries in the triadic version be accounted for in a way that would not violate what one latter-day commentator has dubbed Kaiser’s “ontological commitment” (Svenonius 1978, 137; 1990, 92, with n. 45) to the two categories of concretes and processes, the rationale for which he had outlined in his statements regarding the epistemologico-ontological and logico-linguistic basis of SI.

Kaiser’s solution, as we have seen, was to derive the category of countries from that of concretes by identifying the former as a subclass of immovable concretes, one of the three subclasses of concrete that he postulated (See Section 3.2 of the present chapter, above). This move was not unreasonable, for, in principle, a country could be viewed as a kind of thing. Yet the manner in which Kaiser carried out the derivation left much to be desired from a theoretical point of view. For one thing, as already noted, his understanding of concretes *qua* commodities led to a semantically incongruous definition of countries as a kind of immovable commodity, distinguished from other commodities rooted in the land by the fact that they possessed (relative) politico-economic independence and populations with distinctive socio-cultural features (Kaiser 1911, § 300): such a definition flew in the face of the commercial understanding of commodities as exchangeable goods that he had taken as his own (§ 299; see Sections 3.1.2 & 3.2 of the current chapter). Moreover, whereas Kaiser’s stratagem of identifying countries as a kind of concrete allowed him to account for them within the framework of the epistemologico-ontological and logico-linguistic models

justifying the dyadic category scheme, his detachment of countries from their parent category and promotion of them to the rank of a top-level category in their own right posed another problem that proved more difficult to resolve satisfactorily on a theoretical level: if concretes and processes owed their place in the category scheme to their status as fundamental kinds of entity types, what rationale might warrant the admission of countries, a derivative subclass of concretes, to a comparable position in the scheme? Kaiser's (1911, § 300) argument that countries merited treatment as a "distinct class" because of their "special importance" and distinctiveness as political, economic, and legal units provided an answer of sorts, albeit one that appealed to *ad hoc* pragmatic considerations rather than to a truly principled theoretical reason for placing them on a par with concretes and processes. More convincing in this regard was his characterization of countries as "the localities with which ... concretes are connected" (§ 73) or "the localit[ies] where the action [sci., associated with a concrete—TMD] takes place" (§ 302), which foregrounded the locative function of the category by presenting countries as the setting within which concretes and actions had their existence: however, it was difficult to integrate the latter into the epistemologico-ontological and logico-linguistic accounts justifying the dyadic scheme, neither of which left room for including locality as a category of the same status as concretes and processes. In short, the rationale given by Kaiser for the inclusion of countries within his categorial scheme did not fit the theoretical framework that he had developed to justify his categories: it is not without reason that those modern scholars of KO who have examined his arguments on this score have found them strained at best (Metcalf 1976, 180; Svenonius 1978, 137).

Given that Kaiser appears to have developed the theoretical articulation of his categorial scheme around the categories of concretes and processes alone and that the inclusion of the category of countries compelled him to engage in special pleading, one is naturally left with the two questions: namely, why he took the pains to incorporate the latter category into his schema in the first place and, moreover, why, within the framework of this scheme, he gave it sufficient prominence that, in two out of three of the permissible forms of statement, it occupied the first position in the statement (Statement Form [7.2] and the variant to Statement Form [7.3], in Section 3 of the present chapter). One latter-day commentator has suggested that Kaiser's treatment of countries was the product of "an understanding of the significance of geographical concepts, which is specific precisely to subject analysis" (Vlasák 1967, 155). Basing itself on the fact that subject-based cataloging, indexing, and classi-

fication schemes frequently make some provision for indicating geographical concepts by means of subject headings or class notations and for collocating items of information under them, this interpretation explains Kaiser's inclusion of countries within his system of categories simply as one manifestation of a more-or-less universal trend among designers of KOSs. *Prima facie*, there are good grounds for accepting such an explanation, for, in the late 19th and early 20th century, the creators of the leading systems of subject cataloging and bibliographic classification alike routinely thematized the treatment of geographical, or, as they sometimes called them, national, subjects, expending considerable thought on how to deal with them, as the following review will show.

Within the realm of subject cataloging, Charles A. Cutter (1876b, 38–39, Rules 67–68, & 75–79, Rules 199–202; 1904, 67–69, Rules 162–165, & 123–128, Rules 340–343) set forth and discussed at length in the *RDC* several rules for entering books under subject headings designating countries (and comparable geographical units) and for subarranging the large numbers of entries that tended to accumulate under these subject headings. Although a full account of these rules cannot be undertaken here, one basic point should be noted: they were ultimately based on his stipulation of a significance order among concrete individual, concrete general, and abstract subjects, according to which a cataloger, faced with alternative possibilities for entering a given book was to give precedence to concrete individual subjects over concrete general and abstract subjects (See Section 3.1.1 of the current chapter, esp. pp. 390–393, above). Thus, for example, in books treating of “scientific” or “general” subjects relating to a particular places—such as, for example, “a work on the geology of California”, Cutter (1876b, 1904, 68, Rule 164) held that ideally the book would be entered under both the scientific or general subject GEOLOGY and the place CALIFORNIA. However, he recognized that multiple entry would entail an increase in the bulk of a catalog—a not inconsiderable matter in the case of printed catalogs, the format that he had in mind when he originally formulated the *RDC*,⁴⁰⁶ since the greater the number of entries, the greater the length of the catalog and the greater its cost of publication—and that a choice might have to be made between whether to enter under the general subject or the geographical unit in question. In such cases, he opted for entry under the subject heading of the geographical unit—*in casu*, CALIFORNIA—on the grounds that such units represented an individual subject and “the dictionary catalog in choosing between a class

⁴⁰⁶ The title of the original 1876 edition of the *RDC* was *Rules for a Printed Dictionary Catalogue*, though the adjective “Printed” was dropped in subsequent editions; Miksa 1974, 272, n. 1 & 315.

[sci., a general subject—TMD] and an individual prefers the latter” (Cutter 1876b, 39, Rule 68, with discussion; 1904, 68, Rule 165, with discussion).⁴⁰⁷ This principle of preferential entry under country *qua* individual subject, it may be noted, would make its way into contemporary discussions of periodical indexing (Clarke 1905, 22–23, 29–30), where similar considerations applied.

In cases where the number of titles entered under the subject heading for a country became too large to be easily scanned by cataloger users—a number that Cutter (1876b, 75, discussion to Rule 199; 1904, 123, discussion to Rule 340) set at a “half a dozen to a score”, he recommended subarranging it by divisions referring to various aspects—geographical, natural-historical, social, political, cultural, and linguistic—of the country in question. To this end, he included in the *RDC* a double list of the various kinds of divisions that might be used for this purpose, ranging from “Botany”, “Climate”, “Geology”, and “Ichthyology”, through “Army”, “Ceremonies”, “Commerce”, “Foreign relations”, “Law”, “Money”, “Naval History”, and “Religion”, to “Art”, “Architecture”, “Science”, “Technology”, and “Religion”, and thence to “Ballads and songs”, “Fiction”, “Language”, “Poetry”, and “Wit and humor” (Cutter 1876b, 76–78; 1904, 124–126)—divisions, it will be noted, that included abstract general subjects (e.g., “Botany”, “Geology”, “Law”, and “Science”), concrete general terms (e.g., “Army”, “Ceremonies”, and “Money”), and literary forms (e.g., “Fiction”, “Poetry”, and “Wit and Humor”) alike.⁴⁰⁸ As regarded the development and use of these divisions, Cutter (1876b, 79; 1904, 127 [emphasis his]) noted that his list, derived from the divisions used in

⁴⁰⁷ Note, however, that Cutter (1876b, 12 n. §; 1904, 17, n. §) also made some allowance for cases where countries, or particular geographical units, might be regarded not as individuals but as classes: “Countries ... which for most purposes it is convenient to consider as individual, are in certain aspects classes; when by the word “England” we mean “the English” it is the name of a class”. In commenting on this passage, Miksa (1983a, 30) has suggested that “[a] particular place could also be considered a class of yet more localized places, or at least as consisting of parts that are themselves more localized places”. This interpretation reflects the fact that Cutter used the term “class” to refer to any subject that might be divided into yet more specific subjects sharing a characteristic of some sort, whether the relation between it and its component subjects be generic (i.e., genus-species) or partitive (i.e., part-whole) in nature; for a good example of the latter, see the discussion of the class THEOLOGY in Cutter 1876b, 11; 1904, 16–17. Insofar as the notion of countries *qua* classes figured in the *RDC*, it did so in a partitive sense: for instance, in enumerating areas of application for his rule that catalogers were to “[m]ake references [sci., cross-references—TMD] from general subjects to their various subordinate subjects”, Cutter (1876b, 48, discussion to Rule 85; 1904, 79, discussion to Rule 187) stipulated that, *inter alia*, such references were to be made “from Countries to their colonies, provinces, counties, cities, etc.” Apart from such cases, Cutter seems to have preferred to treat countries as individual subjects; see Miksa 1974, 332–333.

⁴⁰⁸ For a critical discussion of Cutter’s conceptualization and treatment of these topical subdivisions, see Miksa 1974, 337–339.

his own Boston Athenaeum catalog, was more extensive in its scope than had traditionally been the case with other dictionary catalogs:

[t]he former usage was to put under the country only its history, travels in it, and the general descriptive works; and books that treated of the Art, Architecture, Ballads, Botany, Drama, Etc., of that land were put with the general works on Art, Architecture, etc.

Yet, he went to observe,

the tendency of the dictionary catalog is towards national classification; that is, in separating what relates to the parts of a subject, as is required by its *specific* principle, it necessarily brings together all that relates to a country in every aspect, as it would what relates to any other individual.

With these words, Cutter not only reiterated the notion that a country is a concrete individual subject but also reaffirmed the close connection between countries *qua* subjects and the notion of specificity that he took to be the underlying principle of subject entry in a dictionary catalog, according to which it was appropriate that a country *qua* individual subject be subarranged by general subjects, be they abstract or concrete, and literary forms rather than *vice versa* (Miksa 1983a, 92–93). Most important for our purposes, he clearly indicated that, in his eyes, subject collocation by country, or “national classification”, was a significant element of subject cataloging practice, though it is unclear to what extent his contemporaries shared this view (pp. 427–428, n. 7).

Designers of bibliographic classification systems were no less attentive to questions of national classification, often expending considerable ingenuity in developing notational devices to demarcate classes relating to countries and other geographical units. Melvil Dewey’s DC (hereafter, DDC), exemplified an approach that combined innovative features with structural limitations. In the original edition of the DDC, Dewey (1876, 22) assigned classes correlated with countries to the main class representing History, the divisions and sections of which were represented by class numbers ranging from 900 to 999.⁴⁰⁹ Of these classes, the number range 910–919 dealt with “Geography and Description” (910), divided both chronologically (into “historical” [911], “ancient” [912], and “modern” [913]) and territorially (by continent [914–919], understood to fall under the rubric of “modern”

⁴⁰⁹ Note that, in Dewey’s (1876, [3]; 1885, 23) nomenclature, main classes constituted Classes; the subdivisions thereof were Divisions; and the subdivisions of Divisions, in turn, were Sections. As we shall see, the class numbers applying to continents and countries occurred at the hierarchical level of Divisions, Sections, or subdivisions thereof: however, for the sake of simplicity, I shall uniformly refer to Classes, Divisions, Sections and their further subdivisions as “classes” here.

geography), while the range 940–999 covered the history of various continents divided into countries or regions: for instance, the history of Europe was symbolized by the class number 940, that of England, by 942, and that of Italy, by 945; the history of Asia was denoted by 950, that of Japan, by 952; and that of Persia, by 955; and so on. To the extent that these continent and country classes fell under the rubric of history (class 900), they were subdivisions of a class forming a department of knowledge and so did not constitute “pure” geographical classes denoting countries as countries *tout court*: rather, they represented countries as viewed through the disciplinary prism of geography (classes 914–919) or history (classes 940–999).

The array of main classes in the DDC, which, with the exception of an initial “Generalia” class, were correlated with departments of knowledge, did not permit Dewey to establish a set of pure geographical classes as such. Nevertheless, he leveraged his notational system to indicate the various classes pertaining to a given geographical unit scattered across the classification by stipulating that, in certain contexts, the same series of digits could refer to a given continent or country. The basis for these “geographical numbers” (Dewey 1885, 403) was the series of class numbers 940–999. With regards to continents, 940 was correlated with Europe and so the digit “4” was associated with Europe; 950 was correlated with Asia and so “5” represented Asia; 960, 970, 980, and 990 stood in relation to Africa, North America, South America, and “Oceanica” (today’s Oceania), respectively, and so “6” was tied to Africa, “7” to North America, “8” to South America, and “9” to Oceanica. Countries and regions, which constituted subdivisions of continents, received the same treatment: in virtue of the class numbers 942 (“history of England”), 945 (“history of Italy”), and 973 (“history of the United States”), the digit sequences “42”, “45”, and “73” could represent “England”, “Italy”, and the “United States” respectively. This strategy, which Dewey (1876, 5) also employed to denote other categories of concepts applicable across more than one department of knowledge, such as forms of documentary or literary presentation and languages, and which he considered to constitute a “mnemonic principle”,⁴¹⁰ gave him the

⁴¹⁰ For discussion of Dewey’s “mnemonic principle”, see Green 2009, 95–96; Smiraglia, van den Heuvel, & Dousa 2011, 32–34. It should be noted that there was, for obvious reasons, considerable overlap between the geographical numbers and language numbers of the DDC, which featured prominently in the classes for Philology (400) and Literature (800). Thus, for example, the “5” in 450 (“Italian language”) and 850 (“Italian literature”) corresponded to the “5” in 914.5 (“Geography and description of Italy”) and 945 (“History of Italy”); cf. Dewey 1876, 5, 17, 21. However, the correspondence was not, by any means, absolute. For example, the language number “7” in 470 (“Latin language”) and 870 (“Latin literature”) clearly referred to the Latin language and so was correlated

notational means to detach, so to speak, a given continent, country, or region *qua* subject from the main class of history and to transpose it to other sectors of his classification. For example, in the tables of the first edition of the DDC, geographical numbers featured in divisions such as Modern Philosophies (190), which was partially subdivided by countries (e.g., 192 = “English [Philosophy]”, 195 = “Italian [Philosophy]”); Painting (750), which likewise included a few country-related subdivisions (e.g. 755 = “Italian [Painting]”); Ecclesiastical History (270), which was subdivided in part by continents (e.g., 274 = “[Ecclesiastical History of] Europe”; 278 = “[Ecclesiastical History of] South America”); as well as Statistics (310), Customs and Costumes (380), Geology (550), and Botany (580), each of which was partially subdivided by continents and further subdivisible by countries if necessary (pp. 5, 14, 16, 18, 20).

Dewey’s deployment of geographical numbers to represent continents and countries was an ingenious way in which to indicate that a given class of the DDC had to do with a given country or continent. Nevertheless, it was hedged by considerable limitations. Most significant of these, perhaps, was the fact that the use of geographical subdivisions was restricted to only a few classes within the classification that Dewey explicitly designated as conforming to the mnemonic pattern set forth above (cf. Smiraglia, Van den Heuvel, & Dousa 2011, 33–34). For example, in the first edition of the DDC, the digits making up the geographical numbers were understood to refer to continents or countries within the series of classes enumerated in the previous paragraph, whereas, in other places within the classification, the same number sequences could take on quite different meanings (Dewey 1885, 29; 1899, 16; Green 2009, 96; Sayers 1926, 101–102). In subsequent editions of the DDC, Dewey (1885, 30–31; 403–404; 1899, 17, 577–579; 1911, 17, [77[8]]–[780]) significantly expanded the number of classes eligible to undergo geographical subdivision, which he either indicated directly within the classification tables themselves or listed in one of several special index tables appended to the relative index to the classification. Although this enumerative stipulation of classes divisible by geographical numbers gave classifiers greater scope in using the latter notational device, it still left a large proportion of classes incapable of geographical subdivision. Nor did it do away with the problem of notational ambiguity, which might pose difficulties for catalogers seeking to apply the classification without constant reference to its schedules. For his part, Dewey (1885, 29–30; 1899, 16–17)

with the “7” in 937 (“History of ancient Rome”): however, it bore no relation to the “7” in 970 (“History of North America”), which stood in the structurally parallel position (pp. 17, 21, 22).

readily acknowledged that a single (sequence of) digit(s) used to denote a subdivision might have different meanings in different contexts, but considered this to be of little import: he assumed that the general classificatory context of a given class would make it clear whether a (sequence of) digit(s) used to subdivide a subject possessed a certain mnemonic significance or not and argued that, in cases of doubt, one simply had to take recourse to the classification's tables or index.

Kaiser, who, as we have already seen, was quite familiar with the DDC and held a generally unfavorable view of its qualities (See Chapter 3, Section 3.3; Chapter 6, Sections 3.2 & Sections 3.2.2, above), did not fail to take note of this aspect of Dewey's classification in his discussion of classification-related topics in *Systematic Indexing*. He observed that, in Dewey's notational scheme, "locality numbers" could be combined with "subject numbers", an idea of which he thoroughly approved, lauding it as "[a] very good feature of the notation" (Kaiser 1911, § 264). He also noted, albeit without evaluative comment, the consistent use of locality numbers as subdivisions, writing that their "position ... occurs always at the end of the subject numbers" (§ 264). On the other hand, he strongly deprecated the fact that "there are only certain subject numbers which are available for such combinations", for this entailed that, in some class numbers, a given sequence of digits represented a continent or country, while, in others, it did not (§ 264). Kaiser disliked such semiotic ambiguity, which, he argued, led to unnecessary "difficulty and uncertainty in the application of the locality numbers"; accordingly, he drew the conclusion that

locality numbers to be effective must be exclusive and attachable to all subject numbers. It is hardly possible to draw the line between subjects which require a locality number and those which do not. Ultimately all subjects are tied to some locality (§ 265).

To his mind, then, a notation intended to pick out and represent geographical entities was to be designed in such a way that it referred unambiguously to those entities alone and that it could, in principle, be freely combined with any other (presumably non-geographical) subject in a classification's schedules, qualities that were lacking in the notational apparatus of the DDC.

Well before Kaiser set down these views on the ideal features of locality numbers, other classificationists had already developed notational devices to distinguish, in an unambiguous manner, geographical classes from other kinds of subject classes. One of them was Paul Otlet, who, as we have already noted, transformed the schedules of the DDC into the UDC for use with the RBU (See Chapter 1, Sections 1 & 5.2.3, above). His most significant

innovation in developing the UDC consisted in his treatment of what he variously called “determinative ideas” (Otlet 1895–1896, 231), “determinants” (Office International de Bibliographie 1897, 10), and “common subdivisions” (Institut International de Bibliographie 1905b, 8, § 9 & 12, § 13)—that is to say, categories of concepts that tended to recur across different areas of the classification and served to limit the scope of—in other words, to determine (Murray et al. 1888–1928, Vol. 3, 270, 3.b s.v. “Determine”)—the subjects enumerated in its primary tables. Although such categories were already implicit in Dewey’s use of the mnemonic principle, Otlet (1895–1896, 232) went further than the creator of the DDC in that he sought to establish “a structure of classification numbers of such a sort that to each category of determinative ideas, of which the recurrence is periodical, there corresponds a mode of notation with a distinct physiognomy and a permanent meaning”. To this end, he and his collaborators at the IIB drew up a series of auxiliary tables, each of which covered one of the common subdivisions, and devised notational signs to differentiate each subdivision (Institut International de Bibliographie 1905b, 12–20; cf. Hopwood 1907, 310–315). They also devised syntactic rules for combining notational elements from the different auxiliary tables with subjects taken from the primary tables to synthesize composite class numbers (Institut International de Bibliographie 1905b, 16–20; cf. Hopwood 1907, 315–316). The result was, in effect, a series of facet-like categories engrafted onto a traditional, hierarchically ordered classification (e.g., Beghtol 2006, 162; Broughton 2004, 259; 2006a, 53; Smiraglia, van den Heuvel, & Dousa 2011, 34–35).

Among the categories comprising the common subdivisions was that of place. Although the fully developed form of the common subdivision of place encompassed a wide range of geographical concepts, including general geographico-spatial notions, “geological and paleoethnic places and epochs”, physical places, places of the ancient world, places of the modern world, and ethnic subdivisions, Otlet considered “the principal basis of geographical divisions [to be] the political division of countries” (Institut International de Bibliographie 1907e, “9 Histoire, Géographie, Biographie, Généologie”, Observation C). To form the notational designations for this common subdivision, he drew up a table of “geological places”, “physical places”, and “political places” taken, in large part, from the 551 and 930–999 class ranges of the DDC (Institut International de Bibliographie 1905b, 13, § 15; 1907e, “9 Histoire, Géographie, Biographie, Généologie”, Observation L; Office International de Bibliographie 1897, 12), stipulating that the numbers in this table be enclosed in

parentheses. Thus, within the framework of the UDC, any notational element beginning with a digit between 1 and 9 and enclosed in parentheses represented a geographical concept: for example, the element “(26)” denoted oceans and seas in general; “(262)”, the Mediterranean Sea; “(4)”, Europe; “(42)”, England; “(45)”, Italy; “(7)”, North America; “(77)”, the United States; “(773)”, Illinois; and so on.

The UDC’s mode of indicating geographical entities marked an improvement over that of the DDC in four ways. First, in removing geographical classes from main classes representing departments of knowledge (*in casu*, physical geography [551.3, 551.4, & 551.7] and history [930–999]) and according them their own separate auxiliary table, Otlet provided a way for treating continents, countries, and other geographical entities as purely geographical entities without a mediating disciplinary filter. Second, in establishing a notational convention (*in casu*, the enclosure of a certain range of class numbers within parentheses) to represent geographical entities as members of a distinct conceptual category, he assured that the numbers used to designate them did so unambiguously: within a UDC class number, “(42)” *always* designated England and “(77)” *always* designated the United States. Third, in conjunction with treating geographical classes as a distinct and autonomous category, Otlet gave classifiers much greater freedom in using them as subdivisions than Dewey had done in DDC. Rather than restricting geographical subdivisions to certain classes explicitly designated as subdivisible in the schedules, he set no firm limits on their use with the result that they could be applied to any class in the UDC’s primary tables that a classifier saw it fit to do so. Finally, although Otlet took it as axiomatic that, within the framework of the RBU, common divisions of place would, as their very name implied, be used to subdivide subjects falling under the main classes of the UDC, he also envisioned the creation of special “repertories on a geographical basis”, wherein notational elements from the auxiliary table of places could serve as main classes in their own right and so function as points of collocation of different subjects pertaining to a given country (Institut international de Bibliographie 1905a, 91, § 55; 1907e, ¶ “9 Histoire, Géographie, Biographie, Généologie”, Observation B). Thus, for instance, whereas a bibliographical repertory organized by subject typically included class numbers such as “385(42)”, “385(44)”, “385(45)”, and “385(77)”, which brought together the subjects “Railroads of Great Britain”, “Railroads of France”, “Railroads of Italy”, and “Railroads of the United States” under the primary subject “Railroads”, repertories organized on a geographical basis featured numbers such as “(45)07”, “(45)19”, “(45)282”, “(45)37”,

“(45)55”, and “(45)75”, which collocated the subjects “Newspapers in Italy”, “Italian Philosophers”, “the Roman Catholic Church in Italy”, “Education in Italy”, “Geology of Italy”, and “Italian Painting” under the geographical subject “Italy”. To a limited extent, Otlet and his collaborators put this principle into practice within the RBU itself: although the overwhelming bulk of the IIB’s signature repertory was organized by the subjects given in the primary tables of the UDC, it included a small section arranged by geographical entities and subdivided by subjects (Institut International de Bibliographie 1907b, 17).⁴¹¹ In this way, Otlet made some provision for using the UDC as a basis for country-based classification within the context of a classed bibliographical catalog.

Even earlier than Otlet, Charles A. Cutter, who, as we have seen, manifested considerable interest regarding the treatment of countries in the dictionary catalog, had developed a notational means of distinguishing between general and geographical subjects in the EC (cf. Section 3.1.2 of the current chapter, esp. p. 395, above). For the general subjects listed in the seven increasingly detailed parallel tables, or expansions, of this book classification scheme (cf. p. 394, n. 349, above), he prescribed a purely alphabetical notation: thus, for example, in the sixth expansion, “C” stood for “Christianity and Judaism”; “CB”, the “Bible”; “CBCX”, “Exegesis, Hermeneutics, [and] Interpretation [of the Bible]”; “MV”, “Biology”; “O”, “Zoölogy”; “RCZ”, “General and miscellaneous works” on the “[e]xtructive and productive arts”; “T”, the “Fabricative arts, Manufactures and Handicrafts”; “TH”, “Metal manufactures”; WP, “Painting”, and so on (Cutter 1891–1893, 64, 65, 66, 88, 89, 91, 95, 103). Alongside the tables for general subjects, Cutter drew up the Local List, a special table that enumerated geographical regions, continents, and countries and that he intended for use with the more detailed expansions of the EC.⁴¹² Although, at certain points in the schedules, he proposed no fewer than three different systems of notation for designating the geographical entities given in the list (pp. 7–8, 10, 160), the one that he routinely favored in his published accounts of the classification was purely numerical in nature. This consisted of the numbers between 11 and 99 and decimal extensions thereof (Cutter 1891–1893, “Local List”; 1898, 85; Miksa 1974, 586, 589–590): examples of notational

⁴¹¹ According to Rayward (1975, 119–120), this geographical section was begun in 1903 and was abandoned by 1912. He also notes that the IIB’s Universal Repertory of Iconography (RIU) also included a part that was arranged by geographical entities.

⁴¹² Miksa (1974, 580) observes that Cutter expected that the Local List would be used to form class-marks in the fourth through seventh expansions of the EC. Note, however, that parts of the list were already embedded into the classification schedule of the third expansion as subdivisions of the class “G”, “Geography and Travels” in the third expansion (Cutter 1891–1893, 28–29).

expressions therefrom include “14” for Arctic Regions, “143” for Greenland, “15” for Oceans and Islands; “161” for the Hawaiian Archipelago; “30” for Europe, “39” for France, “45” for England, “47” for Germany, “59” for South-East Europe, “595” for Rumania, “83” for the United States, “896” for Illinois, etc. The differential use of alphabetical characters for general subjects and a well-defined set of numbers for geographical ones ensured that, in contradistinction to the DDC, the numerical sequences of two or more digits in a class-mark had a single consistent meaning: as a consequence, Cutter (1897, 197; 1898, 85) noted, “it is possible to express the local relations of any subject in a perfectly unmistakable way, the letters never being used to signify countries and the figures never being used to signify any other subjects but countries”.

Cutter anticipated two distinct uses of the geographical subjects given in the Local List. First, and most typically, they could be used to subdivide the general subjects given in the EC’s tables: to take but one example, “45”, or England, could figure in such composite class-marks as “F45” for “the history of England”; “G45” for “the Geography of England; “KL45” for “English law”, “HL45 for “English joint stock companies”, “IG45” for “the English Poor”, “IU45” for “English schools”, “JT45” for “English politics”; “X45” for “English language”; “Y45” for “English literature”; and “WF45” for “English architecture” (Cutter 1897, 197; 1898, 85). The wide range of subjects denoted by this sample of class-marks may give the impression that the classifier had a fair amount of freedom in deciding which general subjects were subdivisible by geographical units: however, scattered throughout the tables of the later extensions were instructions by Cutter regarding the classes to which elements from the Local List could be applied. In the matter of geographical subdivision, then, the EC imposed limits upon the classifier similar to those that the DDC did; however, because of the distinctive notation of the Local List, this could never lead to confusion regarding the meaning of the numbers in a class-mark, as was liable to occur in Dewey’s classification (cf. Cutter 1897, 197). The second use, which Cutter (1891–1893, “Subject divisions under countries”, 1; 1899, 48–49) expected to find application primarily in college libraries and other specialized collections for serious research work, involved the inverse process of subdividing country class-numbers from the Local List by those for general subjects from the main tables, just as Otlet would recommend in conjunction with his repertories on geographical bases. Thus, for example, if one wished to collocate books dealing with different aspects of England, one could simply invert the class-marks cited earlier in this paragraph to “45F”, “45G”, “45KL”, “45HL”, “45IG”, “45IU”, “45JT”; “45X”; “45Y”; and “45WF”:

this would bring together the classes “the history of England”, “the geography of England”, “English law”, “the English poor”, “English schools”, “English politics”, “English language”, “English literature”, and “English architecture” under the subject of England *qua* country rather than distributing them among the general subjects in question. In such cases of country-based classification, Cutter set no limits to the subjects that could serve as subdivisions, stating that

the use in the notation of letters to denote non-local subjects and of figures to denote countries allows the classifier to group under the country no merely Language and Literature, but also Art, Commerce, Geography, History, Law, the Natural sciences, the Arts, and all of their subdivisions, any subject in fact which he desires to include, whether broad or minute, if only treated locally. The notation permits the widest liberty. ... All subjects or a selection of subjects may be so treated (Cutter 1891–1893, “Subject divisions under countries”, 2–3; 1899, 48).

Although Cutter recognized that country-based classifications would be used more sparingly than subject-based ones, he nevertheless accorded considerable value to this aspect of the EC, for he deemed “classification by country” to be “the most important instance” of the “thing-arrangement” that characterized the classificatory “tendency toward the concrete and the individual” (Cutter 1899, 48, 47; see Section 3.1.2 of the current chapter, esp. pp. 394–395, above). In this, his conceptualization of the treatment of geographical entities in the EC was clearly continuous with the theoretical principles that underlay his rules for dealing with countries *qua* subjects in the *RDC*.

By contrast, Kaiser, who had made a study of the EC, took a purely pragmatic view of Cutter’s notational innovations. “The Cutter notation”, he wrote, “recognises two distinct divisions: the indication of subjects and the indication of localities. The former are always indicated by letters, the latter always by numbers” (Kaiser 1911, § 275). He considered the consistent use of letters for subjects and numbers for countries to be a cardinal virtue of the notational scheme, writing that

[c]ompared with the Dewey notation in which the locality numbers are merely permissive and are liable to be confused with subdivisions, or are wanting altogether, the Cutter notation is far superior. His numbers *always* mean locality, his letters *always* mean subjects ... (§ 277 [emphases his]).

With regard to the subdivision of subjects by countries, he noted, not without some exaggeration, that, in virtue of the notational difference between subjects and countries, “every subject may have a locality number attached to it” (§ 277). Nor did he fail to remark on the syntactic pliability of Cutter’s system, observing that “[t]he positions of letters and

numbers may be reversed, so that a locality may be divided by subjects and a subject may be divided by localities” (§ 277). However, Kaiser’s only comment on country-based classification was the rather negative one that, within the framework of a shelf classification such as the EC, it was no more possible to collocate physically all the books on a given locality under its class-mark than it was to assemble all the books on a given subject under its class-mark, for, as he put it, “[a]uthors as a rule seem to be quite oblivious of the fact that they are overstepping the boundaries marked out by some classification or other” (§ 277): his acute sense of the polytopicality of books and documentary materials, which had led him to question the value of subject-based classification in general (Chapter 6, Section 3.2.2, above), seems to have drowned out any deeper appreciation of the significance of Cutter’s Local List as a tool for creating pure national classifications.

One contemporary who fully appreciated the significance of Cutter’s treatment of countries was James Duff Brown. In his *Manual of Library Classification and Shelf Arrangement*, the first modern British textbook devoted to this subject, he took it as a point of departure for a generalized account of how “national divisions” might be formed within the framework of a bibliographic classification:

To avoid some of the difficulties of classification, especially in regard to overlapping classes or topics, attempts have been made at national divisions, of which Mr. Cutter’s “local” list may be mentioned as an instance. There is a considerable attraction about the plan of adopting nationality as the basis for classification, and in many cases a real convenience would result. An ingenious mind could very easily elaborate such a method by starting with the assumption that all literature is divisible into two main classes, the Abstract and the National. Books which treat of sciences or arts in the abstract without particular reference to geographical areas could be classified according to any minute scheme as at present. Books treating of sciences or arts with reference to nationality could be classified under each country in the order of the abstract main classes. Thus a result would be obtained like this:

ABSTRACT. Class A, B, C, D, E, F, G, etc.

NATIONAL. England. Class A, B, C, D, E, F, and so on.

We have never seen a classification proposed or carried out on this basis, but the suggestion is worth consideration. ... We recommend this system to young librarians for consideration and study (Brown 1898, 95–96).

Yet, if Brown acknowledged the potential utility of a bibliographical classification designed to include a separate country-based classification in parallel to the general subject classification, he did not incorporate this feature into any of the three classifications that he created. In the earlier, relatively simple Quinn-Brown and Adjustable Classifications,

countries as subjects were embedded into the main classes of “History, Travel, Topography” and “History and Geography”, respectively, much as they were in the DDC (Brown 1898, 121–128; Quinn & Brown 1895, 76, 78, 80): however, it is true that, in the Adjustable Classification, Brown did make some provision for the *ad hoc* creation of special geographical classes for local special collections and that, in both classifications, he gave classifiers considerable freedom in the subdivision of countries within the main schedules, envisioning that such subdivisions would include either more minute geographical divisions or subjects pertaining to a given geographical unit (Brown 1898, 101–102; Quinn-Brown 1895, 79).

In the most elaborate and theoretically interesting of his classifications, the SC (cf. Section 3.1.1 of the present chapter, esp. pp. 398–400, above), Brown developed an approach to the treatment of countries that steered a middle course between that of Dewey, on the one hand, and that of Otlet and Cutter, on the other. Like the former, he kept classes for countries within the main schedule of the classification, distributing them within the main class of “History and Geography”. Within the overall structure of main classes in the SC, that of History and Geography took on disproportionately large dimensions: in a classification whose basic notational conventions for denoting a class consisted of a single capital letter (“A”, “B”, and so on, through “X”) followed by a three digit number from “000” to “999” (with some gaps in numeration within each class for the insertion of new classes over time), it covered the letter ranges “O” through “W” inclusive (Brown 1906, 13, 79). Because classes for countries formed part of the main schedules, there was no notational means of differentiating them, *qua* countries, from classes for other subjects apart from the initial letter of their class-mark: thus, for example, among general subjects, “A470” denoted “Bookkeeping”; “B500”, “Railway Engineering”, “C260”, “Thermodynamics”; “D370”, “Sedimentary Rocks”; “F005”, “Vivisection”; “I874”, “Natural Mineral Waters”; “L159”, “Trade Unions”; and “N224”, “Private Theatricals”; whereas, among countries, “O530” designated “British East Africa”; “P020”, “Australian Commonwealth”; “P040”, “Queensland”; “Q043”, “Malta”; “Q500”, “Italia (Italy)”; “Q830”, “Bologna”; “S340”, “Böhmen (Bohemia)”; “S360”, “Praha (Prague)”; “U301”, “England”; “U435”, “Yorkshire”; “U461”, “Leeds”; “W100”, “United States of America”; “W360”, “Illinois”, and “W362”, “Chicago”. Yet, if Brown did not employ any specialized notational contrivances to distinguish countries *qua* subjects from other kinds of subjects as Cutter and Otlet had done, the mixed notation of distinctive letter plus number sufficed to ensure unambiguous identification of individual countries by class-

mark. Accordingly, much like Otlet, he gave the classifier a virtual *carte blanche* to subdivide any general subject in the main schedule by a country class, an operation that could be effected simply by appending the class-mark of the latter to that of the former (Beghtol 2004a, 709; Brown 1906, 19): thus, for example, “Sedimentary Rocks (F005) in Yorkshire (U45)” would take the form of “F005U435”, while “Trade Unions (L159) in the United States (W360)” would appear as “L159W360” and “Natural Mineral Waters (1874) in Bohemia (S360)” would be rendered as “I874S360”.

As a rule, Brown (1906, 19) did not permit the converse operation of subdividing country classes by general subjects from the main schedules. He reasoned that it was generally more “constantly useful” to classify works relating a general subject to a country under the subject rather than the country, though he did allow exceptions in the case of special local collections, in which the geographical class for a given locale might be subdivided by limited sets of general subjects, in particular those having to do with historical buildings and architecture (cf. Beghtol 2004a, 709). Nevertheless, he did provide another means for subdividing country classes by non-geographical subjects. This took the form of what he called “the categorical table”, which he characterized as “a table of forms, phases, standpoints, qualifications, etc., which apply more or less to every subject or subdivision of a subject” (Brown 1906, 15). The SC’s categorical table was roughly analogous to the auxiliary tables in the UDC and, like them, may have been inspired by the small series of “form distinctions” that Dewey (1885, 23–24; 1899, 14–15) developed for the DDC in accordance with his mnemonic principle, a version of which Cutter (1891–1893, 129–130) adapted for use with the EC as well:⁴¹³ Comprising a list of a little over 975 form classes or subjects, notationally represented by one-, two-, or three-digit numbers preceded by a period, it encompassed a wide range of forms or topics ranging from “Bibliographies” (“.1”), “Text-books, Systematic” (“.3”), “Periodicals, Magazines, Reviews” (“.7”), “History” (“.10”), “Modern History” (“.14”), “Museums” (“.57”), “Trades” (“.64”), “Logic” (“.87”), “Balance Sheets” (.108), “Specific Gravity” (“.160”), and “Roads” (“.170”), “Bridges” (“.171”), and “Tunnels” (“.172”), to “Zoology” (“.475”), “Animals” (“.476”), “Children” (“.506”), “Physical Training” (“.569”), “Agri-

⁴¹³ Pace Beghtol (2004a, 709), who holds that Brown’s Categorical Table “appears to be unique in bibliographic classification”. In its size and scope, Brown’s table certainly was unlike the auxiliary tables in the UDC or the lists of form divisions in the DDC and in the EC: however, as an auxiliary table for subdivision, it quite clearly fulfilled the same function that they did. Nor can one agree with the assertion that “the idea of combining any main schedule topic with any element from the Categorical Table appears to be unique in bibliographic classification practice” (Beghtol 2004b, 2), for, as we have seen, Otlet seems to have given classifiers using the UDC a comparable degree of freedom in using the common subdivisions for place.

culture" (.584), "Dairy Farming" (.588), "Commerce" (.839), "Trade" (.840), "Money" (.854), "Language" (.867), "Verbs" (.891), "Cryptography" (.891), and "Renaissance" (sci., the historico-cultural period) (.970), and "West" (sci., the direction) (.975). Brown set no restriction on the use of these classes as subdivisions: in principle, if obviously not in practice, any of the divisions within the categorical table could serve as a subdivision for any class in the main schedule, be it a general or a geographical subject (Beghtol 2004a, 709; 2004b, 2). This meant that, any country listed in the History and Geography class could be subdivided by an element from this table: for example, "Modern History (.14) of Italy (Q830)" would appear as "Q830.14"; "Bridges (.171) of Italy (Q830)" as "Q830.171"; "Animals (.476) of Italy (Q830)" as "Q830.476"; "Dairy Framing (.588) in Italy (Q830)" as "Q830.588"; "Italian (Q830) Money (.854)" as "Q830.854"; and so on. In this way, a classifier using the SC who wished to collocate books on varied subjects by country rather than *vice versa* could do so, just as the compiler of a geographically-based repertory with the UDC could by means of the table of common subdivisions of place or as a classifier using the EC could with the aid of the Local List.

Kaiser viewed the treatment of countries in the SC with a mixture of admiration and criticism. With regard to the country classes, he noted that "[t]he letters O to W are reserved for localities and their divisions indicated by numbers", adding somewhat censoriously that "[t]he nine letters taken for Geography seriously curtail the letter material for the other subject divisions" (Kaiser 1911, § 282). He lauded the fact that "[t]he locality numbers may be attached to any subject number as in Cutter", while expressing reserve at the use of the form of mixed notation for general subjects and countries alike, which, he argued, rendered the latter less easily differentiable from the former than use of distinct sets of characters would: in his words, "the letter in addition to figures makes them [sci., Brown's locality numbers—TMD] less exclusive than the Cutter locality numbers" (§ 282). Yet, whatever quibbles he may have had with the SC's notational conventions to represent countries, Kaiser held a highly favorable opinion of the degree of detail in its coverage of geographical localities, which he found superior to those of the DDC and the EC: in his judgment, "Brown's is the best of the three classifications so far as adequate division of geographical territory is concerned. A great deal of labour seems to have been spent on this part of the scheme, and with good result" (§ 282).

As for the categorical table, Kaiser likewise mingled praise with critique. Recognizing the affinities between Brown's categorical table and Dewey's form divisions, he considered

the use of a separate table for general subdivisions, which he attributed to Dewey, to be “a very good idea” (Kaiser 1911, § 283). He noted with apparent approval the SC’s consistent use of the decimal point as a marker of a subdivision involving “headings”, or classes, taken from the categorical table because it signaled unambiguously the nature of the subdivision within a composite class-mark: “Decimals are employed to express these headings, and they may be joined to the subject numbers as in Dewey but with this distinction that these decimals *always* mean categories” (§ 283 [emphasis his]). On the whole, Kaiser considered the categorical table to be a commendable feature of the SC, holding that “[f]or a large library these categorical numbers would be most useful” (§ 283). Nevertheless, he found its extent to be somewhat problematic, cautioning that both the length of the table and the lack of any formal subdivision of its contents might detract from its practical utility for the classifier: “Brown’s list of headings seems to me too long to be easily mastered. A more systematic division of the headings would certainly facilitate easier retention and application” (§ 283). How such a division might be carried out he did not venture to say.

Over the course of the preceding pages, we have seen that the treatment of countries within the framework of subject cataloging and classification commanded the attention of the librarians and documentalists who designed the most prominent bibliographically oriented KOSs of Kaiser’s day: Dewey, Cutter, Otlet, and Brown all formulated rules and devices for representing geographical entities within the subject access systems that they created, while Brown and, especially, Cutter discussed the matter in theoretical terms as well. Some of these designers accorded countries a higher profile within the structural framework of their KOSs than others. Cutter and Otlet, in particular, foregrounded the categorial distinctness of countries and other geographical entities *qua* subjects by segregating them into special auxiliary tables—the Local List in the EC and the table for common subdivisions of place in the UDC, respectively—and supplying them with special notational features that indicated their status as a category apart: they also made allowances for the creation of distinct sections of bibliographical repertories (in the case of Otlet) or special areas on library shelves (in the case of Cutter) embodying national classifications in which materials were collocated by countries subdivided by general subjects. Dewey’s DDC and Brown’s SC, on the other hand, did not mandate the establishment of separate files for country-based classifications nor did their notational conventions distinguish countries from other subjects as sharply as did those of Cutter and Otlet: nevertheless, the DDC did provide a notational basis for subdividing a limited portion

of its general classes by countries, while the SC allowed for the subdivision of the country classes embedded within its main schedules by means of its categorical table and so permitted collocation under country in a manner akin to that of the EC and the UDC. Kaiser was sufficiently well informed about the treatment of countries in (at least) the DDC, EC, and SC to comment on their respective notational mechanisms for the formation of what he called “locality numbers” and to note the ways in which the latter might be combined with class-marks for general subjects to create composite class-marks indicating a relationship between a general subject and a country or other geographic region.

Kaiser’s interest in how the leading library classifications of his day represented geographical entities lends considerable support to the thesis that his insistence on establishing a distinct category of countries within SI, despite the fact that it did not fit easily into the theoretical framework that he used to justify his choice of categories, simply reflected conformity to a general trend in the design of KOSs. Although such a “universalist” explanation is reasonable, one may well question whether it does full justice to the specific historical contingencies that conditioned Kaiser’s decision to treat countries as a category on a par with concretes and processes. After all, he did not create and elaborate his KOS within the context of general librarianship, as Dewey, Cutter, and Brown did theirs, nor in conjunction with the creation of a universal bibliographical catalog, as did Otlet, but within institutional settings oriented primarily toward the specialized provision of information about commercial matters. One is thus justified in asking whether the specific informational culture(s) of such milieux did not have a hand in shaping his decision to include countries among the categories of SI. An answer to this question may shed light on why Kaiser persisted in following a triadic categorial scheme despite his adherence to a theory supporting a dyadic one. In this regard, a consideration of the knowledge organization régime at the institution where Kaiser initiated his career as indexer and first worked out the basic outlines of SI—namely, the Bureau of Information at the PCM—proves especially revealing and provides the foundation for a historically grounded explanation for the particular, and somewhat peculiar, configuration of his category system.

As we had occasion to see in Chapter 3, the founders of the PCM took as their mission the provision of information about commercial opportunities in foreign markets to any and all interested American businessmen, in particular those who became subscribing members of the museum (See Chapter 3, Section 2, above). In accordance with this goal, they developed a “systematics of commerce” (Conn 2010, 177–179; cf. Chapter 3, Section 3,

above) that pervaded the museum's knowledge organization practices during the time that Kaiser was employed there. Setting the tone thereof was the organization of the exhibits of samples of raw products from regions such as Central and South America, Africa, Asia, and the Pacific Islands that formed the material nucleus and publicly most visible face of the museum. These were arranged into monographic and geographic displays, the former collocating samples by kind of product and the latter, by the country of origin (See Chapter 3, Section 3.1, above): although little is known about the internal structure of the monographic exhibits, the geographic ones seem to have been subdivided, in turn, by kinds of products. In this scheme, then, commodities and countries shared equal footing as principles of organization for the museum's displays: the monographic exhibits, of course, represented the kinds of products available from foreign markets, whereas the geographical ones represented the markets from which the products were obtained. Manufactured products sold in emergent markets, on the other hand, appear to have been organized according to "lines of trade" (Davidson 1899, 360–361; Philadelphia Commercial Museum 1899a, 415; see Chapter 3, Section 3.1, above) in a manner similar to that of the monographic exhibits, though there are some slight indications that geographical organization may have played a rôle here as well (e.g., A Commercial Museum 1897, 1011–1012).

The complementary use of monographic and geographic approaches to organizing the PCM's exhibitions of samples was reflected in the organization of information in its Bureau of Information and library as well. As noted in an earlier chapter, the library was divided into a "Book Division" and a "Journal Division" (Philadelphia Commercial Museum 1897, 66; see Chapter 3, Section 3.2, above). The Book Division, in turn, was further partitioned into a "Subject Division" and "Geographical Division". Books in the Subject Division were classified in accordance with the DDC (Heskin 1952, 12; see Chapter 3, Section 3.2, above), whereas those in the Geographical Division, which consisted primarily of "publications ... issued by ... governments, besides those published by chambers of commerce, boards of trade, and other commercial organizations", were arranged by country (Philadelphia Commercial Museum 1897, 66). Needless to say, the analogy between the Subject and Geographical Divisions of the library's Book Division and the monographic and geographical exhibits of the museum's raw products is obvious. Here, too, countries *qua* subjects were equal in status with general subjects and, in fact, were sometimes considered to have greater weight than the latter: in the year after the library opened its doors to the public, the Chief of the Bureau of Information reported that the Geographical Division was the section of the library that "has

grown most rapidly of late, and which generally gives the most important information to those visiting the institution” (p. 66).

Most significantly in the present context, the distinction between monographic and geographic organization also informed the structure of the card index, the compilation and maintenance of which Kaiser oversaw as librarian (See Chapter 3, Sections 3.2 & 3.3, above). The Chief of the Bureau of Information under whom Kaiser worked characterized the structure of the index in terms of a dichotomy between subjects and countries, stating that

[its] reference cards are filed in the bureau under a double system, according to subject and according to countries. It is therefore an easy matter to make an investigation concerning the general conditions in a given country, or to take one subject or line of commerce and follow it out through every country in the world (W. Harper, in Philadelphia Commercial Museum 1897, 66).

This account of the index clearly aligned its internal organization with that of the library’s division into Subject and Geographical Divisions. However, other contemporary descriptions show that its structure was not purely dyadic. In another account of the index, the Assistant Chief of the Bureau echoed, in large measure, the substance of his superior’s words, although he gave greater prominence to the place of countries and identified what the former had called “subjects” more specifically as “lines of goods”, or commodities:

In classifying this mass of information [sci., information contained in foreign trade publications and official documents from countries around the world—TMD], two systems are pursued—first, by countries, so that, if it becomes necessary to make a study of the commerce of a given country, we find everything relating to that country filed under that particular section; the other classification is by lines of goods, so that if we desire to study any particular line, we can, under its proper heading, find all reference to these goods in every country where they are now imported or used, giving full information as to the volume of trade and all trade conditions (C. H. Green, in Philadelphia Commercial Museum 1897, 18).

In addition to these two divisions, he added a third: “[s]till another classification relates to imports and exports, freight rates from all sections of the world, duties, trade regulations, systems of banking, and, in fact, every subject that has any bearing on commerce” (p. 18). A journalist’s description of the Bureau’s files written shortly after the preceding statements were published indicates that the threefold division into products, countries, and general commercial subjects was reflected in the physical organization of the index as well: one card cabinet, or “subject cabinet”, housed an “index of products”, whereas an “adjoining cabinet” contained a geographically organized file, in which was to be found “everything which relates to [a] country alphabetically classified according to the subjects” and a third “special

cabinet” held cards relating to “specific subjects ..., such as tariff, constructions of recent public works, bridges, railroads, and many other items of interest not included in the index of products” (A Commercial Museum 1897, 1011). Yet, interestingly, the same writer described the process of indexing as one that involved “writing the cards in a dual arrangement of subject and country” (p. 1011). The Bureau’s card index thus differentiated between two kinds of subjects—products, or commodities, and other general commercial topics—and countries, each of which constituted a distinct category: of these three categories, commodities and countries were considered to be primary, in accord with the PCM’s systematics of international commerce.

As was discussed at some length in an earlier chapter, the categories of product, country, and general commercial topic into which the PCM’s Bureau partitioned its index files corresponded to the structural elements of the special inquiries for information that it received from its patrons (See Chapter 3, Section 3.2, esp. pp. 104–105, above). For example, the Bureau reported that, in late 1899, it had received, *inter multa alia*, requests for information on “import duty on shaving and tar soap in Argentina”, “trade in corsets in Cuba”, “United States railway rates and freight rates per mile”, and “exports of cotton goods from the United States” (Requests [1.1]–[1.3], & [1.5] in Chapter 3, Section 3.2, p. 104, text to n. 93, above). The primary components of these requests, as summarized by the Bureau, could easily be resolved into products, or commodities (*in casu*, “corsets”, “cotton goods”, “shaving and tar soap”), countries (*in casu*, “Cuba”, “United States”), and general commercial subjects (*in casu* “import duties”, “trade”, “export”, “railway rates and freight rates per mile”). Two features of this analysis will immediately strike the attentive reader. First, countries constituted a frequent element in requests such as these, although they do not seem to have been an obligatory component thereof.⁴¹⁴ Second, the general commercial subjects—“import duties”, “trade”, “export”, and “railway rates and freight rates per mile”—often included concepts that Kaiser would come to treat as terms of processes within the framework of SI (See Section 3.3.2 of the current chapter, esp. pp. 435–436, 442–443), while the PCM’s category of products bore unmistakable analogies to his category of concretes

⁴¹⁴ For other examples of special requests, see, e.g., the list in Philadelphia Commercial Museum 1900, 6–13. Instances in which countries did not figure *expressis verbis* included: “Makers of portable railways for sugar estates and of sugar machinery” (p. 6), “Importers of dried fruit” (p. 7), “Microscope manufacturers” (p. 8), “Tanneries and shoe factories” (p. 9), “on Westinghouse gas engines” (p. 12), and “Manufacturers of fruit-evaporators” (p. 13). In many such cases, especially those that had to do with information about manufacturers or importers of certain goods, the country was not specified because the questioner did not want to set any geographical limits on the information to be given.

qua commodities and that of countries to his category of countries. A striking consequence of this is that most of the requests quoted here are readily convertible into the triadic form of a statement in SI (Statement Form [7.3] in Section 3 of the current chapter): for example, “trade in corsets in Cuba” is amenable to reformulation as *CORSETS–CUBA–TRADE (and its variant, *CUBA–CORSETS–TRADE), while “exports of cotton goods from the United States” can be expressed as *COTTON GOODS–UNITED STATES–EXPORTS (and its variant, *UNITED STATES–COTTON GOODS–EXPORTS). To be sure, the extremely scanty surviving evidence regarding the Bureau’s indexes does not allow us to conclude that statements of this form were used in its card files (See Chapter 3, Section 3.3, esp. pp. 118–120, above). Nevertheless, it is difficult to escape the conclusion that the product and country sections of its indexes were the ultimate sources for Kaiser’s categories of concretes and countries, respectively, while its file of general commercial subjects may well have informed, if not directly inspired, his formulation of the category of processes.

Further reinforcing the notion that Kaiser’s concretes, countries, and, just possibly, processes, had their roots in the categories used in the PCM’s Bureau is the fact that the subjects of the Bureau’s general reports on the export of American products abroad and on foreign market conditions therewith were articulated according to the same schema as that its personnel used to represent the substance of special inquiries (See Chapter 3, Section 3.2, above). Among the reports issued by the Bureau in the same period as it received the requests discussed in the previous paragraph were ones on the export of “anvils [to] Luxemburg”, “coal [to] Algiers”, and “canned vegetables [to] Shanghai, China”, as well as others on “new market conditions [in] South Africa”, the “mining industry [in] Greece”, and “new gasworks [in] Devonshire, England” (Report Subjects [2.1]–[2.2], [2.4]–[2.5], & [2.7]–[2.8] in Chapter 3, Section 3.2, p. 105, text to n. 94). Here, again, the subjects of the general reports were readily analyzable into commodities (*in casu*, “anvils”, “coal”, and “canned vegetables”), general commercial subjects (*in casu*, “new market conditions” and “mining industry”), and countries and other geographical units (*in casu*, “Luxemburg”, “Algiers”, “South Africa”, “Greece”, and “Shanghai, China”). The structure of the subjects also was informed by the general distinction between subjects, be they commodities or general commercial subjects, and countries, with the former typically being set into relation with the latter: indeed, the general reports tended to use geographical concepts more consistently than did the special inquiries, for they routinely, though not universally, included the name of the country, city, or region to which goods were being shipped or in

which new commercial developments—in particular the installation of new industrial plants or transportation facilities—were taking place.⁴¹⁵

From the arrangement of its museal exhibits to the structuring of its library's book collection and from the organization of its Bureau of Information's card index to its representation of patron requests and formulation of general reports, knowledge organization at the PCM was based on a category scheme based on a twofold differentiation between "monographic" subjects—above all, the (kinds of) commodities and products imported abroad and exported therefrom—and "geographical" subjects—namely, the countries (and subdivisions or aggregations thereof) that, from the perspective of the American manufacturer and merchant, served as sources of imports and destinations for exports. Commercial goods and the localities associated with them thus constituted the two "fixed points"—to use Kaiser's terminology—around which the PCM and, in particular, its Bureau articulated its informational activities. In adopting this scheme as the principle for structuring its indexes, the Bureau reflected a broader trend among organizations, state and private alike, involved in the domain of international commerce. On the state level, a comparable grid of analysis was frequently used in indexes to official publications of consular reports on economic conditions abroad. For example, in a brief survey of the indexes to consular reports from different European countries that he undertook within a paper on the "rational organization of information and documentation in economic matters", Otlet (1905, 9) reported that, in Germany, such reports, published by the interior ministry (*Reichsamt des Innern*) in the yearly cumulation to the section of its official organ, the *Deutsches Handels Archiv, Zeitschrift für Handel und Gewerbe*, entitled *Berichte über das Ausland*, were accompanied by three index tables, "one by the circumscription of the consular agents whose reports are published, the other by names of localities, the third by matters or products".⁴¹⁶ In England, on the other hand, the *Index to Consular Reports*

⁴¹⁵ Examples of general reports without countries, which seem to have been very rare, include "Brick and Clay-working Material" and "Saddlery and Harness Machinery" (Philadelphia Commercial Museum 1900, 13 & 14): as with the special requests, it is likely that the lack of geographical specification betokened a report that had to do with import of materials to multiple markets. By contrast, in the case of new installations, the indication of the geographical locality could reach a fairly high level of specificity, as examples of subjects for reports such as "Proposed Bridge [in] Sydney, New South Wales", "New Sewage Pumping Station [in] Morecambe, England", "New Railway Station [in] Ludgate Hill, London, England", "Two Million Dollar Harbor Improvement" [in] Bristol, England", and "New Waterworks [in] Ladysmith, Natal, South Africa" (pp. 14–15) show.

⁴¹⁶ This tripartite division is evident in the index to the *Berichte über das Ausland* for 1905, in which the first part dealt with individual consular reports, organized by the particular city from which the consular agent filed his report and often dealing with general commercial matters such as ship

published annually by the Board of Trade, consisted of a single table encompassing entries for both commercial subjects and countries arranged

in such a manner as to respond to these two orders of questions: "What [items of] information (*renseignements*) does one find in the collection relative to such-and-such a country, region, locality? Or relative to such and such a kind of product?" The geographical rubrics are subdivided by subject matter (*matières*), while the rubrics for subject matter are subdivided by geographical places (p. 9).

Interestingly, Otlet went on to state that, ideally, the organization of dossiers of information relating to commercial and industrial matters was best accomplished with the aid of tables of classification—"one by subject matter, the other by localities" (p. 28), a task to which his own UDC, as we have seen, could be applied: he too recognized the importance of the commodity-place scheme in industrial information. Although it is much more difficult to come by direct evidence for the use of this mode of organization in the indexes of private enterprises, it is surely significant that contemporary writers on the indexing of commercial correspondence tacitly assumed that, as a matter of course, countries would feature among the subjects that they used to characterize the contents of correspondence describing commercial conditions and opportunities abroad: the examples of subject indexing routinely included the names of countries, colonies, or cities (e.g., Byles [1911], 21–22; Clarke 1905, 142–144; Cope [1913], 110; Mares 1909, 81–87).

All in all, commodities, countries, and other trade-related subjects served as routine elements in subject indexing for the domain of international commerce, with the first two of these often treated as basic categories. This, at any case, was the case at the PCM's Bureau of Information and there can be little doubt that Kaiser's experiences as librarian and indexer there instilled in him an appreciation of the significance of geographical considerations for foreign trade and the importance of providing access to information about countries, as well as about goods and other commercial subjects pertaining to foreign trade. His subsequent work at other institutions—the CIB, British Westinghouse, and the Tariff Commission—would only have reinforced such a view. As we documented in a earlier chapter, the CIB

transport from Germany or local trade conditions, the second constituted "a list of the more important goods over which ... report is made", and the third was an "alphabetical list of the lands and trading towns (*Handelsplätze*), about which ... report is made" (See *Inhalts-Übersichten* 1905). Otlet did not mention that the index table for goods was organized in an alphabetic-classed (See Glossary) manner, with lines of trade (e.g., "Cotton and cotton goods", "Drug, apothecary, and coloring goods", "Iron and iron goods", and so on) forming sections, under which were entered specific kinds of products, each of which, in turn, was subdivided by the geographical unit with which the good had been associated in the reports. The third, geographical table, by contrast, did not subdivide the entries for countries.

sought to replicate the information services provided by the PCM's Bureau on British soil, hiring away key personnel (including Kaiser) from the Bureau and adopting its *modus operandi* for providing information about overseas markets and business opportunities abroad (See Chapter 4, Section 1, above). The Publishing Department of British Westinghouse had a narrower informational remit than the CIB; nevertheless, the company not only had strong ties overseas (most notably to its parent company in the United States) but also foreign competitors in the field of electrical appliances (See Chapter 4, Section 2, above): information about developments abroad most likely figured in its indexes as well. The Tariff Commission, on the other hand, took a wide-ranging interest in international commerce. Seeking to assess the impact of foreign competition and other countries' tariff and trade policies on British industrial and mercantile performance at home and abroad and on the commercial relations of the mother country with her colonies, the Commission's memoranda and reports drew heavily upon information about domestic, colonial, and foreign markets alike to make the case for the formulation of a "scientific tariff" (e.g., Tariff Commission 1904, §§ 17–44; 94–123, 153–196, 202–422, *et passim*; 1905a, §§ 46–61, 241–305, *et passim*; 1909, §§ 6–12, 18–42, 50–152, *et passim*; cf. Chapter 5, Sections 2, esp. pp. 152–153, & 3, esp. pp. 163–164; Section 3.2 of the current chapter, esp. pp. 413–414): here, as at the PCM's Bureau and the CIB, the country loomed large as a unit of interest.

In light of the evidence presented in the foregoing paragraphs, it becomes apparent that Kaiser's insistence on treating the category of countries as a full-fledged element of his categorial scheme, despite the fact that it did not fit easily into his theoretical rationale for the constitution of the latter, cannot be explained simply as a particular manifestation of a general propensity on the part of designers of KOSs to include geographical subjects within their respective systems. Rather, it appears to have had its roots in the informational culture of the institution where he developed the initial version of SI, namely the Bureau of Information at the PCM. Dedicated to providing information to American merchants and manufacturers about the commercial products imported into, and exported from, emergent markets and apprising them of business opportunities abroad, the Bureau, like the PCM in general, articulated its knowledge organization activities primarily around two complementary conceptual pillars: monographic commercial subjects—in particular, commodities—and geographic subjects—in particular, countries. As we have seen, this conceptual division influenced the organization of the Bureau's library, determined the structure of its card index files, and underpinned the formulation of the subjects of the

informational reports that its personnel prepared for their patrons. Within the PCM, commodities and countries were treated as categories of equal importance, since its founders and administrators considered commercial products and markets to be the two primary objects of interest to businessmen engaging in foreign trade and, hence, the focal points around which information was to be organized (See Chapter 3, Section 3.2, above). This, in turn, reflected a view commonly held by the persons and institutions that took upon themselves the task of providing ready access to documentary information about international commerce: for indexers of business literature, product and place alike were of cardinal importance. Kaiser's attentiveness to the category of countries in his own indexing system and his keen interest in how bibliographic classifications treated them takes on its full significance only if viewed in light of this domain-specific perspective.

The domain-specific, historically grounded explanation of Kaiser's adherence to the category of countries advanced here may also shed light, however faint, on the development of his categorial scheme and his simultaneous presentation of both dyadic and triadic versions thereof in *Systematic Indexing*. At the beginning of this subsection, I noted that, in his final exposition of SI, Kaiser suggested that the dyadic distinction between "terms for commodities" and "terms for actions or verbs" was a feature of SI from its inception. However, it now appears that matters may have been more complex. We have seen that the index of the PCM's Bureau of Information, within the framework of which Kaiser formulated SI, was based on the division of subjects into categories of lines of trade, or products; countries; and general commercial subjects. I have also suggested that the first of these categories lay at the roots of Kaiser's category of concretes *qua* commodities, while the second inspired his category of countries and the third encompassed subjects that, in due time, would fall under the category of processes. There is thus good reason to believe that, from the very outset, the categorial scheme of SI included the category of countries as well as those of concretes and processes. Most likely, the categories of concretes *qua* commodities and countries in SI represented a direct inheritance from the Bureau's index, whereas the conceptualization of the category of processes as one centered around actions relating to concretes constituted an innovation on Kaiser's part. Because concretes *qua* commodities and countries were based on well-established categories in commercial indexing, it is probable that, initially, at least, he felt little need to provide theoretical justifications for them: they were, so to speak, self-evident within the domain of international trade and, more generally, business. The category of processes, on the other

hand, was a novelty and so required an explicit rationale for its existence. To this end, Kaiser formulated the epistemologico-ontological and the logico-linguistic accounts of the relationship between concretes and processes, which provided the theoretical underpinning for a dyadic categorial scheme.⁴¹⁷ Yet, since the category of countries already formed part of the indexing system in practice, it could not be altogether omitted from the theoretical framework that he had constructed: accordingly, he sought to incorporate it by deriving it from the category of concretes and according it status as a top-level category by *fiat*. The result was not a happy one from a theoretical point of view (See Section 3.2 of the current chapter); however, Kaiser appears to have found it sufficiently persuasive to include in his published description of SI.

This, then, appears to be the most plausible reconstruction of the broad lines of development of Kaiser's categorial scheme and his theoretical account thereof, at least so far as the evidence at our disposal goes. Needless to say, it must be treated as a hypothesis awaiting the accession of further documentary evidence—if such is still extant and locatable—that will confirm or disprove it. Yet, if the precise details of the history of Kaiser's system of categories remain tantalizingly elusive, there can be little doubt that his adhesion to both dyadic and triadic versions of the scheme in *Systematic Indexing* reflects, in large measure, a tension between theory and practice. One latter-day commentator has suggested that “it seems reasonable to suppose” that, within the framework of his epistemologico-ontological theory, Kaiser “wanted to recognize only two categories of terms”—namely, concretes and processes—and yet felt it necessary to include countries among his categories (Svenonius 1978, 137): she has drawn the conclusion that “Kaiser, while he recognized that the category country was required, from a practical point of view, was nevertheless not going to allow it to intrude upon his theory”. The latter half of this

⁴¹⁷ On the current state of the evidence, it is not possible to reconstruct definitively the development of these two parallel, but distinct, theoretical accounts. However, Kaiser's (1911, § 20) statement that the chapter in which he laid out the epistemologico-ontological account (Chapter III) was among those earlier chapters that he wrote *after* the publication of *The Card System* in 1908, whereas the chapter in which he set forth the logico-linguistic account apparently belonged to materials drawn from earlier (though doubtless heavily revised) manuscript materials (Chapter V) raises the possibility that the latter account may have been chronologically anterior to the former and may well have provided the basis from which it was elaborated. If this hypothesis should turn out to be correct, it would explain why the two accounts took a stringently dyadic form, for, as noted in Section 3.3.2 of the current chapter, the logico-linguistic account appears to have been inspired in part by the grammatical model of subject-predicate, which likewise admitted only two categories. Unfortunately, there is little chance that documentary evidence, either corroborative or disconfirming, is still extant, so that the reconstruction suggested here seems destined to remain perpetually in the realm of hypothesis.

statement requires emendation, for Kaiser did find a place to accommodate, however uncomfortably, the category of countries within his theory as a special kind of concrete. Nevertheless, the basic point is sound, for his treatment of countries as a category of comparable status to that of concretes and processes was ultimately based upon practical considerations, not the least of which was that information about countries *qua* markets was a leading *desideratum* within the field of international commerce, the domain of knowledge within which, and for which, he originally developed the method of SI. Kaiser's categorial scheme is thus best characterized as dyadic in theory, but triadic in practice. A comparable intermixture of practical and theoretical considerations marked his account of the syntax of the statement to which we now turn.

7.3.5. Categories and the Syntax of the Statement

We have now considered, at some length, the three categories of terms that constituted the “fixed points” of SI: concretes, countries, and processes. We have seen that their conceptual contours were characterized by different degrees of fixity. The definitional boundaries of the category of countries were fairly watertight, comprising both broad geographically defined regions—namely, continents and analogous island groups—and politically defined territorial units—namely, countries proper—and their subdivisions, though Kaiser clearly viewed the latter, political definition as primary: furthermore, terms of countries were preeminently individual terms, naming particular regions and particular countries (See Sections 2.2.4 & 3.2 of the current chapter). The case was somewhat different with concretes and processes, for the definitional limits of these categories were, to some degree, less determinate. Both categories of terms were susceptible to narrow definition, terms of concretes as ones denoting kinds of commodities and terms of processes as ones referring to the actions or activities involving commodities. However, they could also be construed in a much more expansive fashion, with concretes encompassing kinds of things in general and processes covering the whole gamut of kinds of conditions attached to things: the terms for both were generic rather than particular (See Sections 2.2.4, 3.1.2, & 3.3.2 of the present chapter). Between the narrow and the broad definitions of concretes and processes, there was considerable scope for definitional negotiation: thus, for example, terms of concretes included terms for ontologically abstract entities, such as labor or information, treated as if they were concrete objects possessing an exchange value, while terms of processes included terms for aspects of the existence of concretes that had little to

do with actions, or processes as such (See Sections 3.1.2 & 3.3.2 of the current chapter). Ultimately, then, boundaries of concretes and processes were determined as much by the mutual exclusivity of these two categories, into which, according to Kaiser, all observable phenomena of the world could be slotted, as by the more formal semantic definitions by means of which he characterized them: in this sense, whatever was not a concrete was a process and, conversely, whatever was not a process was a concrete. This was the minimal level of definitional fixity of the fixed points necessary if terms were to be assigned to a category so that they could be conjoined into properly formed statements (See Section 3 of the current chapter).

Furthermore, our examination of Kaiser's categorial scheme has shown that, if the category of countries enjoyed a greater degree of definitional precision than those of concretes and processes, the theoretical grounds for its status as a category were considerably more tenuous than those for its fellows. Kaiser's theoretical accounts of the rationale for the choice of categories, which he couched both in epistemologico-ontological and logico-linguistic terms (See the beginning of Section 3.4 of the present chapter), provided ample justification for the status of concretes and processes as primary categories within his scheme. They did not, however, provide a rationale for treating countries as a separate category, despite the fact that terms of countries played an important part in the formation of statements, and so Kaiser was compelled to develop a special argument for their presence, identifying them as a certain kind of concrete that, for essentially pragmatic reasons, was to be treated as a full-fledged category essentially equal in status to concretes and processes (See Sections 3.2 & 3.4 of the present chapter). Although the argument was inelegant and can perhaps best be characterized, in present-day parlance, as a kludge, it nevertheless underscored the fact that, in practice, Kaiser understood the category of countries, no less than concretes and processes, to be a vital element—a fixed point—of his indexing system.

Having dealt with the categories and categorial scheme(s) of SI, we are now in a position to return to the questions about the structure of index statements that served as our point of departure in Section 3 of the present chapter. There, in introducing the three permissible forms for statements in SI—i.e., [CONCRETE]-[PROCESS], [COUNTRY]-[PROCESS], and [CONCRETE]-[COUNTRY]-[PROCESS] (var., [COUNTRY]-[CONCRETE]-[PROCESS]) (i.e., Statement Forms [7.1], [7.2], and [7.3], respectively), we noted three prominent structural features thereof: the presence of both bipartite ([7.1] & [7.2]) and tripartite ([7.3] & var.)

statement forms, the positional intersubstitutability of [CONCRETE] and [COUNTRY] either within a single statement form ([7.3] and var.) or across different ones ([7.1] & [7.2]); and the consistent placement of [CONCRETE] and [COUNTRY] before [PROCESS] in the sequence of categories within a statement. In light of the foregoing discussion, we can reconstruct the theoretical and practical motivations governing Kaiser's choice of these as the allowable syntactic structures for statements in SI.

Setting aside, for the time being, the distinction between tripartite and bipartite statements, let us begin by considering two closely connected features of syntactically well-formed statements in Kaiser's indexing system: the positional interchangeability of [CONCRETE] and [COUNTRY] and the constant anteposition of both of these categories to [PROCESS] within the statement. Both features were congruent with the basic theoretical accounts of the interrelations of categories in SI. The treatment of [CONCRETE] and [COUNTRY] as syntactically intersubstitutable categories was consistent with Kaiser's view that countries constituted a particular class of concrete that had been detached from its parent category because of its "special importance" (Kaiser 1911, § 300; see Section 3.2 of the current chapter). To be sure, the two categories had manifestly different semantic functions to play within the framework of a statement, [CONCRETE] representing the subject or object of a process and [COUNTRY] signifying the locality associated with a concrete or process (Kaiser 1911, §§ 73, 302; see Section 3.2 of the current chapter): nevertheless, the genetic relation between the latter and the former apparently created a sufficiently strong bond between them *qua* categories to render their syntactic interchangeability acceptable from a theoretical point of view. Kaiser, at any rate, had little to say on this score, for the primary motivation for intersubstitutability, as we shall see, was primarily practical in nature.

As for the order of categories within statements, Kaiser had no lack of theoretical justifications for stipulating that [CONCRETE] and [COUNTRY] should come before [PROCESS]. In his epistemologico-ontological account of the categories, concretes were the things to which processes were attached in some way or in relation to which they occurred (See Section 2.1 of the current chapter, beginning), while in his logico-linguistic account, things were what was spoken of in literature and processes were that which was spoken of things (Kaiser 1911, § 298; see Section 2.2.4 of this chapter, esp. pp. 350–351, above). In both cases, processes, whether construed as actions, conditions, or linguistic representations thereof, depended upon concretes and, by extension, countries for their existence. Accord-

ingly, Kaiser allotted what he considered the ontologically more substantial and independent categories pride of place within the structure of statements, noting that “we have given concretes and countries precedence over processes, for in concretes and countries we have something more definite to deal with; processes are dependent on concretes, nor are they tied to any one in particular” (Kaiser 1911, § 574). The placement of [CONCRETE] and [COUNTRY] before [PROCESS] within statements, then, was based on what later theorists of KO would term the principle of dependence, which mandated that, in a complex index term formed from several “simpler” index terms from different categories, terms from a category of entity types deemed to be dependent upon the prior existence of another entity type were to follow terms drawn from the latter category (e.g., Foskett 1982, 158; Hutchins 1975, 81). This principle, which would later be independently postulated and articulated by Ranganathan (1967a, 425) as the “wall-picture principle for facet sequence”,⁴¹⁸ continues to be invoked, under various names, as a theoretical guideline for governing the formulation of composite index terms in faceted indexing systems to this day (e.g., Broughton 2004, 273–274; 2006a, 55; Cheti 1990, 31 & 38; Cheti & Paradisi 2008, 239; Svenonius 2000a, 184).

Kaiser also enunciated these ideas in a pragmatically couched argument about the relative utility of the three categories in searching for information. This he embedded within a discussion addressing the question “for what terms of the statement shall cards be made”—in other words, which categories of terms could occupy the initial position in a statement (Kaiser 1911, § 382). Taking as an example the three elements of the statement NITRATE–CHILE–TRADE, he noted that they could, in theory, be arranged in six different permutations (§ 384):

1. NITRATE–CHILE–TRADE (i.e., [CONCRETE]–[COUNTRY]–[PROCESS])
2. NITRATE–TRADE–CHILE (i.e., [CONCRETE]–[PROCESS]–[COUNTRY])
3. CHILE–TRADE–NITRATE (i.e., [COUNTRY]–[PROCESS]–[CONCRETE])
4. CHILE–NITRATE–TRADE (i.e., [COUNTRY]–[CONCRETE]–[PROCESS])
5. TRADE–NITRATE–CHILE (i.e., [PROCESS]–[CONCRETE]–[COUNTRY])
6. TRADE–CHILE–NITRATE (i.e., [PROCESS]–[COUNTRY]–[CONCRETE])

⁴¹⁸ So called because of the analogy that Ranganathan (1967a, 425, § RM1; 1967b, 16, § A63) used to illustrate it: “If two facets A and B of a subject are such that the concept behind B will not be operative unless the concept behind A is conceded, even as a mural picture is not possible unless the wall exists to draw upon, then the facet A should precede the Facet B”. For further discussion, see Horner 1970, 157–158.

Having set forth these possibilities, Kaiser posed a rhetorical question to his readers: “Assuming that we would like to consult our index on this subject, would we ask for *Nitrate* or *Chile* or *Trade*?” To this he responded that

[o]viously [*sic*] we must have some definite idea as to what information we require, we would therefore *not* ask for *Trade*. If any one be so simpleminded as to require information on trade generally, he had better take all the trade literature home with him and study it; he would not require an index at all. But we may reasonably ask for the *trade in nitrate* or the *trade of Chile*, or simply for *nitrate* or *Chile*. From this it follows that concretes and countries are indispensable, while processes are not, for information on a process must include either a concrete or a country (§ 384 [emphases his]).

In giving this answer, Kaiser sounded two now familiar themes. First, he took it as given that the users of a systematic subject index would be primarily interested in information either about commodities (*in casu*, nitrate) or about the countries producing or serving as markets for these goods (*in casu*, Chile). In doing so, he simply recapitulated the leading assumptions underlying the knowledge organization régime at the PCM and its Bureau of Information, where, as we have seen, products and places were the two primary categories around which the institution’s museal exhibits, library, index, and informational activities were structured (See Chapter 3, Sections 3.1 & 3.2; Section 3.4 of the present chapter, above). Second, he set forth a new variant of the argument that processes were dependent upon concretes and, by extension, countries (cf. Metcalfe 1976, 180). According to this version, businessmen were not interested in information about processes *simpliciter*, which, taken by themselves, constituted subjects too general and indefinite to be of use in a commercial setting: rather, insofar as they sought information about processes, it was always about processes in relation to specific kinds of commodities or particular markets—that is to say, to concretes and countries. Thus Kaiser reasoned, information about processes could not but be subsidiary to information about concretes and countries, which tended to be the primary *loci* of interest for manufacturers and merchants anyway. A later commentator would characterize this view in the following terms: “[t]o the business man the ‘concrete’ is the end-product and the ‘place’ is its market, and the process is of little interest” (Mills, in Mr. Metcalfe and Classification Systems 1954, 89). Although this formulation requires minor adjustment in details (e.g., concretes were more than simply “end-products”), it neatly encapsulates the gulf between the relative importance that Kaiser ascribed to concretes and countries on the one hand and processes on the other for the kind of information analysis that his method of SI underwrote.

Such considerations had implications for determining which of the six possible sequences of categories was to govern the order of terms within a statement. To appreciate this point, it is important to recall that one of the practical functions that the statement fulfilled in SI was that of serving as a filing mechanism: as Kaiser (1911, § 314, point 2) declared, “it provides facilities for arranging the information or filing the cards” in an index. We noted earlier that indexers were to derive statements from individual pieces of information and that the statement characterizing a given piece of information and its amplification—i.e., additional data embodying and/or relating to the information in question—comprised an index item that was entered upon a single unit card (See Section 3 of the current chapter); index items were collocated and filed in accordance with the alphabetical order of the component terms of their statements. This meant, of course, that the initial term in a statement assumed especial importance. It constituted the “first term” or the “main term” of the statement by which the card on which it was inscribed would be filed (Kaiser 1908, §§ 114, 366 s.v. “First term”; 1911, §§ 313, 393), while all the terms that followed it served as subdivisions thereof: that is to say, it formed the primary access point by which the information on the subject to which it referred was to be retrieved. Kaiser’s conviction that concretes and countries represented subjects of direct interest to the users of business indexes, whereas processes were inevitably to be tied to one and/or the other of the former categories and so were of secondary importance, led him to “eliminate the *trade* permutations 5 and 6”, in which [PROCESS] appeared as the first element in the sequence of categories (Kaiser 1911, § 385): he likewise rejected permutations on 2 and 3, in which [PROCESS] figured as the second of the three terms, “on the same grounds”. This process of elimination left what he termed “the two essential permutations” (§ 385), which corresponded to Statement Form [7.3] and its variant, namely,

1. NITRATE-CHILE-TRADE (i.e., [CONCRETE]-[COUNTRY]-[PROCESS])
4. CHILE-NITRATE-TRADE (i.e., [COUNTRY]-[CONCRETE]-[PROCESS])

in which [CONCRETE] and [COUNTRY] each occupied the first or second place in the sequence—that is to say, they were positionally interchangeable—and both preceded [PROCESS] (cf. Metcalfe 1973, 308; Mills 1968, 184).

In Kaiser’s view, the restriction of statement forms to ones in which the first, or main, term of the statement was [CONCRETE] or [COUNTRY] and the third, or final, one was [PROCESS], was beneficial for indexers and users of systematic card indexes alike. For the indexer and his clerical staff, it set a definite limit on the work involved in preparing cards

for a given piece of information. This, Kaiser (1911, § 385 [emphases his]) noted, could be stated in the form of what he characterized as “an absolute rule”: “Write as many cards for each statement as it contains concretes or countries”. The benefits of adhering to this rule and following the prescribed statement forms lay in the fact that “[i]nstead of writing six cards to be filled [sic] in six different places [sci., in an index—TMD], we only write two, and the usefulness of the index will in no way be curtailed” (§ 385), for “the cards will fall automatically into their proper places in the index” (§ 386). In other words, Kaiser prescribed a limited form of multiple entry for each piece of information associated with a statement formed according to the tripartite pattern (Coates 1960, 40; Foskett 1982, 127; Metcalfe 1943, 255; 1965, 45; 1976, 181; Mills 1968, 184; Vlasák 1967, 154–155): any entries beyond this would constitute “useless work” or “unnecessary duplication” (Kaiser 1911, §§ 383, 655).

As for the user, consistent application of these two forms assured that individual index items would be filed—and so would be directly accessible—under main terms representing the two kinds of subjects that would be of greatest interest to him: concretes and countries. Furthermore, it had the virtue of predictability. Kaiser (1908, § 115; cf. 1911, § 433) advised users of a systematic index first “to determine on what concrete or country information is required” and then to search among the guide cards in the index files that signaled each distinct main term in the index (See Sections 5.2 & 5.2.1 of the current chapter). If there was a guide card for the main term by which the user was searching, then all he had to do was to peruse the subdivisions thereof to narrow down his search to the kind of information of interest to him (cf. Kaiser 1911, §§ 434–435, 438). On the other hand, Kaiser (1908, § 115; 1911, § 411, Point 1; cf. §§ 434, 445) noted, “if there is no guide, there is no information” in the index on the particular subject of search (at least as expressed by the term used for the search). In his opinion, rapid ascertainment of the presence or absence of index items pertaining to a given concrete or countries allowed “consultation [to] proceed much more rapidly” (1911, § 411, Point 1) than would be the case with less uniformly patterned statements: efficiency of search was not the least of the advantages to accrue from restricting the order of categories within a statement according to his prescriptions.

Kaiser (1911, §§ 312, 376) considered the tripartite statement consisting of [CONCRETE], [COUNTRY], and [PROCESS] to be the “canonical” form of statement in SI (Svenonius 1978, 137). More specifically, he deemed the version of this form in which the term for concrete served as the main term to be the ideal type *par excellence* (Kaiser 1911,

§§ 302, 313). Kaiser seems to have based this preference largely on theoretical considerations. Although he considered concretes and countries to be subjects of more-or-less equal interest to businessmen, his theoretical accounts of the categories, grounded in the dyadic opposition between concretes and processes, clearly gave greater weight to the category of concretes than to that of countries: the latter category, after all, was but a special case, and derivate, of the former. This privileging of concretes over countries has led one latter-day commentator to make the claim, apparently on the assumption that the subject of any index item was ultimately encapsulated in the main term of a statement, that, in SI, “[a] Statement, its Amplification, and the two taken together as an “index item” are about a concrete. Aboutness applies only to concretes, and all Statements are about concretes” (Svenonius 1978, 138). This interpretation, which finds support in Kaiser’s (1911, § 304, Point 2 [emphases his]; cf. § 308) statement that “[s]tatement and amplification cover the whole information given on a particular concrete”, highlights the fact that, in theory, at least, Kaiser presented concretes as the “core or nucleus or starting point” of his categorial scheme (Metcalfé 1973, 309). However, it is not quite complete, for, as we have just observed, Kaiser treated both concretes *and* countries as subjects—at least, if one understands a subject to be that “on what ... information is required” (Kaiser 1908, § 115; 1911, § 433) and a term for which, accordingly, is used as a main term in a statement.⁴¹⁹ Here, again, we encounter the tension between theory and practice that constantly attended Kaiser’s discussion of his categorial scheme and was largely bound up with his account of the category of countries: whereas, in practice, he treated terms of concretes and countries as equally important components of tripartite statements, his theoretical framework led him to accord the status of *primus inter pares* to the category of concretes alone, while treating countries as a secondary emanation, so to speak, of the privileged category.

⁴¹⁹ Of course, one could also understand a given statement to constitute a complex subject; see, e.g., Coates 1960, 39–41 (who preferred to speak of “compound subjects”); Metcalfé 1973, 309. Such an interpretation is certainly consistent with Kaiser’s (1911, § 304) belief that “the statement gives the approximate limits of the information” that it demarcates (cf. Section 3 of the current chapter). It should be stressed that Kaiser himself did not develop an explicit theory of the subject as such nor did he use the term in a consistent way (cf. p. 220, n. 246, above). Nevertheless, his statements that “information” could be “on” such-and-such a thing or that a statement indicates the limits of the information conveyed by a given piece of text certainly can be mapped onto current understandings of subjects as expressions of “aboutness” at either the level of the term (in the former case) or the statement (in the latter).

Whatever the theoretical vagaries surrounding it, the tripartite form [CONCRETE]–[COUNTRY]–[PROCESS] represented the normative model for formulating a statement in SI (Kaiser 1911, § 303; Svenonius 1978, 137). Nevertheless, Kaiser also permitted the use of two bipartite forms—namely, [CONCRETE]–[PROCESS] and [COUNTRY]–[PROCESS]. With regard to these, he observed that despite the fact that, ideally, a statement should include concrete, country, and process, “experience will show that often no country is given, and sometimes there is apparently no concrete” (Kaiser 1911, § 303; cf. 1908, § 115). His general explanation for the absence of [COUNTRY] or [CONCRETE] in such cases was that

the country is only omitted where the action is not necessarily confined to a particular country, the action may hold good for all or most countries and similarly where the concrete is missing, its character is so general or unmistakable that in ordinary language the process indicates sufficiently the concrete (Kaiser 1911 § 303).

He went on to amplify and illustrate these points for both categories.

Kaiser’s provision that [COUNTRY] might be left out of a statement if the item of information to which the statement was applied discussed a subject pertaining to a number of different countries was consistent with his general predilection for avoiding the unnecessary use of collective geographical terms (Kaiser 1911, § 333; see Section 2.2.5 of the current chapter, esp. p. 369, above). As he observed *à propos* of what he called “an extreme case”, “the term *world* may be used as a collective country” for pieces of information having to do with phenomena occurring on a global scale (Kaiser 1911, § 333 [emphasis his]): however, he argued, so broad a term “will add nothing to our information in the majority of cases and is therefore better left out”. In the same vein, he offered the example of an index item the amplification of which contained the following information:

[In] 1899 [f]or all newspapers of the world it [sci., the amount of paper used—TMD] amounts to about 800,000,000 kgs per year. Out of this quantity about 12,000,000,000 copies are produced. It has been estimated that the quickest printing press would have to work constantly for 333 years to supply the demand for newspapers for one year (§ 498).

For this, he formulated a bipartite statement NEWS PAPER–CONSUMPTION rather than employing a tripartite form such as *NEWS PAPER–WORLD–CONSUMPTION (§ 498). Similar considerations held in the cases of index items involving such subject matter as the description of mechanical devices or electrical equipment (§§ 462–464) or with the corrosive action of a kind of wrapping paper upon metallic items (§ 458–460): these involved information about elementary physical mechanisms or mechanical functions of

concretes that, in principle, would hold good in any locality in the world and for which, accordingly, the specification of geographical locale was deemed to be unnecessary.

The absence of [CONCRETE] from a statement involved a comparable rationale, albeit one presented in a somewhat different manner. We have already seen that one of the core tenets of SI was that terms of concretes were to be derived—directly extracted, preferably—from the text being indexed (See Section 2.2.3 of the current chapter). However, Kaiser (1911, § 322) also envisioned occasions in which extraction would not be possible: despite the fact that the conceptual content of the piece of information being indexed implied that it had to do with a given concrete, the text did not contain any words explicitly naming the concrete itself. In such a situation, an indexer could follow two courses of action. “In some cases”, Kaiser declared, “the term of the concrete has to be supplied, for instance in *transportation in China* the concrete is *freight*, so that the statement will be *Freight–China–Transportation*, although the information only speaks of transportation in China” (§ 322 [emphases his]; cf. § 457). In other words, because a statement of the form *CHINA–TRANSPORTATION would fail to indicate whether the piece of information being indexed was about the transportation of commercial goods or people in, to, or from China—a distinction of considerable importance to businessmen, it was permissible—indeed, necessary—to add the concrete term FREIGHT to specify the object of transportation, a move that obviously resulted in a standard tripartite statement. However, Kaiser added, “[i]n other cases the concrete might be supplied, but as probably nothing would be gained by it, it is perhaps best to neglect it, especially if a country be given” (§ 322; cf., however, § 184). For example, he noted, “our information may speak on *Education in Peru*” in general, “the concrete implied” being “*boys, girls, scholars, etc.*” (§ 322 [emphases his]): in this instance, since the primary point of interest was the general nature of education in Peru rather than the identity of the persons educated there, it would be acceptable to limit the statement to the bipartite form PERU–EDUCATION (§ 346) rather than to expand it to *CHILDREN–PERU–EDUCATION or similar. The only explicit guideline that Kaiser gave for deciding whether to include an implied concrete in a statement or not was that it could be omitted if “its character is so general or unmistakable that in ordinary language the process indicates sufficiently the concrete” (§ 303): examples such as BRAZIL–IMMIGRATION (§ 465), ITALY–EMIGRATION (§ 467), FRANCE–TRADE (§ 346), BRAZIL–LAW (§ 346), and FRANCE–CUSTOMS REGULATIONS (§ 466) illustrate how he applied this in practice.

In light of the preceding discussion, it is evident that bipartite statements are best seen as reduced versions of the basic tripartite model. In effect, statements taking the form [CONCRETE]-[PROCESS] were realizations of an underlying structure *[CONCRETE]-∅-[PROCESS], whereas those formulated according to the template [COUNTRY]-[PROCESS] represented a form *∅-[COUNTRY]-[PROCESS] (or, perhaps better, if one took the variant tripartite form [COUNTRY]-[CONCRETE]-[PROCESS] as a basis, *[COUNTRY]-∅-[PROCESS]). As such, the process of reduction left intact the syntactic rules that Kaiser had stipulated for tripartite statements—namely, that either [CONCRETE] and [COUNTRY] initiate the sequence of categories in a statement and that both categories precede [PROCESS]. By the same token, it resulted in the positional intersubstitutability of [CONCRETE] and [COUNTRY] across the two bipartite forms of statement, at least in the sense that the terms belonging to these categories occupied structurally equivalent positions in the bipartite statements in which they occurred. The surface structural analogy between the respective positions of [CONCRETE] and [COUNTRY] in the bipartite statement forms [CONCRETE]-[PROCESS] and [COUNTRY]-[PROCESS] should not blind us to the fact that, as was the case in tripartite statements, the two categories played quite distinct semantic rôles. In general, [CONCRETE] represented the object in relation to which a process stood, whereas the [COUNTRY] signified the place in relation to which a process occurred: the only exceptions to this rule were bipartite statements featuring terms for discursive processes, such as COTTON GIN ROLLER-DESCRIPTION and COMORO ISLANDS-DESCRIPTION (Kaiser 1911, §§ 462, 516), in which the term in the first position, be it a term for a concrete or a term for a country, denoted the object of a given writer's act of description (See Section 3.3.2 of the current chapter, esp. pp. 438–441, above). For filing and retrieval purposes, however, bipartite statements fulfilled precisely the same *desideratum* that their tripartite counterparts did: in virtue of the fact that [CONCRETE] and [COUNTRY] served as the main filing terms, they provided users with direct access to information about what Kaiser considered to be the primary points of business interest—namely, commodities and countries.

Such, then, were the considerations, both pragmatic and theoretical, that underlay the respective syntactic structures of the three forms of statement that Kaiser prescribed for use within a systematic card index. The unifying feature of these structures, whether the statement be tripartite or bipartite in composition, was that the main, or entry, term was always either a term for a concrete or one for a country, while the process term—notably,

the only category of term to appear in all three statement forms (Metcalf 1973, 308)—consistently stood in last place in the sequence of component terms, functioning as a subdivision for filing purposes. Kaiser (1911, § 648) considered the strict separation of terms of concretes and countries from those of processes and the exclusive use of the former as primary access points and the latter as subdivisions to be a cardinal feature of his indexing method: indeed, he claimed that following this policy helped to reduce “the number of cards” used in an index “to the minimum” and enhanced “the efficiency of the index” as a whole. However, he also acknowledged that there might be exceptional situations in which process terms could serve as filing terms in their own right. For example, Kaiser envisaged a scenario in which an indexer might come across a piece of information in which “no concrete is given” and “the country also is absent or so general that it has little significance” (1911, § 346; cf. 1908, § 115), leaving only process terms available for indexing: in such cases, one had the option of using the latter as independent filing terms. Another, more plausible situation was that of a business specializing in the production or distribution of “one specific commodity” (1911, § 653): because the number of concretes *qua* commodities on which information would be required was reduced—in theory at least—to one, it stood to reason that the intelligence department would opt to “index by processes altogether”. Kaiser also suggested that the same principle could be extended to apply to “an average business”, the intelligence department of which might choose to index by processes at least some of the pieces of information pertaining to its core areas of specialization (§ 654); he assumed that, in this case, the number of process terms employed in this manner would be restricted in size (§§ 446, 654).

Whatever the motivation for incorporating entries indexed by processes rather than concretes or countries into a systematic card index might be, Kaiser insisted that indexers accord special treatment to such entries. In *The Card System* and *Systematic Indexing*, he gave only very general indications of what this would involve. One suggestion was to compile a special list of all the process terms used as filing terms in an index and/or to inscribe index entries employing them on specially colored cards: this was meant to distinguish them clearly from the majority of cards upon which normal index items with statements and so to keep them “absolutely under control” (Kaiser 1911, § 654; cf. § 446; 1908, § 115). Alternatively, one could prepare special guide cards for process terms deemed important enough to serve as filing terms, upon which references were made to all the terms of concretes in the index with which they were associated: this measure would allow

one virtually to collocate information on a process without requiring the creation of full entry cards for the process in question (Kaiser 1911, § 655; Mills 1968, 184). Kaiser (1911, § 655) mentioned these expedients with considerable reluctance, for he firmly believed that “[a]s a rule indexing under process terms means unnecessary duplication” of the sort that his rules for the formation of statements had been intended to obviate in the first place. Moreover, the use of process terms as independent filing terms constituted an exception to Kaiser’s general rule that terms of concretes or countries should function as the access points in a systematic card index; inasmuch as he disliked the idea of making exceptions to rules (cf. Kaiser 1926, 28, § 25), he did not encourage the practice. Yet, he made allowance for it, apparently on purely practical grounds, to accommodate cases in which it might prove desirable, or even necessary, to do so: here, again, he allowed practical considerations to temper his theoretical convictions.

7.3.6. Semantic and Syntactic Limitations of Categories and Statements: Problems and Solutions

One striking aspect of Kaiser’s categorial scheme was its structural parsimony. As we have seen, it consisted of three semantic categories ([CONCRETE], [COUNTRY], and [PROCESS]) into which the entire set of terms used in an index was to be divided in such a way that each term would fall under one, and only one, category (See Sections 2.2.2.4 & 3 of the current chapter). Once categorized, terms could be conjoined in accordance with one of three—in truth, four—officially permitted sequences (i.e., [CONCRETE]–[COUNTRY]–[PROCESS] (and, conversely, [COUNTRY]–[CONCRETE]–[PROCESS]); [CONCRETE]–[PROCESS]; and [COUNTRY]–[PROCESS]) to form the composite index terms, or statements, that both indicated the subjects of the individual pieces of information entered into an index and served as the filing mechanisms by means of which these were collocated and organized (See Sections 3 & 3.5 of the present chapter). Because of its small number of categories and limited set of statement forms, SI’s categorial scheme has often been judged to be “simple” in structure (e.g., Batty 1976, 6; Cleverdon 1960, 53; Rodríguez 1984, 173; Svenonius 2000a, 174). And, indeed, from a formal point of view, it was. Yet its structural simplicity came at a price, for it imposed semantic and syntactic constraints upon how an indexer could mobilize the terms he derived from texts for the purpose of subject indication. Often enough, these constraints did not materially affect one’s ability to categorize terms effectively or to combine them into well-formed statements. However, in certain circumstances, they proved problematic, either because the terms at the indexer’s disposal

could not be easily reduced to the available categories or because the statement forms proved overly confining. Kaiser's own experiences with implementing SI, which led to the addition of "many improvements" over the years (Kaiser 1911, § 20; see Chapter 3, Section 3.3), apparently instilled in him an awareness of some of semantic and syntactic limitations hedging his categorial scheme, for he identified points at which problems arose and proposed solutions for dealing with them. A survey of the problems that he addressed and the remedies that he suggested is instructive, for it shows that, Kaiser combined a certain amount of practical pliability in the resolution of hard cases with an intransigent insistence on maintaining the integrity of the basic structural features of his scheme.

Semantic difficulties arose primarily from the requirement that the categories of concrete and process be mutually exclusive (See Sections 3 & 3.3.2, conclusion). One problem lay in the fact that, in ordinary language, some words could be used to name either a concrete or a process. On this point, Kaiser observed that

[n]aturally one should have thought that there would be distinct names at any rate for concretes and for processes but that is not always the case. Thus the word *organisation* may be either the name of a concrete or a process. In the concrete sense we may speak of the army as *an organisation*, in the process sense we may speak of the work connected with bringing an army into being as *organization* (Kaiser 1911, § 111; cf. § 605).

The categorial polysemy of words such as "organization" was the artifact of a general linguistic phenomenon that one contemporary French linguist called "thickening" or "concretization" (Bréal 1897, 148 with n. 1),⁴²⁰ whereby the meaning of an abstract noun originally signifying an action, quality, or state was extended to cover concrete objects or collective entities as well—a phenomenon the results of which were also well known to the authors of logic manuals, who routinely deprecated the everyday use of terms such as "sensation", "conception", "production", or "definition" to refer indiscriminately to processes or the products thereof (e.g., Fowler 1905, vii–viii; Jevons 1881, 21–22, Joseph 1906, 16; Stock 1888, 9). Needless to say, names of this sort posed a challenge to Kaiser's requirement that, within the framework of a systematic card index, a given index term be assigned to the category of concretes or that of processes, but not both.

There was no lack of possible solutions to the dilemma occasioned by categorial polysemy, many of which were paths that Kaiser did not take. One that he mooted but

⁴²⁰ The original French term was "*épaississement*", glossed as being "*la traduction exacte du latin concretio*".

immediately rejected was using the indefinite article to distinguish “an organization” *qua* concrete from “organization” *qua* process. Such an expedient, he averred, “is of no use for our purposes, unless we are satisfied with an index by articles” (i.e., one where the indefinite article “an” served as the entry word); furthermore, he argued, it failed to cover cases of categorially polysemous nouns such as “engineering”, which did not take an article in ordinary speech in either their concrete or their abstract meaning (Kaiser 1911, § 111). The alternative possibility of employing the plural form to distinguish the concrete signification of a name from the process-related one (e.g., “organizations” vs. “organization”; cf. Fowler 1905, vii) ran aground on Kaiser’s (1911, § 319) insistence that, whenever possible, index terms for concretes should take the singular form (cf. Sections 4.2 & 5.1 of the current chapter, below): moreover, it was inapplicable to nouns, like “engineering”, that did not have a plural form. Another alternative, much used in present-day subject indexing systems, would have been to add parenthetical qualifiers (Aitchison, Gilchrist & Bawden 2000, 33; Frâncu 2003, 180; Svenonius 1990, 94): for example, “the term Organization could be split into Organization (entity) and Organization (process)” (Svenonius 2000a, 142). Now Kaiser (1911, § 321; cf. § 377; 1908, § 102) suggested such a measure as a means of distinguishing the different senses of polysemous terms *within* the category of concretes: for example, he advised that an ambiguous term like “file”, which could either refer to a tool for scraping or to a piece of furniture containing documents, “should be written either—file (tool)—or—file (furniture)—as the case may be, the terms in being explanatory”. However, he seems not to have envisaged using this technique for the purposes of inter-categorial disambiguation.

Ultimately, Kaiser proposed two solutions to the problem of categorial polysemy. In *Systematic Indexing*, he counseled that, when we face “doubts or difficulties in deciding whether a given term should be treated as a concrete or as a process” ..., “we must decide one way or the other and abide by our decision” (Kaiser 1911, § 663, s.v. “Concrete and Process”): the choice of category, he declared, “will depend on individual requirements” (§ 347). In other words, the indexer was to assign a categorially polysemous term either to the class of terms of concretes or to that of terms of processes on the basis of whether he anticipated that it would be more useful as a filing term or a subdivision and, thereafter, to use it consistently in accordance with the original choice. This policy imposed a measure of semantic control upon these terms, for, as one latter-day commentator has justly observed, “in the Kaiser system to define terms as either concretes or processes already limits their

use" (Vickery 1985 [1968], 16).⁴²¹ In a later account of his indexing system, Kaiser (1926, 23, § 11) added a further linguistic refinement, stating that "[t]o avoid confusion, the process should where ambiguous be stated as a gerundive, i.e., "organizing" in place of "organization," because the latter may have a concrete meaning": while not a panacea, this "morphological convention" (Svenonius 1978, 139) resolved the problem for at least certain kinds of categorially polysemous names.

A related, but decidedly distinct, challenge was that of dealing with "names which imply both a concrete and a process" (Kaiser 1911, § 111)—that is to say, single words—usually, but not exclusively, compound abstract nouns—the meaning of which could be analyzed into two semantic elements, one of which signified a concrete and the other, a process. Kaiser (1911, § 184; 1926, 27, § 22) cited, as examples of such bicategorical names, "agriculture", which he broke down into the concrete element "land" (*agri-*) and the process element "cultivation" (*-culture*); "bibliography", which he analyzed into the concrete "book" (*biblio-*) and the process "description" (*-graphy*); and "bacteriology", which he partitioned into the concrete "bacterium" (*bacteri-*) and the process "science" or "study" (*-ology*). Because of their semantic hybridity, bicategorical names obviously contravened the sharp categorial distinction between concretes and processes and so, in Kaiser's estimation, could not be admitted into a systematic index in their natural form without "upset[ting] the entire arrangement", which was based on the principle that terms of concretes and countries are to be subdivided by terms of processes (1926, 27, § 22). His answer to this problem was to decompose such names into separate terms of concretes and processes and to recombine the latter into bipartite statements (Kaiser 1911, § 184; 1926, 27, § 22; cf. Svenonius 1978, 136): thus, "agriculture" was to be converted into LAND-CULTIVATION or similar; "bibliography" could be represented as BOOK-DESCRIPTION; and "bacteriology" could be reformulated as BACTERIUM-STUDY or similar.⁴²² Kaiser (1926, 27, § 22) acknowledged

⁴²¹ Svenonius (1978, 136) has asserted that Kaiser distinguished the different senses of categorially polysemous terms, which she calls homonyms, "syntactically, by means of position", within the framework of indexing statements, since "in an expression in Kaiser's language the name of a process is normally preceded by the name of a concrete". This formulation leaves open the possibility that Kaiser would have countenanced the use of the same term as both concrete and process within the framework of a single index, since position within a statement alone would suffice to indicate its categorial identity: however, his insistence that indexers make a decision regarding ambiguous terms and treat the terms in accordance with that decision clearly indicate that this was not the case.

⁴²² Metcalfe (1957, 240; 1959, 249; 1965, 46; 1976, 181) attributed to Kaiser the transformation of the term "education" into CHILDREN-INSTRUCTION by the same procedure. However, this example, which has been cited by other commentators (e.g., Horner 1970, 149; Mills 1968, 184; Rodríguez 1984, 166), is doubly incorrect. First, Kaiser never formulated such a statement: the closest he came

that he was not entirely at ease with this procedure, for it violated the general principle that one should not “interfere” with terms extracted from a text (See Section 2.2.3 of the current chapter, above; cf. Metcalfe 1965, 46; 1973, 310–311): indeed, he considered the necessity of remolding bicategorical names to constitute one of the “weak points” of SI. Nevertheless, insofar as it preserved the distinction between concretes and processes that he took to be central to the efficient functioning of a systematic index, he accepted it as necessary evil.

Kaiser’s treatment of bicategorical names has garnered much attention from later theorists of KO, who have seen in it an early version of the indexing technique known as “semantic factoring” (e.g., Bakewell 1972, 261; Foskett 1982, 127; Svenonius 1990, 93; 2000a, 141).⁴²³ This involves analyzing a conceptually complex term into its elementary conceptual components and using a combination of terms denoting these in its stead; to take a standard example, the word “thermometer” can be taken to represent the complex concept [*DEVICE FOR THE MEASUREMENT OF TEMPERATURE*] and so be resolved into component terms—*in casu*, *DEVICE*, *MEASUREMENT*, and *TEMPERATURE*—which can then be arranged according to some syntactic order and even represented notationally, if need be, so as to represent the notion originally conveyed by “thermometer” (e.g., Foskett 1982, 70; Perry, Kent, & Berry 1956, 86). As with other forms of semantic factoring, Kaiser’s

to doing so was to note that the process term *EDUCATION* implied the concrete “*boys, girls, scholars* etc.” (Kaiser 1911, § 322 [emphases his]). Second, a morphological feature of bicategorical terms common to the examples advanced by Kaiser was that they were compound terms consisting of a noun-derived root (*agri-*, *biblio-*, *bacteri-*) and an abstract suffix, interpreted as expressing a verbal concept (*-culture*, *-graphy*, *-ology*): this was not accidental, for Kaiser derived the resultant component terms *etymologically* from the roots and suffixes of his terms. “Education”, however, does not follow this pattern, for it is formed from a verbal root (*educ-* < *educere* “to lead out”) and an abstract noun suffix (*-tion*), and so is a pure process term, not a bicategorical one. Thus, in stating that “education” implied a concrete term referring to children or students, Kaiser was not decomposing it into its component units but rather pointing out that a concrete term could be supplied to indicate its object: needless to say, the suppletion of a concrete term for a process term is quite distinct from deriving one etymologically from one of the latter’s morphological component.

⁴²³ One should note that the technical term “semantic factoring” (and the conceptualization that it expresses) derive from the discourse of information retrieval of the 1950s and 1960s. It appears to have developed from the phrase “semantic factor”, apparently originally coined by J. W. Kuipers (so Wagner 1960, 115, s.v. “semantic factor”) and popularized by Allen Kent and James Perry, the leaders of a project, based at the CDCR (Center for Documentation and Classification Research) at Western Reserve University (WRU), to develop a machine literature searching system. Perry and Kent used it to refer to one of the components of the complex, notationally expressed index terms used in their so-called semantic code (for summary accounts of which see, e.g., Gilchrist 1971, 30–33; La Barre 2007, 138–140; Lancaster 2003, 192–196; Melton 1962; Vickery 1959; comprehensive discussion in Perry, Kent, & Berry 1956; Perry & Kent 1958): thence it became a general term within the realm of thesaurus construction (Aitchison, Gilchrist, & Bawden 2000, 43; Broughton 2006b, 93–94; Lancaster 1986, 54; Soergel 1974, 74–78). An alternative term used by Vickery (1965, 40–41) to denote the same procedure was “analysis by definition”.

resolution of bicategorical names into concretes and processes has been subjected to criticism on two grounds. First, to represent commonly used words such as “agriculture” with artificial expressions such as LAND–CULTIVATION was to violate the norms of common linguistic usage (e.g., Metcalfe 1957, 240–241; Olding 1966, 143; 1969, 100; Svenonius 2000a, 141) and so, it is claimed, would have imposed a burden on users of a systematic index, who would have had to make the adjustment from familiar words to an unfamiliar statements in searching for information (Milstead 1984, 159; Sharp 1967, 162).⁴²⁴ Second, to transform a word such as “agriculture” into LAND–CULTIVATION was to substitute for it an expression that severely reduced its meaning in comparison to its signification in ordinary discourse (Metcalfe 1973, 311; Svenonius 1990, 93; 2000a, 141–142).

Kaiser (1911, § 330) was generally aware that the presence of terms deviating from “accepted usage” in an index is problematic but maintained a discreet silence about it, at least with regard to the decomposition and reconstitution of bicategorical names. With regard to the question of semantic reduction, he took a different perspective from that of his modern critics, which he outlined in his final exposition of SI. Although he admitted that splitting up bicategorical names into component terms was hardly ideal, he did not deem the matter to be “serious”, for almost all the names treated in this manner “are of such a general character that they rarely come up for indexing” anyway (Kaiser 1926, 27 § 22). By this, he meant that such names tended to refer to very broad areas of human endeavor or to departments of knowledge and as such, were too broad to be useful in an indexing system designed to focus on specific subjects (cf. 1926, 29, § 30). Indeed, he claimed, there was an argument to be made “that “using the axe” tends to improvement” in an index (Kaiser 1926, 27, § 22). This he laid out in the following terms:

Agriculture implies a host of things. It is of no use in an index. Much better to split it up into “LAND...cultivation,” “CATTLE...raising,” etc. Or take a somewhat extreme case, Zoological Geography, also known as Geographical Zoology. These subjects contain two concretes and two processes each; they may be translated “animal-discussing description of the earth,” or “globe-describing animal study.” Why is the plain English “ANIMAL ... distribution” not satisfactory? It is shorter, more manageable, and has a more definite meaning. I will readily admit the euphony of the Greek terms, but one would hardly put down the plain English as a cacophony.

⁴²⁴ As Metcalfe (1957, 240; 1959, 299; 1965, 45) has insinuated, the problem of translation could, in principle, have been partially alleviated by including the original bicategorical name within the index as a lead-in term, with cross-reference to the statement(s) formed from it. However, there is no indication that Kaiser did so.

In filing euphony is of no assistance whatever; simplicity is what makes a large index manageable; complicated terms like these usually make good hiding places in an index for all kinds of information of doubtful meaning and utility (1926, 27, § 22).

As this passage indicates, Kaiser considered semantic reduction to be a boon rather than a bane, for it allowed the indexer to specify more distinctly and concretely the content of the pieces of information being indexed than would be the case if he used broad terms like “agriculture”. In his view, such abstract terms covered a wide array of phenomena and accordingly their meanings were more diffuse and indefinite than those conveyed by the names of specific kinds of objects, or concretes; thus, it was necessary to cut them down to size. Kaiser’s proposed decomposition of “agriculture” into LAND–CULTIVATION was, as he himself admitted, based largely on etymology as were his other examples (1926, 27, § 21; cf. Section 2.2.1 of the current chapter, pp. 328, n. 304, above). Nevertheless, his insinuation that the same name could also be split up into CATTLE–RAISING and, presumably, other statements (“etc.”) indicates that he did not consider etymology to be the sole criterion for semantic analysis: accordingly, the indexer could express in the resultant statement that particular aspect of agriculture with which a given piece of information dealt and so achieve a greater measure of definiteness in representing its informational content. To be sure, a statement such as ANIMAL–DISTRIBUTION failed to indicate the fact that “zoological geography” and “geographical zoology” were sciences: however, it did signal, in a straightforward manner the object of these sciences. An important consequence of this form of semantic reduction was that it effectively banished from the index most, if not all, of what general librarians would have called “abstract general subjects” (Cutter 1876a, 15; 1904, 23; cf. Section 3.3.1 of the present chapter, esp. p. 391) or “abstract classes” (Brown 1898, 95; cf. Section 3.3.4 of the current chapter, esp. p. 462)—that is to say, subjects referring to departments of knowledge and practice, replacing them with statements centered on terms of concretes representing (kinds of) things in the world. Kaiser thus took what, in the present-day parlance of KO, is called an “ontological”, or phenomenon-oriented, approach to knowledge organization, one that contrasted sharply with the “epistemological”, or discipline-oriented, approach thereto routinely used in contemporary book classification schemes (Dousa 2010, 15; Gnoli 2008a, 100–101; 2011, 30).

Although Kaiser employed semantic factoring as a technique in SI, he did not do so consistently, for he also identified certain bicategorical names that were to be left intact. These were names pertaining to payment of money, namely PRICE and WAGES (Kaiser 1911, § 325). PRICE, in Kaiser’s view, could be interpreted as signifying an exchange of a

commodity for money: for example, “The *price of coal* implies the *exchange of coal* and the *exchange of money*” (§ 325 [emphases his]; cf. § 347). Similarly, WAGES referred to the exchange of money for labor and so was “equivalent to the *price of labour*” (§ 325 [emphases his]). Such an analysis, however, led to syntactic difficulties, for it could not be represented within the structure of a well-formed statement in SI: it involved a single process (*in casu*, exchange) standing in a single relation to two concretes (*in casu*, money and labor), whereas the relevant statement form [CONCRETE]–[PROCESS] allowed for the presence of one concrete term only.⁴²⁵ Thus, in the case of the price of coal, Kaiser noted, “logically we should have to index the two concretes” as COAL–EXCHANGE and MONEY–EXCHANGE and, by the same token, “wages ... contains two statements, *labour–exchange* and *money–exchange*” (Kaiser 1911, § 325). This move, however, entailed distributing the results of the analysis across two statements, neither of which would represent all of the semantic components of the complex notions represented by PRICE or WAGES: as a result, the latter would simply evanesce from the index, leaving in their wake partial and confusing representations. Accordingly, Kaiser concluded that splitting the term in such cases “would be going too far for our purposes” and recommended that indexers use PRICE, WAGES, and other comparable money-related terms in their usual form (§ 325).

There remained, then, the problem of finding a place for these bicategorical names within a categorial structure into which they did not, strictly speaking, fit. Here, Kaiser invoked the same rule that he did for categorially polysemous names, decreeing that PRICE (and related names) could be treated either as terms of concretes or terms of processes (Kaiser 1911, §§ 325, 347). Again, he left the category assignment of such terms as “a matter to be decided according to the requirements of each individual case” (§ 325), though, for his part, he tended to treat PRICE as a process term (§ 530) and to decompose WAGES into LABOUR–PRICE (§ 476) alone. If Kaiser’s insistence that terms like “agriculture” be partitioned into their component elements betokened both an impulse to conform bicategorical names to the requirements of the categorial system of SI and a desire to exclude from indexes terms that he found too general to be useful, his treatment of PRICE and related terms represented a more tempered, pragmatic approach that retained commitment to the system but acknowledged its limitations. When the syntactic structures of the categorial system proved too

⁴²⁵ Coates (1960, 42) noted a further ramification of this limitation that Kaiser did not discuss: if WAGES were the equivalent of LABOR–PRICE and one wished to apply this analysis to a statement such as WAGES–INCREASE, the result would be *LABOR–PRICE–INCREASE, a tripartite statement that clearly violated Kaiser’s rules for statement forms.

constrained to deal adequately with the semantic analysis of a bicategorical name that Kaiser considered to have indexing value for his chosen domain of business literature, he adopted a compromise solution whereby the term would not be decomposed into its categorial components but assigned to that category within the system where it would be most useful for indexing purposes: in this case, considerations of practical utility outweighed those of theoretical consistency.

The syntactic difficulties surrounding the representation of PRICE and its congeners were symptomatic of a more general limitation that hedged the categorial system—its structural incapacity to indicate the relationship between two concretes within the compass of a single statement (Vickery 1950b, 221; 1950b, 144; Vlasák 1967, 154, 155). Kaiser (1911, § 327; cf. § 304) fully recognized this limitation, writing that “[w]hen two concretes appear in the same item [sci., the piece of information—TMD], they must be separated into two statements”. As an example, he cited the complex noun phrase “the *use of water power to generate electricity*” (§ 327 [emphases his]), which he resolved into the statements WATERPOWER–APPLICATION and ELECTRICITY–GENERATING. For each of these, the information relating to the concrete that could not be included in the statement would have to be “completed in the amplification” accompanying it (§ 327). Thus, the text of the amplification to the statement WATERPOWER–APPLICATION would have to give the information that waterpower was being applied to generate electricity, while, conversely, that of the amplification to the statement ELECTRICITY–GENERATING would have to state that the electricity was being generated by means of waterpower: most likely, the same amplification would be used in conjunction with both statements (cf. § 305).

Although the use of the amplification to fill out the information that could not be included in the statement constituted a workaround that allowed the indexer to respect the structural constraints of statement forms, it was far from ideal. For one thing, it meant that there was a limit to a statement’s collocative power: for example, Kaiser’s sample statements would have required those users of an index interested in information on hydroelectric power to search through all the cards containing pieces of information indexed with WATERPOWER–APPLICATION and all those collocated under ELECTRICITY–GENERATION to find those items on their chosen subject rather than taking them directly to those cards on the generation of electricity through waterpower alone. Relatively unproblematic in a small index file with only a few index items under each statement, this lack of collocative granularity would have resulted in more onerous searches as the number of

entries under each statement increased. Furthermore, the requirement that two statements be made for a single piece of information containing two distinct concretes required that it have multiple entries in the index, albeit under different filing terms (Metcalf 1973, 309–310; 1976, 181), thus contributing to the duplication that he so disliked.

Another, more effective way in which Kaiser dealt with the structural limitations of statements was to permit the use of complex phrases containing the names of two concretes as a single term for concrete. Such phrases, however, were restricted to one or the other of two special kinds of concrete terms—namely, those connected with money or labor (cf. Section 3.1.2 of the current chapter). About these he stated that, “[t]erms of money and terms of labour are frequently brought into combination with other concretes in such expressions as *import duty on machinery, skilled labour in the iron industry etc*” (Kaiser 1911, § 329). To terms such as these, which took the grammatical form of noun phrases with prepositions, were to be added others, such as “tea duty”, “tobacco tax”, and “wine traveller” (i.e., a travelling salesman dealing in wine), in which a noun signifying a money- or labor-related notion (*in casu*, “duty”, “tax”, and “traveller”) was modified by a preceding noun indicating a commodity (*in casu*, “tea”, “tobacco”, and “wine”, respectively). Kaiser regarded both grammatical forms of terms as having a common semantic structure: “the terms of labour and money are the real concretes, the terms of merchandise qualifying or specifying them” (§ 329). Yet he did not consider them equally suitable for indexing purposes. Whereas the terms in which a noun modified a noun represented a common and unexceptional pattern in the formation of multiword concrete terms (§ 317), those featuring noun phrases with prepositions were more problematic. Kaiser found the latter uncongenial because, as a rule, he believed that “prepositions are apt to create confusion in filing”: accordingly, he held that “[p]repositional terms should be avoided wherever possible” on the grounds that (§ 324). Unsurprisingly, then, he considered it appropriate to alter the grammatical structure of these terms—yet another exception to the general principle that terms of concretes extracted from texts were not to be altered (See Section 2.2.3 of the present chapter).

Kaiser proposed two alternative ways in which terms with prepositional forms could be reformulated. With regard to the first, he wrote, “[t]he terms of labour or money are combined with the qualifying terms of merchandise to form one term each” (Kaiser 1911, § 330). This involved, in effect, transforming a phrase of the form “[NOUN PHRASE₁] [PREPOSITION] [NOUN PHRASE₂]”, in which [NOUN PHRASE₁] was a term for labor or

money and [NOUN PHRASE₂] was a term for merchandise, into one of the form “[NOUN PHRASE₂] [NOUN PHRASE₁]”: for example, the phrase “import duty on machinery” would be rendered as MACHINERY IMPORT DUTY (§§ 329 & 330, Point 1; cf. § 324). Kaiser found this method to be “quite logical” (§ 330), doubtless because it resulted in a form analogous to that of phrases in which a noun signifying a money- or labor-related notion was modified by a preceding noun representing a commodity of some sort. Nevertheless, he put his finger on an important difference between terms altered in this manner and forms, such as TEA DUTY, taken directly from ordinary language:

We are all familiar with such terms such as *tea duty*, *tobacco tax*, *wine traveller* etc. But while custom sanctions these terms it only does so apparently because they are simple cases. Such terms as *machinery import duty*, *textile works female labour*, *cattle farm unskilled labour* etc although they belong logically to the same category as the shorter terms, sound unfamiliar and even paradoxical (§ 329).

In other words, the transformed versions of the original “prepositional terms” (§ 324) yielded “unfamiliar combinations” of words that “sin[ned] against accepted usage” (§ 330), a fact that Kaiser ascribed to their comparative length. As for the second method, Kaiser described it as one in which “[t]he terms of labour or money are taken as the terms of the concretes, and the qualifying terms of merchandise are added in brackets” (§ 330): this created forms like IMPORT DUTY (MACHINERY), LABOUR (TINPLATE), and similar.⁴²⁶ Here, too, Kaiser cautioned, it was necessary to depart from “combinations sanctioned by usage” (§ 330). Moreover, such forms were akin to “inversions”—that is to say, they introduced an element of classification internal to the term, since, in filing, LABOUR (TINPLATE), LABOUR (FLAX YARN), and so on would collocate information about different kinds of labor under the head noun LABOUR much as COINS, COPPER, COINS, SILVER, and so on would collocate information about different kinds of coins under the head noun COINS—and inversions, in his view, “should be strictly avoided” (§ 330; cf. Section 4.2 of the current chapter, esp. p. 513, with n. 450 below). On the other hand, Kaiser observed, the use of “brackets”, or parentheses, assimilated terms formed in this manner to those requiring parenthetical qualifications for the purposes of disambiguation (§ 330; cf. § 317), which were perfectly licit.

⁴²⁶ In *The Card Index*, Kaiser (1908) also included forms linked with hyphens such as PROFIT-WIRE (§ 118). One idiosyncratic feature of the examples that he gave in this earlier publication deserves comment: in the case of compounds of this sort, he allowed the indexer to invert the expression so that a concrete term PROFIT-WIRE could also be expressed as WIRE-PROFIT or, more dubiously, FOREIGN COMPETITION-GRANITE could be expressed as GRANITE-FOREIGN COMPETITION (§§ 118, 235–236). For discussion of the probable reason for this, see p. 502, n. 435, below.

Neither of the two methods, then, could escape the problem of violating common usage. Kaiser (1911, § 330) accepted this as a price to be paid if prepositional formulations were to be avoided, concluding that either method could be legitimately used, provided that it was applied consistently. In theory, he favored the first method, which, he told his readers, “will undoubtedly give the best results” (§ 330). Yet, in practice, it was the second that he adopted: among the statements given as examples in *Systematic Indexing*, one finds IMPORT DUTY (GROUND WHITE LEAD)–AUSTRALIA–EFFECT (§ 477) and LABOUR (FLAX YARN)–FRANCE–PRICE (§ 476), a pattern routinely followed in the index files of the Tariff Commission (e.g., INCOME TAX (LINOLEUM)–FRANCE–EFFECT; ROYALTIES (PIG IRON)–FRANCE–AMOUNT; LABOUR (WOOLLEN YARN)–GERMANY–CONDITIONS; and TRUSTS (WORSTED YARN)–UK–FAILURE),⁴²⁷ though dashes were sometimes used instead of brackets as, for instance, in IMPORT DUTY–JUTE YARN—SPAIN—EFFECT.⁴²⁸ Needless to say, this technique allowed the indexer to weld together two separate terms for concretes into a single “compound concrete term[]” (§ 476) and so to express, in a highly compressed form, the relationship between two different concretes within the single position allotted for this category in the syntactic structure of a statement. Here, then, was a way in which to elude, at least to a limited degree, the structural limitations of SI’s statement forms: it is unsurprising that, in the Tariff Commission’s files, Kaiser occasionally extended its use to terms of concretes having little to do with money or labor, as in the cases of PATENT

⁴²⁷ See TCP 5/2/7, Index to Questionnaires for Hemp, Jute and Linen Fibres, Index card, INCOME TAX (LINOLEUM)–FRANCE–EFFECT ... F3553/10, n.d.; TCP 5/2/9, Index to Iron and Steel Evidence, Index cards, ROYALTIES (PIG IRON)–FRANCE–AMOUNT ... E3449, n.d.; TCP 5/2/19, Index to Woollen Questionnaires, Index cards, LABOUR (WOOLLEN YARN)–GERMANY–CONDITIONS ... F2477/6; TRUSTS (WORSTED YARN)–UK–FAILURE ... 2415/7, n.d.. On the interpretation of trusts, or combinations of companies, as a term for labor, see p. 410, n. 358, above.

⁴²⁸ See TCP 5/2/7, Index to Questionnaires for Hemp, Jute and Linen Fibres, Index card, IMPORT DUTY–JUTE YARN—SPAIN—EFFECT ... F2292/7, n.d.. Both the Index to Questionnaires for Hemp, Jute and Linen Fibres (TCP 5/2/7) and the Index to Woollen Questionnaires (TCP 5/2/19) contain numerous examples of the form with a dash, always used in conjunction with the head noun IMPORT DUTY: evidence from cards from other files indicate that DUTY and phrases formed with it routinely took a dash; yet other examples in *The Card Index*, such as PROFIT–WIRE and RAILWAY RATES–GRANITE, demonstrate that other terms could take the hyphen as well (Kaiser 1908, §§ 118, 235–236).

(HOSIERY YARN),⁴²⁹ FREIGHT (WORSTED GOODS)⁴³⁰ and even CATALOGUE (MACHINERY).⁴³¹

Kaiser also made provisions for expressing relations between different countries, a point of especial importance for an organization such as the Tariff Commission, whose researchers were interested, *inter alia*, in analyzing trade relations between the United Kingdom, its colonies, and its foreign competitors (See Chapter 5, Sections 2 & 3, above). His mechanism for doing so was to create statements in which the slot for the country term was occupied by the names of two countries connected by a hyphen, such as JAPAN-MEXICO or UK-USA. According to Kaiser (1911), the “hyphen [was] used to symbolise connection between the two countries” (§ 341; cf. § 377): it also distinguished such expressions from those denoting a country and its subdivision, such as UK, LONDON, in which a comma separated the two elements (See Section 3.2 of the current chapter). The convention of connecting two countries’ names by means of a hyphen was most often used in conjunction with terms of processes involving movement of things from one point to another, such as EXPORT, IMPORT, TRANSPLANTATION, MIGRATION, and DUMPING,⁴³² the last of which was a technical term signifying the sale of goods manufactured in one country in another at a price below the original cost of production—a phenomenon of great concern to members of the Tariff Commission and other proponents of tariff reform, who firmly believed, and sought to prove, that a flood of cheap imports from foreign competitors was subverting the domestic industries of the United Kingdom (Green 1995, 226–229; Marrison 1996, 150–156; Tariff Commission 1904, §§ 62–66; 1907b, §§ 7–8; Tariff Dictionary ... 1904, 69–71, s.v. “Dumping”). In such cases, Kaiser (1911, § 342) stipulated, “the process applies to the first term” of the two-country dyad, a precept which he explained with the example that “export from USA to UK should be stated USA-UK ... export, if export from UK to USA, then UK-USA...export”: thus, the statement WOOLLEN GOODS—UK-UK, COLONIES—EXPORT signi-

⁴²⁹ See TCP 5/2/19, Index to Woollen Questionnaires, Index card, PATENT (HOSIERY YARN)-UK-LAW... F2142/10, n.d.

⁴³⁰ See TCP 5/2/19, Index to Woollen Questionnaires, Index card, FREIGHT (WORSTED GOODS)-GERMANY-EXPORT RATES... F10626/11, n.d.

⁴³¹ See TCP 5/2/9, Index to Iron and Steel Evidence, Index card, UK, NEWARK-CATALOGUE (MACHINERY)-TRANSLATIONS ... E2598, n.d.

⁴³² For EXPORT and IMPORT, see Kaiser 1911, § 342. For TRANSPLANTATION, see TCP 5/2/9, Index to Iron and Steel Evidence, Index card, BLACK PLATE WORKS—UK-ITALY—TRANSPLANTATION ... E1341–1345, n.d.. For MIGRATION, see TCP 5/2/9, Index to Iron and Steel Evidence, Index card, TINPLATE WORKS—UK-USA—MIGRATION ... E3658, n.d.. For DUMPING, see, e.g., TCP 5/2/7, Index to Questionnaires for Hemp, Jute and Linen Fibres, Index card, HEMP TWINE—GERMANY-UK—DUMPING ... F3248/17, n.d.

fied the export of woollen cloth from the United Kingdom to its colonies,⁴³³ while JUTE YARN—GERMANY—UK—DUMPING indicated the dumping of jute yarn manufactured in Germany into British markets and USA—UK—STEEL—DUMPING referred to the dumping of steel from the United States into the United Kingdom.⁴³⁴

Kaiser (1911, § 341) held that, as a rule, when relations between two countries were expressed in this manner, “both should be indexed and the information should be brought out under each respectively”. Thus, for instance, a statement taking the form UK—USA—MACHINERY—EXPORT, in which the initial name of the two-country dyad, UK, functioned as the main term, would also be indexed as USA—UK—MACHINERY—IMPORT, in which the order of the elements in the dyad was inverted so that USA could serve as the main term (§ 342). The attentive reader will note that this required altering the process term—*in casu*, from EXPORT to IMPORT—so that it continued to contract its primary semantic bond with the first term in the dyad (*in casu*, “export from UK to USA” became “import to USA from UK”). Such a transformation could be readily carried out with process terms that expressed inverse relations, as was the case with EXPORT and IMPORT, but was much less tenable for terms such as TRANSPLANTATION and DUMPING, which lacked suitable inverse correlates; Kaiser did not address these hard cases in *Systematic Indexing* and it is not clear how he dealt with them in practice. At any rate, statements containing two-country dyads typically were tripartite in composition and so required multiple entry with separate statements headed by the name of each country as well as the relevant concrete: for example, a single piece of information on the export trade in electric traction motors from Italy to France would require the following three statements (§ 386):

1. ELECTRIC TRACTION MOTOR—ITALY—FRANCE—EXPORT TRADE
2. ITALY—FRANCE—ELECTRIC TRACTION MOTOR—EXPORT TRADE
3. FRANCE—ITALY—ELECTRIC TRACTION MOTOR—IMPORT TRADE⁴³⁵

⁴³³ See TCP 5/2/19, Index to Woollen Questionnaires, Index card, WOOLLEN GOODS—UK—UK, COLONIES—EXPORT... F6564/9, n.d.

⁴³⁴ See TCP 5/2/7, Index to Questionnaires for Hemp, Jute and Linen Fibres, Index card, JUTE YARN—GERMANY—UK—DUMPING ... F10607/5, n.d.. On jute, see p. 443, n. 397, above.

⁴³⁵ For a comparable example, see Kaiser 1908, § 118, 4th through 6th cards from bottom of picture. Note also that the bottommost three cards in that picture follow the same pattern but with the two elements of a composite concrete term as the object of inversion rather than the (single) country in the statement: PROFIT—WIRE—UK, WARRINGTON—FLUCTUATION, WIRE—PROFIT—UK, WARRINGTON—FLUCTUATION, and UK, WARRINGTON—WIRE—PROFIT—FLUCTUATION. This latter application of the pattern, which would not be mentioned in *Systematic Indexing*, is yet another indication of the close connection in Kaiser’s mind between concretes and countries: not only were these

The two-country dyad gave indexers a means by which to work around the syntactic limitations of the statement forms, expanding the number of countries that could be represented within a single statement from one to two. Yet, even here, the indexer faced certain constraints. Whereas he was free to use the device to express relations between two countries (e.g., USA–UK), a country and its colonies (e.g., UK–UK, COLONIES),⁴³⁶ or a country and a continent (e.g., UK–S(OUTH) AMERICA),⁴³⁷ he could not do so if he desired to indicate a relationship between a city or other subdivision of one country and that in another. Here, Kaiser outlined two courses of action. On one hand, the indexer had the option of ignoring the subdivisions and creating a statement with the names of the countries alone (Kaiser 1911, § 341). On the other, Kaiser counseled, “if it is desired to bring out the subdivisions, then each country with its own subdivision may be taken separately and the second one transferred to the amplification” (§ 341). On this score, he gave the example of a piece of information on “the textile trade between Bradford [in the United Kingdom—TMD] and Chemnitz [in Germany—TMD]” (§ 341): this would require the preparation of two separate statements—namely, UK, BRADFORD–TEXTILE–TRADE and GERMANY, CHEMNITZ–TEXTILE–TRADE—, with the former accompanied by an amplification mentioning Chemnitz and the latter by one mentioning Bradford.⁴³⁸ Similarly, he stipulated that “[i]f several subdivisions are given for a country (*UK, London, Birmingham, Manchester, etc*) a separate statement is required for each if detailed indexing is desired, otherwise all the subdivisions may be transferred to the amplification” and the name of the country alone incorporated into the statement (§ 342 [emphases his]). Although Kaiser did not set forth a rationale for imposing these limitations on the granularity of geographical entities named within the two-country dyad, he appears to have done so primarily for syntactic reasons, namely to avoid the creation of statements with long and unwieldy [COUNTRY] elements such as *UK, BRADFORD–GERMANY, CHEMNITZ.

Finally, we come to terms of processes. Kaiser did not set forth any explicit guidelines in *Systematic Indexing* for representing complex relationships within the [PROCESS] element

categories positionally interchangeable in a statement, but composite terms for each could, in certain circumstances, be subjected to the same form of intra-categorical syntactic inversion.

⁴³⁶ See TCP 5/2/19, Index to Woollen Questionnaires, Index card, WOOLLEN FABRIC—UK–UK, COLONIES—EXPORT... F10451/4, n.d.

⁴³⁷ See TCP 5/2/19, Index to Woollen Questionnaires, Index card, WOOLLEN GOODS—UK–S. AMERICA—EXPORT... F6564/9, n.d.

⁴³⁸ Of course, each of those statements would require the construction of a separate one in which the [COUNTRY] and [CONCRETE] terms were reversed, yielding four separate statements for a single piece of information.

of a statement, as he did for [CONCRETE] and [COUNTRY]; nevertheless, as the index files of the Tariff Commission show, he found ways of expressing them, if need arose. As a rule, terms of processes tended to be “much simpler in structure” than those for concretes (Mills 1968, 184). Yet even a syntactically unprepossessing term such as EXPORT DECLINE in the statement WOOLLEN GOODS—UK—INDIA—EXPORT DECLINE represented a complex notion combining two distinct processual notions—namely, a decline in export trade (or, in concrete terms, a decline in exports):⁴³⁹ in its form, it presented a clear analogy to the terms of concretes in which one noun modified another. On occasion, the verbal expression occupying the [PROCESS] position in a statement exhibited a more complex syntactic structure, such as EFFECT ON MANUFACTURE in IMPORT DUTY—WOOLLEN GOODS—EFFECT ON MANUFACTURE.⁴⁴⁰ This and similarly formed expressions typically brought the process term EFFECT into relation with other process terms, such as EMPLOYMENT and SECURITY, as well as with bicategorical terms treated as processes, such as PRICES and WAGES.⁴⁴¹ Prepositional combinations of this sort, however, appear to have been largely limited to ones with the head noun EFFECT, which could also occur as a simple process term, as in the statements IMPORT DUTY (GROUND WHITE LEAD)—AUSTRALIA—EFFECT (Kaiser 1911, § 477) and JUTE TRUST—EFFECT.⁴⁴² Interestingly, despite the fact that Kaiser professed no less a dislike for the use of prepositions in terms of processes than in those for concretes (§ 345), he does not seem to have made any effort to transform the prepositional process terms in the Tariff Commission’s indexes into forms such as *EFFECT (MANUFACTURE) or *EFFECT (PRICES); with them, he hewed to common usage.

The preceding uses of terms of processes respected the syntactic boundaries necessary to create a well-formed statement in accordance with the forms prescribed by Kaiser in *Systematic Indexing*. However, the files of the Tariff Commission provide evidence that, in

⁴³⁹ See TCP 5/2/19, Index to Woollen Questionnaires, Index card, WOOLLEN GOODS—UK—INDIA—EXPORT DECLINE ... F6566/2, n.d.. See also the discussion of the process term TRADE DECLINE in Section 3.3.2, pp. 436 with n. 383, above.

⁴⁴⁰ See TCP 5/2/19, Index to Woollen Questionnaires, Index cards, IMPORT DUTY—WOOLLEN GOODS—EFFECT ON MANUFACTURE ... F2772/18, n.d.

⁴⁴¹ See, e.g., TCP 5/2/19, Index to Woollen Questionnaires, Index cards, IMPORT DUTY—ANGOLA YARN—UK—EFFECT ON EMPLOYMENT ... F4015/6, n.d.; IMPORT DUTY—ALPACA GOODS—UK—EFFECT ON SECURITY ... F6512/6, n.d.; IMPORT DUTY—ANGOLA YARN—UK—EFFECT ON PRICES ... F4015/6, n.d.; IMPORT DUTY—HOUSE FLANNEL—UK—EFFECT ON WAGES ... F1977/6, n.d.. Note that the term for concrete ANGOLA YARN refers to a yarn composed of a mixture of wool and cotton (Curtis 1921, 7; Harmuth 1920, 7), while HOUSE FLANNEL refers to a kind of low-quality flannel cloth used as scrubbing rags (e. g., Murché 1897, 141); on ALPACA GOODS, see p. 436, n. 382, above.

⁴⁴² See TCP 5/2/7, Index to Questionnaires for Hemp, Jute and Linen Fibres, Index card, JUTE TRUST—EFFECT ... F3471/14, n.d.. On trusts as concretes, see p. 410, n. 358, above.

practice, such boundaries were occasionally breached. A cardinal example of this is the treatment of the process term DUMPING, which, as we have just seen, represented a concept of central importance to the Commission. As one would expect, this term routinely occupied the [PROCESS] position within the structure of the statements in which it was used, as, for instance, in USA-UK—STEEL—DUMPING, TWINE—AUSTRIA-UK—DUMPING, and JUTE GOODS—GERMANY—DUMPING.⁴⁴³ However, not infrequently, it was placed in the [CONCRETE] slot of a statement, augmented by a term for a commodity attached to it by a hyphen, as if it were a term for money or labor: examples, the number of which could easily be multiplied, include DUMPING—WORSTED VELVET—UK—EXAMPLE; DUMPING—IRON & STEEL—UK, S. WALES—DURATION; DUMPING—IRON & STEEL—USA-UK—POLICY; and DUMPING—IRON TUBE—GERMANY-UK—METHOD.⁴⁴⁴ In all these latter cases, DUMPING stood in relation with another process term (*in casu*, EXAMPLE, DURATION, POLICY, and METHOD): yet, the choice was made to treat it as a term for a concrete rather than to incorporate it into a composite process term, such as *DUMPING METHOD or *DUMPING (POLICY). It is unclear whether this decision was motivated by a desire to use DUMPING as a main filing term because it expressed a particularly important concept for the Commission or by an unwillingness to make it part of a composite process term for fear that this would unduly obscure its relation to the country terms with which it stood in close semantic connection: however this may have been, the presence of a second process term in a statement containing it led to its placement in a position that, strictly speaking, violated the norms of SI. This is not the only case of anomalous formulations of statements within the Commission's index files: examples such as FANCY YARN—UK—COMPETITION FROM GERMANY and RAILWAY RATES—GRANITE—UK—ASSIST FOREIGNERS show, respectively, that the names of countries (*in casu*, GERMANY) and concretes (*in casu*, FOREIGNERS) could

⁴⁴³ See TCP 5/2/9, Index to Iron and Steel Evidence, Index card, USA-UK—STEEL—DUMPING ... E2261, n.d.; TCP 5/2/7, Index to Questionnaires for Hemp, Jute and Linen Fibres, Index cards, TWINE—AUSTRIA-UK—DUMPING ... F5265/5, n.d.; JUTE GOODS—GERMANY—DUMPING ... F10607/10.

⁴⁴⁴ See TCP 5/2/7, Index to Woollen Questionnaires, Index card, DUMPING—WORSTED VELVET—UK—EXAMPLE ... F6644/16, n.d.; TCP 5/2/9, Index to Iron and Steel Evidence, Index cards, DUMPING—IRON & STEEL—UK, S. WALES—DURATION ... E653, n.d.; DUMPING—IRON & STEEL—USA-UK—STEEL—POLICY ... E1193-1196, n.d.; DUMPING—IRON TUBE—GERMANY-UK—METHOD ... E1630, n.d.. These four statements may be rendered in ordinary language as “Example of dumping of worsted velvet (sci., from various countries) into the United Kingdom”; “the duration of dumping of iron and steel (sci., from various countries) into the South Wales”; “the policy of dumping iron and steel from the United States into the United Kingdom (sci., pursued by American business concerns)”; and “the method of dumping iron tubes from Germany into the United Kingdom (sci. practiced by German business concerns)”.

occasionally make their way as secondary elements into composite process terms as well.⁴⁴⁵ Evidently, the syntactic limitations of SI's statement forms sometimes proved too restrictive to be followed to the letter, especially if one sought to express a complex relationship within the [PROCESS] position of the statement, with the result that, on occasion, terms of processes were treated as terms of concretes and the components of composite process terms came from different categories. In these rare cases, pragmatic considerations appear to have overridden the categorial distinctions that Kaiser was otherwise eager to preserve at all costs.

We have now considered the primary semantic and syntactic limitations of Kaiser's categorial scheme and the ways in which he resolved them. The problems that he encountered were varied, as were his proposed solutions. One source of difficulty was natural-language terms that resisted easy categorization within the framework of the categorial scheme because they were categorially polysemous (i.e., interpretable either as signifying a process or as denoting the concrete results thereof) or bicategorial (i.e., considered to be decomposable, on etymological or other grounds, into two or three simpler terms at least one of which denoted a concrete and the other signified a process). Kaiser took two very different approaches to the treatment of such terms. In the case of categorially polysemous terms, he stipulated that, within a given index, each such term was to be assigned either to the category of concretes or that of processes on the basis of local requirements and thereafter consistently treated as a member of the category in which it had been placed. With bicategorial terms, he opted for a more original, but drastic solution—namely, splitting them into their semantic components and formulating the latter into the [CONCRETE]-[PROCESS] statement form. While Kaiser readily applied this procedure to abstract terms denoting concepts of great generality, he demurred from using it with certain other terms, the semantic decomposition of which would give rise to practical inconveniences: these latter were to be treated in the same manner as categorially

⁴⁴⁵ For FANCY YARN-UK-COMPETITION FROM GERMANY, see TCP 5/2/19, Index to Woollen Questionnaires, Index card, FANCY YARN-UK-COMPETITION FROM GERMANY ... F 4777/9, n.d.. The term for concrete FANCY YARN refers to a class of color-patterned yarns "exhibit[ing] special effects, produced by difference in shade, size, twist, looping, etc." (Dantzer & Dantzer 1905, 149). The normal form of a statement such as the one in which it appears here would be *FANCY YARN-UK-FOREIGN COMPETITION, with the information that the competition was from Germany transposed to the accompanying amplification (cf., e.g., TCP 5/2/19, Index to Woollen Questionnaires, Index card, WORSTED YARN-UK-FOREIGN COMPETITION ... F5487/8, n.d., in which the accompanying amplification specified that the competition came from Saxony). For RAILWAY RATES-GRANITE-UK-ASSIST FOREIGNERS (and variants), the only example known to me of a process term taking the grammatical form of Verb complemented by a Direct Object, see Kaiser 1908, §§ 235-236.

polysemous terms. Whether involving simply the restriction of a term's meaning or the wholesale morphological transformation thereof, Kaiser's measures had the same practical effect—namely, conforming terms that were, strictly speaking, *hors de catégorie* to the grid of interpretation formed by the categorial scheme of SI.

The simplicity of the statement forms posed another kind of representational problem. In theory, the structure of the standard [CONCRETE]–[COUNTRY]–[PROCESS] form (and, *a fortiori*, those of its truncated versions [CONCRETE]–[PROCESS] and [COUNTRY]–[PROCESS]) limited statements in SI to expressing a relation between one concrete and/or one country and one process (cf. Kaiser 1911, § 302; see Section 3 of the present chapter). This constraint, however, proved difficult to sustain in practice and Kaiser developed workarounds that allowed indexers to incorporate, at least to a limited degree, more complex relational structures into statements. Provided that a term for a concrete referred to a money- or labor-related notion, it could be combined with another concrete term signifying a commodity to form a composite term indicating a relation between the two. The names of two countries could be conjoined to form a dyad indicating a relationship between its members, the nature of which was then spelled out by the following process term. Processes could be telescoped verbally into composite terms. In this way, Kaiser made provision for the representation of relationships between two concretes, two countries, or two processes within the compass of a single statement. Yet, these refinements left the fundamental structures of the statement forms intact, for, if they affected the respective internal configurations of the [CONCRETE], [COUNTRY], and [PROCESS] elements of a given statement, the syntactic relationships among these three elements stayed very much the same: each element could occur only once in a statement, [CONCRETE] and [COUNTRY] continued to be positionally interchangeable and both preceded [PROCESS]. Thus, Kaiser's method of incorporating more than one term from a single category into a statement did not compromise his commitment to the simple syntactic structures of the statement forms but, with rare exceptions, functioned entirely within the constraints set by the latter: in other words, his response to the limitations of SI's categorial system ultimately served to buttress them.

7.4. The Technique of Systematic Indexing

Now that we have examined Kaiser's conceptualization of his categories for terms and his rationale for the structural forms of the statements created by combining terms from

these categories, we are in a position to consider how he applied them to the analysis and reconstitution of textual information that, in his estimation, constituted systematic indexing in the strict sense of the term (Kaiser 1911, § 295; See Section 1 of the current chapter, esp. pp. 282–283, above). The key moments of this process, which we shall pass in review here, were the selection of documents for indexing; the derivation of statements from the texts carried by these documents; the formulation of an amplification—that is to say, a succinct representation of the particular information from the text associated with each statement combined with data about the text itself; and, finally, the recording of each combination of statement and amplification, or index item, upon an index card, which thereby became the unit record representing the item of information in the card index (See Section 3 of the current chapter).

7.4.1. The Selection and Preparation of Documents for Indexing

The starting point for indexing was the selection of the textual material to be indexed, be it a letter, a press cutting, an article in a periodical, a chapter from a book, or some other kind of documentary material collected by an intelligence department (See Chapter 6, Section 2.3, esp. pp. 207–210, above). As was discussed at length in Section 1 of the present chapter, Kaiser expected that texts would be chosen for indexing because they contained information deemed pertinent to the interests of the business organization for which the department was operating its index. To assure consistency and completeness of coverage of such information, he deemed it necessary to establish firm criteria for what kinds of subjects were to fall within the purview of the index. Accordingly, Kaiser (1911, § 311; cf. § 91) counseled that the person responsible for managing a card index formally delimit its subject scope as carefully as possible prior to the commencement of indexing activity: “[b]efore he starts work, he must clearly define his purpose, he must determine on what concretes and processes information is wanted”. He also suggested further, fairly broad criteria that might govern the selection of texts, such as the quality of the information and its mode of presentation; the degree of its specificity and anticipated utility; and the authoritativeness of its source (§§ 92–96; see Section 1 of the current chapter, esp. p. 294, above), although he did not elaborate on these in any depth. At any rate, when Kaiser wrote that the first step in “the whole operation of making a card index” is to “[s]elect carefully what is to be indexed” (§ 447, Step 1), his observation applied equally to the selection of the kinds of subjects to be represented in the index and to the choice of textual materials for indexing,

Kaiser (§ 305 [emphasis his]) referred to any text selected to be an object of indexing as “an *information*”, a term by means of which he indicated that a given “piece of literature” constituted a self-contained textual unit, even if it formed part of a larger documentary whole.⁴⁴⁶ He assumed that these “informations”—or textual units, as I shall henceforth call them—would, for the most part be quite short, typically on the order of a periodical article or book chapter ranging from a few hundred words to ten pages or more (§§ 305, 308, 366)—an assumption consistent with his belief that the small, easily digestible articles published in newspapers and trade journals were becoming the primary vehicle of published communication in the business world (§§ 75–76, 585) and, one might add, congruent with the realities of business correspondence as well, for commercial letters rarely extended beyond a few paragraphs in length.⁴⁴⁷ Furthermore, he expected that, prior to indexing, the document bearing a textual unit would have already undergone a fair amount of processing at the hands of the intelligence department’s staff. In particular, he anticipated that the responsible staff member would have prepared records of it for the card registers, if these were necessary, and assigned to it the call number that indicated its future position in the files or on the shelves (Kaiser 1908, §§ 219–220, 233, 244–245, 256–257, 265–266; 1911, §§ 295, 367; see Chapter 6, Section 3.1, above): indeed, in his ideal workflow for the processing of documents within an office or intelligence department, indexing was the last major operation to be carried out on a document before it was filed.

7.4.2. The Derivation and Formulation of Statements

Once a textual unit came into the hands of the indexer, he was to read it through, note any terms of concretes or countries that, in his estimation, merited indexing, and draw rings around these with a colored pencil (Kaiser 1908, §§ 113, 182, 219, 226; cf. 1911, § 447, Steps 2 & 3).⁴⁴⁸ This, in effect, marked a second round of selection, for the ringed terms

⁴⁴⁶ For further discussion of this locution, see p. 408, with n. 356, above.

⁴⁴⁷ For model specimens of business letters, see, e.g., Hooper & Graham 1903, 62–64; Parkyn 1906, Vol. 1, 84–94 & Vol. 2, *passim*.

⁴⁴⁸ Contemporary writers on the construction of card indexes also recommended the practice of marking important terms for indexing by inscribing rings around them with a colored pencil (e.g., Byles [1911], 25–26; Mares 1909, 83); alternative methods included stamping the terms in question with a rubber index stamp (Mares 1909, 82) or drawing a line with a colored pencil in the margin next to the passage to be indexed and indicating the subject under which it was to be indexed in an accompanying annotation (Cope [1913], 111). In all these cases, the authors seem to have assumed that this procedure would be primarily used in the indexing of correspondence and so there is reason to believe that the correspondence file was the original field of application for ringing. Kaiser (1908) wrote that ringing could be used with “printed or written documents” (§ 113), but otherwise

formed the nuclei of the statements that would serve to delimit those portions of the textual unit's informational content to be included in the index items incorporated into the card index (See Section 3 of the present chapter). Needless to say, the number of terms selected determined the number of index items per textual unit (Kaiser 1911, § 305). Here, much depended upon the degree of granularity to which the indexer chose to press his analysis of a textual unit such as a periodical article: as Kaiser stated, “[a]n article as a whole may be treated as an item, and its various parts may again be treated as separate items, provided always that in each case we obtain separate statements” (§ 305). Yet, whether one confined oneself to characterizing a textual unit as a whole—in effect, indexing it at the same level of granularity as a periodical index would (See Section 1 of the current chapter)—or selected different smaller chunks of information within it for this treatment, the result would be that the unit in question would “contain[] as many items for indexing as it contains separate *statements*, in other words there will be at least as many items as there are concretes” (Kaiser 1911, § 308 [emphasis his]; cf. § 657). In fact, the number of terms of concretes—and, one might add, countries—chosen for indexing provided only a minimum baseline for the number of index items associated with a textual unit, for, as Kaiser noted, “sometimes it happens that the same concrete must be taken more than once because the description includes widely different processes” (§ 308): in other words, a single term for a concrete (or country) in a given textual unit could be combined with different terms of processes to create multiple statements and, accordingly, give rise to a corresponding number of index items. The act of selecting and ringing terms thus set into motion the reduction, or decomposition, of one textual unit into what were, in effect, component units of information defined by the statement (See Section 3 of the present chapter; cf. Dousa 2014, 310–311).

Obviously, the perspective of the indexer assumed central importance at this stage of indexing, for it governed his decision as to which terms to choose from those contained in the textual unit that was the object of his analysis. Kaiser (1911, § 448) illustrated this point by means of a sample analysis of a short article on the nitrate trade culled from the *Chemical Trade Journal*, the text of which ran as follows:

mentioned it explicitly only in relation to the indexing of correspondence (§§ 182, 219) or press cuttings (§ 226): it is unclear whether he extended the practice to articles in bound journals or books, where an indexer's mark might be regarded as undesirable. At any rate, marking correspondence in this manner—an activity which many authors assumed would be done by the businessman reading a letter rather than the filing clerk responsible for preparing the card records for it (Byles [1911], 25; Cope [1913], 111)—not only aided the indexer in his work but also created eye-guides for those consulting the document, who were led straightaway to the portion of the letter or cutting that had been indexed.

Nitrate of Soda. Never in the history of the nitrate trade has so complete a state of stagnation been seen at this time of the year; week after week passes without business being transacted, and importers are at their wits' end to know how to dispose of having "sold forward," as much as was delivered in the previous spring—i.e., some 800,000 tons—their sales are up to the present quite insignificant, the country dealers, who then without exception lost money, declining to repeat the experience, more especially when they are asked to pay higher prices. Consumers, now almost everywhere on the Continent suffering from floods, are in no mood to purchase long ahead of their spring requirements, and the position has practically reached a deadlock. Holders being afraid to spoil their market for next season dare not reduce their quotations, and are manfully holding them up; but the Process will become increasingly difficult when the heavy October sailings come in and the bills drawn there against have to be met. These comprise an unusually large number of German vessels accustomed to making the voyage in or under 90 days, and the procession once started will last for several months. Most of the September cargoes have already arrived, and stocks are accumulating in Europe, while those in Chili awaiting shipment ensure the continuance of shipments on a scale calculated to depress the market. Every effort will no doubt be made to keep down the December total, but the only chance of permanent recuperation is in the reduction of output, and of this there are no indications, the tendency on the contrary being towards expansion (§ 449).

According to Kaiser, this text contained no fewer than sixteen terms denoting concretes—including movable ones such as "nitrate of soda", "money", "bills", "September cargoes", "stocks", and shipments"; immovable ones such as "market"; and abstract ones such as "importers" and "consumers"—that an indexer could take as the basis for constructing a statement (§ 452), not to mention several terms of countries. However, he did not expect that an indexer would attempt to formulate statements for all these candidate terms. Rather, he averred, the information in the article could be viewed from "various standpoints" and would be judged useful or not in light of the "various purposes that it [might] serve":

the merchant will be interested in it because it describes nitrate as a saleable commodity, the manufacturer if he buys nitrate has only an indirect interest in it, the technologist will pass it by, the stock broker may find some motive for action in it, the freight broker will be mainly concerned with the vessels, the banker will have his eye on the bills, the economist may extract some points on the consumer etc etc. (§ 454).

Given this diversity of interests, the article would receive quite different treatment at the hands of different indexers: "[s]upposing that the information is valuable", Kaiser observed, "each one will index it from his own standpoint and for his own purpose" (§ 454), In practice, this meant that an indexer would select that term for concrete that best answered to his particular perspective: for example, "[t]he manufacturer whose prime material is

nitrate” would be “mainly interested in its price” and so might choose NITRATE as a concrete term around which to build the statement NITRATE-PRICE, while the banker, whose interests lay in the financial instruments mentioned in the article, might take NITRATE BILL as his point of departure for formulating a statement along the lines of NITRATE BILL-LIQUIDATION and the freight broker might opt for SAILING VESSEL as the basis for a statement such as SAILING VESSEL-AVAILABLE (§ 455). The selection of terms was thus a practical manifestation of the perspectivalism that, in Kaiser’s eyes, ineluctably accompanied human knowledge of, and discourse about, the world (See Section 2.1 of the current chapter, esp. pp. 308–309, above).⁴⁴⁹ The formal definition of the purpose and subject scope of an index, codified, so to speak, the perspective to be adopted by the indexer and so offered guidance in the selection of terms: hence Kaiser’s insistence that these parameters be firmly specified prior to the initiation of indexing.

The terms in a textual unit selected by the indexer provided the raw material, so to speak, from which to construct statements and, accordingly, the construction of statements required that decisions be made about the form that its component terms would take. We have already seen that, as a general rule, Kaiser favored a policy of term extraction, whereby the indexer was to incorporate the terms that he had selected from a textual unit directly into the statements that he created to represent its informational content (See Section 2.2.3 of the present chapter). However, we have also had occasion to note that he was willing to deviate from the norms of extraction in various circumstances (See Sections 2.2.3 & 2.2.5 of the current chapter). In fact, his guidelines for the treatment of terms in SI varied the stringency with which the policy of extraction was to be applied from category to category and included measures for the semantic or morphological normalization of terms even in the case of those categories to which the policy was to be applied with fullest force.

In setting out rules for the treatment of terms, Kaiser devoted the greatest attention to terms of concretes, for he believed that, in virtue of the position that they occupied as the main, or filing, term in the prototypical statement form [CONCRETE]-[COUNTRY]-[PROCESS], it was especially important to formulate them as precisely and accurately as possible. “If the concrete is stated wrongly”, he warned, “then, given a large card index, it may be safely assumed that the real information is lost as soon as this particular card [sci., the one bearing the poorly formulated concrete—TMD] is filed”: accordingly, “[n]o pains

⁴⁴⁹ For a similar example featuring a longer article on “how paper affects metal” taken from the *Paper Makers’ Monthly Journal*, see Kaiser 1911, §§ 458–460.

should be spared to state the concrete properly” (Kaiser 1911, § 315). In theory, the imperative of accuracy required that the name of the concrete be extracted from the text being indexed—that is to say, that the form of the name “be taken as it is found” without any alteration whatsoever (§ 318), a point that Kaiser repeatedly stated in emphatic terms (§§ 317–318, 320, 348, Point 4; cf. Sections 2.2.3 & 2.2.5 of the current chapter). In particular, he insisted that indexers refrain from introducing inversions into their received terms—for example, “machine, sewing” for “sewing machine”—on the grounds that these led to unnecessary complications in alphabetical filing and interfered with the cross-reference structure of an index (§§ 225–226, 230, 318, 348, Point 5, 417; cf. Section 5.1 of the present chapter, below, esp. pp. 574–577).⁴⁵⁰

Yet, alongside his injunctions that terms of concretes be taken from texts without abridgment or modification, Kaiser made several stipulations that relativized his insistence upon strict fidelity to the term’s original form. For one thing, he enjoined that “[t]he term of the concrete should always be expressed in the singular, excepting of course in the case of collectives which have no singular, as ironworks, cotton goods, etc.” (Kaiser 1911, § 319; cf. § 348, Point 5; 1908, § 102), a rule bound up with the exigencies of alphabetical filing (1911, § 397). Similarly, he held that “[p]repositional terms should be avoided wherever possible because prepositions are apt to create confusion in filing” (§ 324; cf. § 348, Point 5). This precept mandated altering phrases such as “nitrate of soda” (§§ 449, 452) to SODA NITRATE (§§ 450–451): it also impinged upon the formation of composite concrete terms combining terms of money or labor with those of commodities (See Section 3.6 of the present chapter, esp. pp. 498–501, above). Third, Kaiser (1911, § 319) demanded that any terms of concretes which, taken in isolation, were liable to interpretation in different senses—what, in the present-day parlance of KO would be called homonyms or homographs (e.g., Aitchison, Gilchrist, & Bawden 2000, 32–33; ANSI-NISO 2005, 20 & 160, s.v. “homograph”)—be disambiguated with the aid of brackets, or parentheses, a measure that, as we have already observed, he also utilized in creating the aforementioned composite concrete terms (See Section 3.6 of the current chapter, esp. p. 491, above). Finally, he stated that “[n]ational adjectives”, such as “French”, “Spanish”, or “English”, “require care” (Kaiser 1911, § 323). If a national adjective formed a fixed part of the name of a concrete, as in the case of “Indian ink”, which designated a specific kind of “black pigment ... consist[ing] of

⁴⁵⁰ Kaiser’s opposition to inversions in index terms was consistent with his eschewal of inversion of personal and firm names in alphabetical registers (see Chapter 6, Section 3.4, p. 259, text to n. 269, above).

lampblack made into a paste with a solution of gum [and] sold in sticks” (Murray et al., 1888–1928, Vol. 5/2, 206, s.v. “Indian ink”) actually made in China but associated with India (A Stick Of Indian Ink 1886; How And Where Indian Ink Is Manufactured 1905; Smith 1871, 117–118), then the form of the term in the index was to follow the form of the name (*in casu*, INDIAN INK). In all other cases, the name was to be split into a term for the concrete and the name of the country associated with the national adjective, so that, for example an original expression “New Zealand mutton” would be decomposed into NEW ZEALAND and MUTTON (Kaiser 1911, § 323), with the two terms then recombined within the framework of a statement—a move designed to prevent the scattering of entries for a given commodity (*in casu*, “mutton”) under geographical entry-words (*in casu*, “New Zealand”).

The adoption of the grammatical singular form, the elimination of prepositions, the juxtaposition of terms in parenthetical qualifiers, and the factoring of expressions with national adjectives into distinct terms for a concrete and a country all effected morphological changes in terms of concretes extracted from texts and so constituted modes of term normalization. In addition to prescribing these modifications to extracted terms, Kaiser also advocated modes of deriving terms of concretes that went beyond extraction in the strict sense of the word. We have already noted that he gave leave to indexers to supply terms that were not present in the text itself but were inferable from its contents (Kaiser 1911, § 322; see Section 3.5 of the present chapter, esp. p. 486, above). We have also seen that, by the same token, his valorization of subject specificity led him to countenance the replacement of relatively general, or collective, terms occurring in a text with more specific ones supplied by the indexer in accordance with his understanding of the text (§ 320; See Section 2.2.5 of the current chapter, esp. p. 370, above). Conversely, he also envisaged situations in which it might be acceptable to substitute one collective term for a number of specific ones. An indexer might be dealing with a passage from a text in which a large number of concretes was associated with a single country and process: for example, a passage in given article might discuss the importation of goods to a given country, enumerating a long list of specific kinds of wares, such as wrought iron, steel, needles, latches, head rails, sashbolts, mountings of doors, window fasteners, keys, collar chains, thimbles, padlocks, horseshoe nails, cooking utensils, tinned pots, and so on (§ 473). In such a case, Kaiser proposed three possible courses of action. First, he stated, “[i]f the requirements of the index warrant the work, each concrete is treated in the usual way” (§ 328, Point 1)—that is to say, the name of each particular kind of metallic ware became the

basis for a separate statement. Alternatively, he suggested that “[t]he concretes [can be] collected into a few class terms, which are then treated as concretes, the specific terms being transferred to the amplification” (§ 328, Point 2): in other words, an indexer might choose a single collective term, such as HARDWARE, to represent the series of specific terms and use it in their stead as the basis of a single statement, while reserving the list of original terms for the accompanying amplification (§ 473). A third and final option was to refer “all the concretes ... to the amplification, if a country is given” (§ 328, Point 3)—that is to say, to dispense with a term for concretes altogether, construct a statement of the [COUNTRY]–[PROCESS] form, and, again, enumerate the terms for specific wares for the amplification. Of these three possibilities, Kaiser considered the first to be “undoubtedly the best” (§ 329) but conceded that occasions might arise when it was more expedient to adopt one of the other two options. This conclusion is emblematic of his general prescriptions for the treatment of terms of concretes: whereas he clearly preferred that indexers extract terms directly from texts and subject them, if necessary, to the normalization procedures outlined above, he also made provisions for what can be called the indirect derivation of terms, whereby terms were either supplied on the basis of the indexer’s interpretation of the text or substituted for terms in the text at the discretion of the indexer. In other words, although most of the terms of concretes selected and ringed by the indexer would make their way directly into the index, some would be supplanted by other terms deemed more appropriate within a given context.

Whereas Kaiser (1911, § 312) held that the selection and formulation of terms of concretes was no easy task, he maintained that terms of countries “as a rule will give very little trouble”. He considered them to have more definite semantic reference than those denoting concretes, for, as he put it, “[c]ountries have exact limits by reason of their political boundaries, while with concretes it is impossible to find such limits, we only know approximately the area covered by each term” (§ 334; cf. § 423): in this respect, at least, the former constituted an exception to his thesis that, as a rule, the names of things in the world had indeterminate semantic boundaries (See Section 2.2.1 of the current chapter, esp. pp. 327–333, above). Furthermore, the overall number of terms of countries was decidedly smaller than that of terms of concretes, for there are many more things in the world than there are politically defined geographical units. Given both the relative semantic determinateness and the relatively restricted number of terms of countries, Kaiser believed that it was possible to establish fairly clear-cut measures for normalizing them. For one

thing, he recommended that an indexer settle upon preferred forms for names of countries, which were to be used consistently for representing them in index statements:

[t]here only being a limited number of countries, and each having known limits, it is quite in order at any rate as far as the specific countries are concerned, to adopt a fixed nomenclature, especially in the case where the country goes under several names. Thus: *Dutch* may be adopted to stand also for *Hollandish* or *Netherlandish*. The same applies to spelling, which should be uniform, whatever variation is adopted (Kaiser 1911, § 338 [emphases his]).

With regard to the spelling of “foreign geographical names”, the foreign vernacular was to be used “unless there is a recognized equivalent in English” (§ 372). As with terms of concretes, inversions of multiword country names were to be “absolutely avoided” and prepositional terms were to be eschewed if at all possible (§ 340). Inasmuch as terms of countries were relatively fixed, their forms could be abbreviated (§ 339). This applied not only to names of countries and their subdivisions (e.g., USA for “United States of America”; UK for “United Kingdom”; NY for “New York”; BC for “British Columbia”; and NSW for “New South Wales”) but also to national adjectives forming part of the name of a country (e.g., BR for “British”, FR for “French”, GER for “German”, or SP for “Spanish”) and to terms referring to geographical orientation (i.e., N for “North”, S for “South”, E for “East”, W for “West”, and “C” for “Central”) if they were part of a geographical proper name (e.g., GER S W AFRICA for “German South West Africa” or BR C AFRICA for “British Central Africa”) (§ 339). Otherwise, we have already seen that the standard form for representing subdivisions of a country, such as counties or cities, or the collective colonial possessions of an empire was to have the name of the country or seat of empire precede the name of the subdivision or the collective term COLONIES and to separate the two with a comma, as in the terms UK, LONDON or UK, COLONIES (See Section 3.2 of the current chapter), while relationships between countries were indicated by connecting their names with hyphens to form a two-country dyad, as in UK–USA or USA–UK (See Section 3.6 of the present chapter, esp. pp. 501–503, above).

The forms of most terms of concretes and countries used in SI were likely to bear some traces—sometimes quite extensive ones—of morphological normalization. Nevertheless, Kaiser assumed that, for the most part, they would be based directly upon terms found in the text, even if he also gave indexers some leeway to supply terms that were not directly present in the text but were implied by its informational content or other contextual factors. With terms of processes, the situation was somewhat different. Kaiser (1911, § 344) firmly believed that “[t]he process is always contained in the information, it is never absent”. Yet

he also held that, despite its presence in the information, the process would frequently not be expressed directly in the words of the text; thus, he observed, the indexer would have to exercise “some judgment and patience to find it” (§ 313) and might well have to supply his own process term on the basis of his interpretation of the text. Even in cases where words or phrases indicating a process were present, they might take the form of a verb and so require recasting in the form of a noun, a noun phrase, or an adjective (§§ 344, 663, s.v. “Concrete and Process”; see Section 3.3.2 of the present chapter, esp. pp. 444–445, above). Accordingly, Kaiser inclined towards more relaxed treatment of terms of processes, stating that “with the process more latitude may be allowed, for it has not such an important position in filing as the concrete” (§ 313). He did not set any special ground rules for normalization, apart from the familiar strictures against inversions and prepositional phrases (§ 345; cf. Section 3.5 of the current chapter). Similarly, he stipulated that if several processes were associated with a single concrete in a text, the indexer was at liberty to substitute a single collective process term to represent them, much as he could, in certain circumstances, employ a single collective term to stand for multiple concretes occurring in tandem with a process or country term (§ 344). All in all, then, Kaiser did not expect that terms of processes would be directly extracted from texts but assumed that they would be applied by indexers to indicate those aspects of the concretes or countries discussed in texts judged to be of greatest interest to the users of their indexes: as he put it, “[t]he term of the process may be chosen to suit our convenience” (§ 344; cf. § 452).

Kaiser’s instructions for the treatment of terms reflected the general process by which indexers were to form statements. Beginning with the terms of concretes and countries which they had selected and which they had ringed, they were to join these with terms from other categories that they had derived from their reading of the text, be it by direct extraction, substitution, or suppletion: applying the appropriate normalization procedures and syntactic rules, they were to formulate statements in which the ringed terms served as the main terms and to associate with each statement a “synopsis of the information” (Kaiser 1908, § 113) to which it referred. To illustrate this, Kaiser (1911, § 307) offered the “simplified example” of information analysis given in Figure 19, below. Here, he presented the results of an analysis carried out on a very brief text for “a commercial index” (§ 307, n. *)—that is to say, the kind that a merchant might consult. This snippet of text, perhaps an extract from a longer textual unit, contained three nouns that could be unequivocally

interpreted as terms of concretes—namely, “paper”, “market” in “Indian market”, and “stock”.⁴⁵¹ Of these three candidates, only “paper” could be said to be the subject of the text,

Information given	“ During the last six months the prices paid for paper have been rising continuously owing to its scarcity. The Indian market seems almost depleted of stock, it is difficult to obtain any large quantities and in some instances the usual prices have advanced by 60 to 80 per cent.”						
Statement and extension*	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; border-bottom: 1px solid black;">PAPER</td> <td style="width: 33%; border-bottom: 1px solid black;">INDIA</td> <td style="width: 33%; border-bottom: 1px solid black;">DEMAND</td> </tr> <tr> <td colspan="3">Prices have advanced 60-80% owing to scarcity.</td> </tr> </table>	PAPER	INDIA	DEMAND	Prices have advanced 60-80% owing to scarcity.		
PAPER	INDIA	DEMAND					
Prices have advanced 60-80% owing to scarcity.							

Figure 19: An example of information analysis, showing original information, statement, and extension (Source: Kaiser 1911, § 307).

for “stock” referred to stocks of paper, while “market” played a secondary rôle in the phrase “Indian market”, the primary function of which was to indicate a geographically delimited economic region. Hence, Kaiser elected to extract PAPER from the text as the term for concrete to be indexed.⁴⁵² Inasmuch as the term “Indian market” was composed of a national adjective modifying a term for an immovable concrete, it could be factored into a term for the country represented by the adjective, INDIA, and a term for a concrete, *MARKET and, since INDIA denoted the *mise-en-scène* for the information pertaining to paper, it was chosen as the term for country. Once PAPER and INDIA had been selected as terms for concrete and country, respectively, there remained the matter of settling upon a term for the process. Kaiser opted for DEMAND, a term that did not occur in the text itself but expressed an inference from the original information that the price of paper in India had drastically increased as a result of low supplies to the conclusion that this indicated a high

⁴⁵¹ “Paper” was self-evidently a term for a movable commodity. In Kaiser’s (1911, § 452) view, the word “stock/stocks” also belonged to the class of terms for movable concretes, while “market” represented an immovable concrete. It should be noted that the bicategorical word “prices”, which occurs twice in the text, could conceivably have been construed as a term for a concrete as well (Kaiser 1911, § 325; cf. Section 3.1.2 of the current chapter, esp. p. 410, above); however, since it could be treated with equal propriety as a process (Kaiser 1911, § 347; cf. Section 3.6 of the present chapter, esp. p. 496, above), Kaiser appears to have chosen to leave it out of consideration in what was, after all, intended to be an introductory example.

⁴⁵² The choice of “paper” also reinforced Kaiser’s contention that the words denoting the thing spoken of in a passage of text need not be the grammatical subject of the sentences in which they occurred (Kaiser 1911, § 301; see Section 3.3.2 of the present chapter, esp. pp. 431–423, above), for “paper” was present only as the object of a preposition embedded in the noun phrase “the prices paid for paper”, while the noun “prices”, noun phrase “Indian market”, and pronoun “it” occupied the position of grammatical subject in the sentences of the sample text.

demand for paper in that particular economic region; presumably, he did so because the term was simple and expressed an aspect of the concrete PAPER likely to be of interest to merchants seeking information about trade opportunities in that particular commodity. The combination of the three terms in accordance with the syntactic rules for creating a well-formed statement resulted in the tripartite statement PAPER–INDIA–DEMAND—which, of course, would require construction of the variant *INDIA–PAPER–DEMAND (cf. Section 3.5 of the current chapter)—and was complemented by a brief summary extension containing the information about the increase in prices. Needless to say, indexers taking a different perspectives might derive different statements from the same text: for example, somebody preparing a card index for an economist interested in the prices of commodities might construct a statement such as *PAPER–INDIA–PRICE, *PAPER–INDIA–PRICE INCREASE, or even conceivably *PRICE (PAPER)–INDIA–INCREASE (on the last of these forms, cf. Section 3.6 of this chapter, esp. pp. 495–496, 498–501, above). At any rate, Kaiser’s example neatly encapsulated, with reference to a single statement, how its component terms might be derived by direct extraction without alteration (*in casu*, PAPER), by extraction with morphological modification (*in casu*, INDIA), and by suppletion in accordance with the indexer’s interpretation of the original text (*in casu*, DEMAND). In presenting the terms for concrete and country as ones extracted from the original text, he also subtly underscored that, in practice as well as theory, terms from these categories were to be the starting points from which statements were constructed.

Such, then, was the general protocol for the formation of statements in SI. As we noted earlier, Kaiser considered the statement to be a minimal expression of the informational content of the text from which it was generated and of which it marked the thematic limits (See Section 3 of the present chapter). Insofar as the forms of statements reduced the representation of information to three or, in many cases, two conjoined terms, a statement was rarely able to communicate in full the content of the information to which it pointed: for example, the statement whose formation we have just discussed, PAPER–INDIA–DEMAND, clearly indicated that there was a demand for paper in India but did not convey any of the information given in the original text about the reason for the demand—namely, the scarcity of paper in India—or about the manifestation of this demand in the market—namely, the continuous increase of the price of paper by 60 to 80 percent over a six-month span. To bring such informational content within the compass of the index, it was necessary to complement the statement with what Kaiser (1911, §§ 304, 349) called its amplification.

7.4.3. The Formulation of the Amplification

The purpose of the amplification was twofold. First, it was “[t]o amplify the statement so as to cover the whole contents of the original information” (Kaiser 1911, § 350); in other words, it was to represent, in reduced form, those contents of the text being indexed that pertained to the subject expressed by the statement but could not be included in the latter because of its structural limitations (§ 304). Second, it was “[t]o give the data available for the purpose of identifying the original, in case it should be required” (§ 350): that is to say, it was provide what would be called, in the parlance of present-day KO, “descriptive metadata” (Taylor & Joudrey 2009, 102–103) about the document bearing the textual unit from which the information was taken. The amplification, then, contained two different kinds of data: information about the concrete or country denoted by the main filing term of a given statement that, in a sense, completed the latter and data about the source from which the information was derived. The former encompassed the *extension* of the statement, which embodied the additional information pertaining to the concrete or country in question, and the *date of information*, which indicated the chronological period for which the description of the concrete or country held good (Kaiser 1911, §§ 351, 353–354); the latter comprised such elements as the *author* of the textual unit from which the information was taken, if named; the *name or title of the document* from which the textual unit was taken; its *date of publication* or, in the case of manuscripts, its creation; indications of *pagination* and *length* of the textual unit; and the *call number* assigned to the document bearing it (§§ 358, 365–367). All of foregoing data elements could form part of an amplification (§ 350). However, Kaiser did not demand rigid adherence to a set formula in the construction of amplifications as he did with statement forms: in his words,

[w]hile the statement must be constructed on very definite rules because it is also used for the filing or classing of information, more latitude may be allowed in the amplification because it has no bearing on filing. Again while the statement is obligatory, the amplification is more or less optional (§ 349).

In other words, the indexer was free to choose just those items from the list of data elements that he deemed practicable to accomplish the purpose of the amplification and to formulate these, within certain limits, as he saw fit. Amplifications thus could vary in the configurations of data elements that they included and the structure of some of these elements—most notably, the extension—was left entirely to the discretion of the indexer.

Although each component of an amplification contributed in some way to complementing the statement to which it was conjoined, either by completing the information that

the it conveyed or by indicating the source from which it was derived, the element that stood in most intimate relation to the statement was the extension, so much so that at times Kaiser (1911 §§ 304, Point 1; 353 [emphases his]) used the terms “extension” and “amplification” interchangeably. As its name indicated, the purpose of the extension was to extend, or amplify, the information represented in the statement by giving, in compact form, those elements from the original textual unit relating to the term for concrete or country that could not be included within the constrained structure of a statement form. Now the contents of the statement set thematic limits on the contents of the extension. “Whatever appears in the extension must have reference to the statement, and whatever is not covered by the statement cannot find a place in the extension”, insisted Kaiser, on the grounds that “as the statement forms the basis for filing or classing the information, any information foreign to the statement contained in the extension must inevitably be lost, for there are no means of tracing it” (§ 353): in other words, the extension had to contain material derived from the original textual unit that was directly relevant to the statement (cf. § 657). Conversely, he counseled that “it is important to include in the extension all the information in the original having reference to the statement, at any rate so far as required for the purpose of a given business” (§ 354): that is to say, the extension should give a reasonably complete representation of the information contained in the original text. Such information, Kaiser hastened to add, could include mentions of “foreign concretes or countries” (that is to say, concretes and countries not occurring in the statement), “provided that they are necessary for the elucidation of the statement” (§ 354): in this way, the indexer could indicate the broader context for the relationship between concrete, country, and process enshrined in the statement.

Insofar as the extension of a statement was to represent, in compact form, only those pieces of information in a textual unit that were deemed relevant to the statement’s subject, it entailed what Kaiser (1911, § 306, n. * [emphases his]) called the “*reduction of literature to a smaller compass*”. He identified no fewer than five “processes of reduction” whereby one might create a shortened representation of a given piece of text. *Reduction by Elimination* consisted in leaving out passages from the text and so gave rise to abridgement or abbreviation, while, conversely, *Reduction by Selection* involved quoting parts of a text and resulted in the production of extracts or excerpts (§ 306, n. *): both of these modes of reduction yielded a series of passages taken verbatim from the original text. *Reduction by Concentration*, on the other hand, was the process by which, in Kaiser’s words, “we reduce

the volume but not the contents” of a textual unit (§ 306, n. *). Although he did not specify how this was to be carried out, it seems to have entailed reformulating the text in a more compressed manner: an abstract, summary, or, to use Kaiser’s (§ 663, s.v. “Condense”) preferred term, “condense”, was the product thereof. *Reduction by Recapitulation* combined reduction by selection with reduction by concentration, intermingling verbatim passages from the text with reformulated statements of its main points (§ 306, n. *): according to Kaiser, its results took the form of a resumé, précis, compendium, or digest of information. Finally, *Reduction by Analysis* featured “the maximum reduction” of a text into its most compact form, expressed as an index (§ 306, n. *). Kaiser situated both the statement and the amplification within this typology of processes of reduction and their products with the declaration that “[t]he terms *statement* and *amplification* ... correspond, but only to *some* extent, to the terms *index* and *abstract*” (§ 306, n. *). It is hardly surprising that he took the statement to result from reduction by analysis, for he considered it to be “a statement of ... information reduced to the smallest compass” and so to constitute a “maximum reduction” thereof (§§ 302, 306, n. *). In the case of the amplification, however, his wording could have been more precise. Inasmuch as the extension constituted that portion of the amplification that expressed the informational content of a text in a condensed form, it is apparent that when Kaiser spoke of the amplification as fulfilling a function akin, albeit not identical, to that of an abstract, it was in fact that extension that he had in mind.

Kaiser’s refusal to equate the extensions of a statement with abstracts *tout court* become evident when one considers the forms that an extension might take. He envisaged that “the extension can be managed in two ways, the choice depending on the requirements in each case” (Kaiser 1911, § 355). First, the extension could “take[] the form of annotation, giving particulars of the various phases of the original and critical comments” (§ 355, Point 1). In characterizing certain kinds of extensions as annotations, Kaiser used a word that, in ordinary language, signified “[a] note added to anything written, by way of explanation or comment” (Murray et al. 1888–1928, Vol. 1, 341, 3 s.v. “Annotation”) but had a more specialized meaning in the parlance of librarianship.⁴⁵³ According to the *Manual of Descriptive Annotation for Library Catalogues* authored by the British public librarian E. A. Savage (1877–1966), the leading contemporary text on the subject, the term “annotation” could be applied to any descriptive note on a book added to the simple catalog entry

⁴⁵³ For a general discussion of annotation in late 19th and early 20th-century British librarianship, see Bowman 2007.

consisting of “heading, title ..., and imprint” (Savage 1906, 2). The goal of annotation was to describe “the leading features and ideas of books in a succinct manner, whether by analysis or criticism, or both” (p. 1) and, in the case of the “literature of knowledge”, that is to say non-fiction or “informative” literature (p. 4), annotations might take the form of short notes on, *inter alia*, the author and his background, the subject of the book, the author’s mode of treatment of the subject, and bibliographical or edition information ancillary to that given in the imprint (pp. 5–17), as well as evaluative comments upon mode of treatment (E. A. Baker, in Savage 1906, 43–45). Kaiser’s understanding of the extension as annotation was quite close to this view, for to give “particulars of the various phases of the original” and, if need be, “critical comments” thereon was to describe the key features of the content of the textual unit from which the information was taken and briefly to evaluate it. The following examples of what I shall call annotative extensions, which are quoted from *Systematic Indexing* and given in tandem with their respective statements, provide clear illustrations of what this meant in practice:⁴⁵⁴

[7.4]. COTTON–BRAZIL, RIO DE JANEIRO–INDUSTRY

General condition, number of factories, spindles, employees, quantity of raw material consumed, price (Kaiser 1911, § 468).

[7.5]. ELECTRIC CRANE–DESCRIPTION

Notes, breakdowns and their prevention, 1200 W (§ 463).

[7.6]. BRAZIL, PARA–RUBBER–EXPORT

Quantity, kinds, destination, names of exporters, annual totals 1897–1899 (§ 484).

[7.7]. GINGER–JAMAICA–CULTIVATION

Description, method of preparation (§ 475).

Each of these extensions signaled, in severely telegraphic form, the nature of the information about the subject of the statement that the textual unit from which the latter was derived contained; examples [7.5] and [7.7] also noted the form of treatment (*in casu*, “notes” and “description”) and [7.5] added the bibliographical detail that the original text was approximately 1200 words long. Yet, while they indicated the informational content of the textual unit in question, they did not give the content itself: in the case of these and

⁴⁵⁴ For other examples, see Kaiser 1911, §§ 480–483, 485–486.

similar annotative extensions, Kaiser observed, “obviously it will be necessary ... to refer to the original for the actual information” (§ 356).

The presence of informational content taken from the original textual unit was the distinguishing feature of the second form of extension, which, Kaiser (1911, § 355, Point 2) averred, “takes the form of a condense of the original i.e. the actual information is given but in very condensed form”. The nature of such “condenses”—in effect, abstracts by another name (§ 663, s.v. “Condense”)—can best be appreciated by considering several examples, again taken from *Systematic Indexing* and coupled with their respective statements:

[7.8]. OSTRICH-S AUSTRALIA-FARMING

At the Lake Albert Farm, there are 320 birds, they are thriving splendidly and produce feathers of excellent quality. The industry might be developed, the natural conditions of the country favour raising (§ 497).

[7.9]. BUTTER-AUSTRALIA-PACKING

The butter is packed in a box, consisting of six sheets of ordinary window glass, with the edges covered with gummed paper. This box is next enveloped in a ¼ inch layer of plaster of Paris, and is covered with specially prepared paper. The plaster, [*sic*] being a bad conductor of heat, the temperature within the boxes remains constant. Butter has thus been sent successfully from Melbourne to Kimberley in South Africa. This method costs about 2 cents per lb (§ 499).

[7.10]. BOOT-CANADA, YUKON-DESCRIPTION

Superintendent Wood, Mounted Police, Upper Yukon, says: Boots like the Elcho field boot is [*sic*] the article required for either walking or riding; they stand the water well, whereas the long black boots go to pieces when used on river work, the long tan boots sent up for issue on repayment should take their place. The red leather ankle boots are strong, comfortable, and wear well (§ 478).

[7.11]. BR E AFRICA-SKIN-EXPORT

Is prohibited (§ 513).

[7.12]. CALICO-RUSSIA-PRINTING

Moscow with 17 works, has 146 machines, printing annually 7, 566,000 pieces. Petersburg with 5 and 43 machines, 2,450,000; Wladimir with 331, and 168 machines, 11,555,000; Petrikau with 6, and 62 machines, 1,230,000; Rjasan, Twer, and Kostroma with 1 each and a total of 22 machines, 1,200,000 pieces of printed cloth (§ 490).

[7.13]. CEYLON-CINNAMON-ANALYSIS

	Moisture.	Fixed Ether Extract.	Alcoholic Extract.	Acid and Alkali Extract.	Fibre.	Nitrogen.	Total Ash, less sand.	Ash soluble in water.	Ash insoluble in water.
Cinnamon Chips	12.57	2.10	12.43	34.84	34.10	.50	3.06	.19	3.77
Broken Cinnamon	11.33	2.30	12.90	34.34	34.33	.54	4.80	.10	4.70
Quill " (a)	13.00	2.13	13.27	32.96	35.67	.54	2.97	.90	2.07
" " (b)	12.50	1.87	11.00	35.96	34.27	.42	4.40	.63	3.77
" (superior) ...	12.65	2.30	13.23	33.92	32.90	.54	5.00	.50	4.50
Average of above 5 samples ...	12.41	2.14	12.57	34.41	34.25	.51	4.22	.46	2.76
Wild or Spurious Cinnamon ...	12.10	1.30	10.72	44.21	27.05	.50	4.62	1.04	3.58

(§ 514).

[7.14]. LABOUR-GERMANY-CONDITION

The price of labour is steadily rising. Demand good, complaints are made of deficiency of skilled and unskilled labour. The employment of Italian and other foreigners is large and apparently increasing (§ 496).

[7.15]. GERMANY-BENZINE FUEL-INSTALLATION

At the Laurahütte in the Kattowitz district a locomotive burning benzene fuel has been running in the mine for over a year most satisfactorily. The weight of locomotive is 4,600 lbs; length 9 ft 2 in; width 2 ft 11 in; height from the rails 1 ft 4 in; gauge 1 ft 8 in, and 6 hp. The work actually performed is hauling (in one trip) about 1,375 lbs, or approximately 120 metric tons per shift. Consumption of benzene, about 22 lbs, and daily expenses including interest on investment and sinking funds, wages, benzene and lubricants is 7s 6d. The result of the use of the oil field locomotive has been to reduce the cost of hauling 2,200 lbs from 1 ½d to ¾ d (§ 531).

[7.16]. PARAGUAY-YERBA MATE-DESCRIPTION

Yerba mate takes the place of tea or coffee in South America, and is made from leaves of the *Ilex paraguariensis*, a tree from 12 to 20 feet high. The tea is gathered every two or three years, and dried over a slow fire. Boiling water is poured on the leaves, which serve for several infusions. Taste, bitter but not unpleasant, the effects invigorating. Yerba is claimed to be a valuable restorative. The French government has ordered a shipment for their colonial troops, and samples have been sent to Germany. This tea is consumed in Brazil, Argentine Republic, Chile, Uruguay, and Paraguay. A company in Philadelphia has introduced it into the United States as a beverage for the laboring classes. Analysis shows it to be rich in caffeine [sic] and cafetaimic acid (§ 533).

[7.17]. TOBACCO-VICTORIA-CURING

The new dry air process has been carried out with great success on the government experimental farm (§ 509).

[7.18]. INDIGO-JAPAN, FORMOSA-REFINING

A Japanese has bought large indigo fields intending to erect works for the refining of indigo (§ 495).

[7.19]. RUSSIA, SIBERIA-BUTTER-TRANSPORTATION

It is intended to run special trains fitted with ice waggons from Siberia to St. Petersburg, Reval, Riga and Libau (§ 525).

The foregoing examples show that condenses could vary considerably in form and content. Typically, they consisted of a single paragraph of text giving information relating to the subject delimited by the index statement, though, as example [7.13] indicates, statistical information could be presented in tabular form as well. As a rule, condenses tended to be longer than annotative extensions (cf. Kaiser 1911, § 356); yet, as examples [7.17]–[7.19], and, especially, [7.11] show, they could also attain very high degrees of brevity. For the most part, a condense was syntactically distinct from the index statement to which it was attached, though, on occasion, they could be interpreted as forming a single linguistic unit: such was the case in example [7.11], in which the combination of statement (B E AFRICA-SKIN-EXPORT) and extension (“Is prohibited”) could be rendered by the sentence “The export of skin from British East Africa is prohibited”.⁴⁵⁵ The information recorded in a condense generally consisted of statements of fact pitched at various degrees of specificity, which could range from general statements about the condition of labor in a given country (example [7.14]), the condition of a given enterprise (example [7.8]), or about a recent event with commercial implications (examples [7.17] & [7.18]), to detailed accounts of a particular kind of raw material (example [7.16]) or of the handling of a certain commodity

⁴⁵⁵ Comparable examples of “integrated” statement-extension combinations are attested in the Tariff Commission’s card indexes as well. For instance, one card in the index to Iron and Steel evidence conjoined the statement “USA-LOCOMOTIVE-DEMAND” with the single-word extension “Large.”, a combination interpretable as “(The) demand (for) railroad(s) (in the) United States (is) large.”, while another from the index to the Woollen Questionnaires combined the statement “WORSTED YARN-UK-EXPORT TRADE DECLINE” with the extension “Is due entirely to protective duties in foreign countries.”, which, conjointly, could be read as “(The) decline (in) export trade (of) worsted yarn (from the) United Kingdom is due entirely to protective duties in foreign countries”. See TCP 5/2/9, Index to Iron and Steel Evidence, Index card, USA—LOCOMOTIVE—DEMAND ... E1884, n.d.; TCP 5/2/19, Index to Woollen Questionnaires, Index card, WORSTED YARN-UK-EXPORT TRADE DECLINE ... F6533/21 (altered from original F6533/20), n.d.

(example [7.9]), not to mention quantitative descriptions of the functioning of an industrial installation (example [7.15]), the chemical composition of a raw material (example [7.13]), and the size and output of an industry in a given geographical region (example [7.12]). However, it could also include statements about planned future actions (examples [7.18] & [7.19]) and expressions of opinion about the quality or effects of a given commodity (examples [7.10] & [7.16], in particular, the sentence “Yerba is claimed to be a valuable restorative”). Kaiser anticipated that the preparation of a condense would entail more work than that of an annotative extension. However, because a condense presented a compact version of the information given by a textual unit rather than simply indicating the nature thereof, it had the potential to “obviate[] reference to the original except in special cases” (§ 356): that is to say, it could be used as a source of information in its own right in lieu of the original textual unit from which its contents were derived.

To the modern student of KO, Kaiser’s differentiation between annotative extensions and condenses cannot but call to mind the distinction between indicative and informative abstracts. According to this distinction, which first came to prominence in the late 1940s in discourse about abstracting in the sciences (e.g., Chadwick 1948, 557; Ditmas 1948, 69; Publication and classification of scientific knowledge 1947, 649) and has continued to be a standard *topos* in discussions of abstracting up to the present day (e.g., ANSI-NISO 1997, 3; Koltay 2010, 45–49; Lancaster 2003, 101–102; Rowley 1988, 14–15; Sharma & Sharma 2007, 75–76; Wellisch 2000, 36, s.v. “indicative abstract” & 37, s.v. “informative abstract”), an indicative abstract identifies the main topics of a document and describes their treatment, whereas an informative abstract presents, in highly compressed form, the informational content, or, if one will, the message, of the document. Authorities on abstracting have often noted that, since indicative abstracts only indicate the nature of the information, whereas informative abstracts give the information itself, the former are easier to write and tend to be shorter than the latter; for the same reason, it is generally accepted that reading an informative abstract can, in principle, substitute for reading the original document that it summarizes, whereas an indicative abstract generally cannot be used in this way (e.g., Koltay 2010, 47, 49; Lancaster 2003, 101–102). In these respects, at least, the notion of the indicative abstract bears some analogy to Kaiser’s idea of an annotative extension and the concept of the informative abstract closely parallels that of the condense, the primary difference being that abstracts are generally considered to represent

documents as wholes (e.g., Collison 1971, 27; Riaz 1989, 291), whereas Kaiser conceived of extensions as representing topically defined parts, or fragments, of a textual unit.

Yet another point of convergence between the current understanding of abstracts and Kaiser's conceptualization of extensions lies in their shared admission of "mixed" forms. Latter-day writers on abstracting have frequently noted that, in practice, abstracts not infrequently "combine[] the indicative and informative approaches" (ANSI-NISO 1997, 3): this has led writers on abstracting to categorize abstracts mingling description of the contents of a document with the more important elements of its informational substance—the "indicative-informative abstract" (Koltay 2010, 49–50; Lancaster 2003, 102; Rowley 1988 15; Wellisch 2000, 36, s.v. "indicative-informative abstract"). In a similar vein, Kaiser (1911, § 355) observed, with regard to annotative extensions and informative condenses, that

it is not always possible to adhere strictly to either one or the other form. Sometimes it will be more convenient to have a mixture of both, at other times it will be sufficient to quote the conclusion arrived at in the original information.

He illustrated such hybrid and quotational extensions with the following examples, which, again, are accompanied by their respective statements:

[7.20]. COTTON GIN ROLLER–DESCRIPTION

Intended to displace saw gin, advantages, il, invented by MPrior (§ 462).

[7.21]. BRAZIL–IMMIGRATION

Encouraged by government, number of immigrants, establishment of model colonies, nationalities (§ 465).

[7.22]. INSULATING MATERIAL–DESCRIPTION

Concludes "a tremendous step forward for the electrical engineer would be an insulating material of the flexibility of asbestos and the ideally high insulating and dielectric strength of mica" 1800 W (§ 464).

As examples [7.20] and [7.21] clearly show, the mixed form of extension tended to follow the generally terse, telegraphic style of the annotative extension, interspersing pieces of substantive information with general descriptions of content and form. In [7.20], the information that a cotton gin roller invented by a certain M. Prior was intended to supersede the saw gin was combined with indications that the original textual unit from which the information was taken discussed the advantages of the new invention and gave

an illustration thereof,⁴⁵⁶ while in [7.21], the extension stated that immigration to Brazil was encouraged by the government while signaling that the original source gave further information on the number of immigrants, their nationalities, and the model colonies in which they settled: in light of their brevity, they formed what could be called indicative-informative annotations. Example [7.22], on the other hand, is an example of an extension formed through the process of reduction by selection, in which the conclusion of the article is directly quoted: as such, it corresponds to what modern writers on abstracting call an “extract” (ANSI-NISO 1997, 1; Koltay 2010, 30).

Whereas Kaiser (1911, § 656) showed that the extension of a statement could take the form of a brief indicative annotation, a longer informative condense, or a combination of both, he did not give any explicit rules for formulating extensions on the grounds that “[i]t must be left to each individual index to treat that part of the information on lines best adapted to meet its own requirements”. However, he felt compelled to respond to what he identified as “a general objection to condensing and abstracting”, according to which “a restatement of an information divesting it of some of its accompanying clauses and isolating it from subsidiary subjects cannot in fact be a true representation of the original and may possibly convey a different meaning” (§ 656). To Kaiser’s mind, the argument that, because an informative condense omitted large parts of the text from which its contents were derived and did not give the latter in their original context, it was incomplete, liable to misinterpretation, and hence disqualified from being “a true representation of the original” threatened to subvert the rationale for such abstracts altogether and, accordingly, he sought to diffuse it with the following counterargument:

[t]he objection ... amounts to this that information must not be touched at all, it must be taken as it stands, because it cannot be reproduced exactly in another form.

This being the case, then it may with equal reason be argued for instance that a stenographic report of a speech is useless, for the voice of the speaker has been omitted; it may be further argued that a phonographic reproduction is quite inadequate, for the movements and expression of the speaker are wanting; even combined kinemato-phonographic reproduction is not complete, for in point of time, audience, receptivity of the hearers, etc reproduction is altogether impossible. All this will only lead to the negation of literature as a means of reproduction. What little truth there may be in this argument is but a recognition of our difficulties of reducing our thoughts to writing and of the imperfection of the means to this end at

⁴⁵⁶ For a description and illustration of the so-called “Prior cotton gin” to which the extension referred, which was invented by Matthew Prior of Watertown, Massachusetts in the mid-1890s, see Prior 1898.

our disposal. However true the latter may be, we must take literature as we find it with all its weak and strong points, for it is the basis of our work. Literature itself as has been shown is at best but an incomplete abstract (§§ 657–658; cf. §§ 60, 67, 71, 97).

Although Kaiser's articulation of his argument was somewhat obscure, its main lines can be reconstructed as follows. If it was indeed the case that a representation could be "true" only if it reproduced the totality of the attributes of the object being represented, then no true representation of anything was possible, for any attempt to represent a thing or person inevitably involved the loss or omission of some details of the original and so failed fully to reproduce its attributes: yet, many reproductions of a given object of interest, such as the stenographic, phonographic, or kinemato-phonographic (i.e., cinematic) records of a speech, were valid representations of the event that they recorded, despite their incompleteness. In the case of texts, stipulating the exact reproduction of a textual unit as a necessary criterion for creating a true representation thereof was to deny the possibility of creating any valid representation of a textual unit apart from copying it out in full and hence, in principle, to foreclose the creation of more concise surrogates thereof: this, apparently, is what Kaiser meant when he characterized the argument against condensing and abstracting as entailing "the negation of literature as a means of reproduction".⁴⁵⁷ In his estimation, setting such a high bar for the representation of texts was inappropriate. Invoking his view that language was inherently incapable of capturing in full the conceptual contours of the ideas, or mental pictures, that writers sought to convey in discourse (See Sections 2.2.1 & 2.2.3 of the current chapter), he maintained that *all* texts were by nature incomplete reproductions of the knowledge of the persons who created them: it was in this sense that one could speak of literature as "an imperfect abstract" of reality. On this view, the limitations hedging informative condenses were only a special case of the general limitations of language. The

⁴⁵⁷ One reason for the apparent opacity of Kaiser's argument at this point was his use of the word "reproduction", which conveyed two related, but distinct nuances. In late 19th and early 20th century English, "reproduction" commonly connoted "repeat[ing] in a more or less exact copy" and was especially used with regard to making copies of works of art and other non-textual materials (1888–1928, Vol. 8/1, 489, 2.b s.v. "Reproduce"; 2.a, s.v. "Reproduction"): indeed, Kaiser (1911, §§ 68–72) used the word and its cognates in this sense, contrasting illustrations as a mode of reproducing a concrete with texts as a mode of describing it. However, he also spoke of "reproduction" as an act that could be carried out "by means of literature" (§ 664, s.v. "Reproduction"). This latter use, which is the one in our passage, corresponded to a more general meaning of "reproduction" as "a representation in some form or by some means of the essential features of a thing" (Murray et al. 1888–1928, Vol. 8/1, 489, 2.b s.v. "Reproduction"). Thus, Kaiser's use of the word "reproduction" hovered between the specific notion of "exact copy", which, for him, required total representation, and the more general one of "representation of ... essential features", which did not.

fact that they did not represent the entirety of their original context was no more troublesome than the fact that the texts of the original documents from which they were taken did not—and could not—fully express the thoughts that their authors sought to convey: in both cases, one simply had to accept, and work within, the limitations of the textual medium with which one was working. In this way did Kaiser seek to defend informative condensations against those who might question their use.

Whether it took the form of a descriptive annotation, an informative condensation, or a combination of both, the extension helped fill out “the skeleton of the information” expressed in the statement by setting it into a context of some sort (Kaiser 1911, § 302; see Section 3 of the present chapter). Another data element that complemented statement and extension alike was the date of the information. This Kaiser defined as “the time—year, month or day—on which the action named by the process took place” (§ 351), though, inasmuch as some terms of processes represented qualities or conditions rather than actions or events (See Section 3.3.2 of the current chapter), it actually denoted the time at which the state of affairs indicated by a statement and described in the accompanying informative condensation held good. Kaiser insisted that the date of information “not be confounded with the date of publication ... i.e. when the information appeared in print” (Kaiser 1911, § 351): although the two dates were often likely to coincide, especially when the information consisted of news about current events or market conditions, a textual source might well describe historical events and trends over time as well. Kaiser took it as an axiom that “[m]ost information of any importance has a date” (§ 351). If a date of information was not specified in a given textual unit, it could “very often be supplied” by the indexer on the basis of his interpretation of the text (§ 351).

As regarded its form, the date of information could consist of a calendar year (e.g., “1887”), a fiscal year (e.g., “1889/1890”), a continuous range of years (e.g., “1890–1895”), or a discontinuous set thereof (e.g., “1873, 85, 94”): if it was supplied by the indexer and he was not certain of the accuracy of his assignment, he was to indicate this by attaching a question mark to the year given (e.g., “1893?”) (Kaiser 1911, §§ 351–352). Furthermore, Kaiser stipulated that “[i]n all cases where several years are given, they should be written in descending order thus: 1895–1890; 1894, 85, 73”; and so on (§ 352). His rationale for advocating this format had to do with filing, for formulating date ranges in this way supported the arrangement of different index items entered the same statement in descending chronological order so that entries bearing information about more recent

states of affairs would precede those containing information about earlier ones—a mode of arrangement, analogous to that of the individual letters within a correspondence file (cf. Chapter 6, Section 3.1, esp. p. 223, n. 250, above), that foregrounded access to the most recent information under each statement in the card file. If months and/or days were to be included in the date, Kaiser recommended that they follow the year “in the same descending order”, with the month represented in Roman numerals and the day in Arabic ones: thus, for example, “[t]he 15th of July 1900” was to be written “1900.VII.15” (Kaiser 1911, § 352). Not only did this ordering of the date’s elements conduce to the chronological arrangement noted above, but also, as Kaiser observed, it was “similar to that of the country” in its ordering of subdivisions (§ 352): just as a term for country with a subdivision had the name of a country precede its subdivision (e.g., UK, LONDON; see Section 3.2 of the current chapter), so did the name of the year precede its immediate subdivision, the month, which, in turn preceded its subdivision, the day. Here, then, was a shared systemic feature of structuring subdivisions, be they geographical or chronological: a whole always preceded its parts.

Whereas the extension and date of information were the parts of an amplification that augmented and specified the informational content of a statement, the remaining data elements served to identify and characterize the source of information from which this content had been drawn. First among these was the author (and/or title) of the textual unit associated with the information represented by a statement and its extension. For Kaiser, the primary significance of this element lay in the fact that it provided a foundation for assessing the credibility of the source and, hence, the trustworthiness of the information being summarized: in his words, “[f]or indexing the whole question of authors resolves itself into this and this only: To what extent do their name, rank or sources guarantee the reliability of the information they give” (Kaiser 1911, § 358). Kaiser’s concern with what latter-day theorists would come to call the “cognitive authority” (Wilson 1983, 13–30) of the sources of the information incorporated into a systematic card index was congruent both with his understanding of information as consisting of statements of fact and expressions of opinion and with his appreciation of the individual and perspectival nature of the knowledge represented in literature (See Section 2.1 of the current chapter): after all, if a businessman was to form a plan for action on the basis of information derived not only from his own observation but also from the testimony of others recorded in the business literature and summarized in the systematic card index maintained by his firm’s

intelligence department, he had to have some means of deciding whether the originators of the written information upon which he was relying were in a position to make accurate statements of fact and whether the opinions they deduced from their interpretations of the facts were likely to be well founded. The authoritativeness of a writer or a publication already figured among the criteria that Kaiser (1911, §§ 94–95) suggested should govern the selection of literature for indexing in the first place; the indication of the source of information in an amplification thus both served as a warrant that the indexed information did, indeed, come from a reputable source and could provide at least a hint of the (kind of) perspective that it represented.

In a domain, such as business, for which the primary medium of written communication was the periodical article, authors were legion: “Who does not read a paper or write an article nowadays?”, mused Kaiser (1911, § 75). One result of what he saw as the numerical hypertrophy of authors (§§ 75, 80, Point 4, 364) was that it became difficult for consumers of business literature to keep track of who was who among the persons writing on subjects of interest to them. Although some authors acquired enough of a reputation among members of (a given branch of) the business community to be recognized by name alone, most did not: “[i]n the majority of cases”, Kaiser observed, “the name of the author alone does not indicate much” (§ 359). Many publications, however, provided some information about an author’s qualifications, most often by appending to the paratextual presentation of his or her name a brief phrase or string of titles that stated his or her accomplishments, occupational positions, or institutional affiliations (e.g., “J. W. Stannard, Author of “British Business Methods” [Stannard 1908, 142]; “R. Borlase Matthews, Wh. Ex., A.M.I.C.E., A.M.I.E.E.” [Matthews 1907, 510];⁴⁵⁸ “William Judson, President, National Wholesale Grocers’ Association; President, Judson Grocer Company” [Judson 1908, [4]]). Kaiser considered such paratextual elements to be important indicators of an author’s cognitive authority, observing that

[t]he title or rank of an author may ... give significance and weight to the information, for it almost always indicates some responsible position or standard qualification. In the case of government officials and representatives, such as consuls etc the title is generally of more importance than the name (§ 359).

⁴⁵⁸ The string of acronymic titles indicated that the author had been a Whitworth Exhibitioner (Wh. Ex.), that is to say, the holder of a prestigious British scholarship for students of engineering, and was an associate member of the Institute of Civil Engineers (A.M.I.C.E.) and of the Institute of Electrical Engineers (A.M.I.E.E.). For the keys to these acronyms, see Holmstrom 1956, 444–445.

It may be noted that, in this regard, Kaiser's views were close to those of contemporary writers on the use of descriptive annotations in library catalogs, who recommended that, in their annotations to individual books, catalogers include an "author note" briefly giving the author's qualifications in relation to the subject about which (s)he was writing (Savage 1906, 3, 6–8, 53–54, 101–104): here, too, the purpose was to allow the user of catalog to form a judgment of the authoritativeness of the information given in the book.

Now in ordinary language, the notion of authorship typically carried with it the connotation of originality: in most general terms, the word "author" signified "[a] person who originates or gives existence to anything", that is to say, an originator or cause of something (Murray et al. 1888–1928, Vol. 1, 571, 1 s.v. "Author"), while, within the domain of literary production with which Kaiser was concerned, it typically referred to "[t]he original composer of a book or writing of any kind, as distinguished from a compiler, translator, editor, or copyist" (Whitney & Smith 1911, Vol. 1, 386, 3 s.v. "author"). Kaiser, however, took a more expansive view of authorship, according the status of author not only to writers whose writings presented original informational content but also to those who repackaged the work of others, for, as he observed, the information presented by an author might "not [be] based on original work but merely compiled" from other sources (Kaiser 1911, § 360; cf. § 94).⁴⁵⁹ In cases when a text selected for indexing represented a restatement of other persons' work, Kaiser envisaged several courses of action. First, if the original sources from which the author had taken his content were also present in the collection of the intelligence department, they were to be "treated independently" as the primary source for the information, with a reference made to the work of the compiler (§ 360). If, on the other hand, a compilation intermingled "new facts" with the original information or was likely to "save considerable time in consulting, as compared with the original", then it was best to index it separately as a distinct source of information (§ 360). Finally, if the sources used by the author of the compilation "[were] known not be reliable",

⁴⁵⁹ It is interesting to note that, within the more specialized discourse of library cataloging, Cutter held a comparably expansive, though not entirely identical, notion of author. His definition ran as follows: "*Author*, in the narrower sense, is the person who writes a book; in a wider sense it may be applied to him who is the cause of the book's existence by putting together the writings of several authors (usually called *the editor*, more properly to be called *the collector*). Bodies of men (societies, cities, legislative bodies, countries) are to be considered the authors of their memoirs, transactions, journals, debates, reports, etc" (Cutter 1904, 14, s.v. "Author" [emphasis his]). This definition was taken over, with some light modifications in the first Anglo-American Rules for Cataloguing (Committees of the American Library Association and {British} Library Association 1908, xiii, s.v. "Author").

it was advisable “in most cases” not to index the information at all (§ 360). Whatever the specific course of action the members of an intelligence department might choose to take in any given case, Kaiser maintained that, as a rule, when a given textual unit was derivative of another, “[s]pecial care should be exercised in identifying originals and in checking compilations” (§ 360): in such situations, he added, “a reasonable amount of verification is indispensable”.

Virtually identical to the treatment of textual units that were compilations of others was that of a comparable phenomenon frequently encountered in trade periodicals—namely, the republication of an article that had originally appeared in one periodical in others, often in truncated or expanded form. Kaiser (1911, § 362) illustrated this with the following scenario: “An article by the Belgian consul appeared first in the “Tropical Agriculturist” and was then quoted in the “Trades Review””.⁴⁶⁰ Positing the case in which an indexer’s source for the information was the “Trades Review”, he considered the “Tropical Agriculturist” to be the indirect source or, as he preferred to call it, the “indirect author” (§ 362). In this situation, he advised that the indexer seek to procure a copy of the original article from the “Tropical Agriculturist” and use it as the basis of indexing; however, if the version published in “Trades Review” stated “new facts or opinions”, separate index entries were to be made from it as well (§ 362). At all events, he stipulated, any entries made for information drawn from this article should include the name of the Belgian consul and indicate both of the journals in which versions of it appeared.

Another situation confronting indexers was the fact that many trade publications did not identify the authors of all the textual units that they published. As Kaiser (1911, § 361) observed, “[m]any articles, leaders, contributions, correspondence etc appear without the author’s name being given, or have merely initials or pseudonyms in its place”. In such cases, he counseled that “the standing of the periodical, in which the article appears, may be taken in place of the author”—that is to say, “the title of the periodical [was to be] treated as the author” (§ 361). Although Kaiser apparently held that the reputations of journals could serve as a sufficient warrant for the quality of the information in the anonymously or pseudonymously authored articles that they published and that their editorial positions afforded an indication of the perspectives that one could expect their authors to represent,

⁴⁶⁰ For a comparable case, see Kaiser 1911, § 458, in which he cited *in extenso* an article written by the chemist (and special library pioneer), Arthur D. Little and entitled “How paper affects metal”, which was first published in the journal *Printing Art Sample Book* and then republished in the *Paper Makers’ Monthly Journal*.

he was also careful to note that “periodical literature is ever subject to more or less radical changes” (§ 361): perceptions of a given periodical’s quality might rise or fall and editorial viewpoints might shift over time, requiring one to amend one’s assessment of the reliability of the information that it purveyed. He also observed that other kinds of documentary materials, including “manuscripts, cuttings, hand bills or notes”, might also fail to indicate the author of the texts that they contained, either because they were anonymously produced or because the portion of the document originally giving the name had been lost (§ 363). These constituted harder cases than unsigned periodical articles, for there was no indirect way of assessing the authoritativeness of the information that they contained; accordingly, treatment of them required great circumspection on the part of the indexer. The information that they contained “must be verified”, urged Kaiser, adding that “if that be impossible it is not safe to make use of it” (§ 363). In the case of presently unverifiable information that was nevertheless considered to be significant, he recommended that “it be kept back for possible future verification” rather than discarded altogether (§ 363).

Whether the title of a periodical accompanied the name of an author or was treated as an author in its own right, Kaiser (1911, § 362) believed that it “should be accompanied by the place and date of the publication as far as available”, a practice that was to be used for other kinds of documentary materials as well. The place of publication, which, as a rule, was the city where the publisher were based (cf., e.g., the examples in §§ 462–479), could serve, in many instances, as an indication of the national or geographical point of view with respect to which the information was formulated (cf. § 343), while the date of publication obviously “state[d] the time when the information was first published” (§ 365). The granularity of the date of publication varied with the kind of documentary material being indexed: for books and pamphlets, it was typically a year, whereas for articles culled from periodicals, it was a day or month within a given year: thus, the date of publication was to be formally expressed in the same manner as the date of information—i.e., in the descending order of year, month, and day. In the case of texts that did not give their date of publication and of unpublished documentary materials, Kaiser recommended suppletion of a date, be it that of publication, of composition, or of receipt by the intelligence department, “even if only approximately correct” (§ 365): these were to be accompanied by a query mark, “unless their correctness ha[d] been satisfactorily verified”. Stating the date of publication as fully as one could was important, for, in situations where several index items

entered under the same statement also shared the same date of information, the date of publication could serve as a basis for further subdivision (§§ 365, 396).

Other bibliographical features of a given textual unit could find a place in the amplification as well. Observing that “[i]n cataloging a book, note is taken of its pages, edition, series, volume, part, supplement, size, etc”, Kaiser (1911, § 366) suggested that such attributes of a publication could be listed in an index entry as well “[s]o far as practicable”. In practice, pagination appears to have been the bibliographical element that received the greatest use. This was especially true for records containing information from periodical articles, in which the initial page of the article in question was appended by means of a hyphen to the date of publication: thus, for example, “Engineer, London 98XI18-506” indicated an article beginning on p. 506 of the issue of the London-based journal *Engineer* published on 18 November, 1898 (§§ 470-471). Otherwise, Kaiser recommended that if an indexer wanted to signal the extent of a given article, he should do so by giving the approximate number of words comprising it rather than recording the page range that it occupied, his rationale being that variations in the physical size of pages and typographical layout across different periodicals rendered the number of pages a poorer indicator of the comparative length of texts than the number of words, which provided a uniform measure thereof; nevertheless, he pragmatically conceded that “if an article extends over ten or more pages, the number of pages might be given in preference to the number of words” (§ 366). As examples [7.5] and [7.22] demonstrate, the word count, when included as an element in the amplification, was attached to the end of the extension.

The final major element of the amplification was the call number of the document that carried the textual unit from which the information embodied in the statement and extension had been taken. This, as we have already seen, was a device common to card index and card register records alike (See Chapter 6, Sections 3.1 & 3.4, above). Within the context of a systematic card index, Kaiser (1911, § 367) held,

[t]he function of the call number is to supply a short symbol for the purpose of quoting or indentifying [*sic*] the information [*sci.*, the textual unit—TMD], and also for locating the original indexed. It is in many ways convenient to be able to quote any article by a simple number, be it for future reference, or for giving the authority for any statement made.

Although, in this passage, Kaiser foregrounded the rôle of the call number as a shorthand way of referring to documents, he by no means undervalued its use as a locator of textual units within the document files of an intelligence department (cf. § 122). A clear indication

of this was his recommendation that, in the case of amplifications containing information taken from periodical articles, the page number of the article in question was to be attached as an extension to the call number: thus, for example, “P23.34–345” referred to the article beginning on p. 345 of the 34th issue of the journal designated as P23 that the intelligence department had received (1911, § 367; cf. 1908, § 238 & Chapter 6, Section 3.1, above). In such cases, the page number was not repeated after the date of publication (cf., e.g., the examples in Kaiser 1911, §§ 450–451, 462–463, 475) so that the call number became, in effect, the primary means not only of finding the original documentary, or filing unit, from which the information was taken but also of finding the place of the information within that unit. Similarly, in the case of call numbers for letters from which information had been indexed, the date of the individual letter was to be appended to the call number to individuate it and make it findable within the set of letters belonging to the filing unit of which it formed part (e.g., 1911, §§ 476–477; cf. 1908, § 82 & Chapter 6, Section 3.1, above). The call number, then, formed the point of intersection between the information recorded and incorporated into a card index and the files containing the documents from which this information had been derived: through it, the systematic card index was set into relation to the other elements of the knowledge organization régime of which it was a component—the document files organized on the basis of documentary kinds and the various forms of card registers associated with them (cf. Chapter 6, Sections 2.2 & 3, above).

7.4.4. The Index Item as Unit Record

As we have already seen, a statement and its amplification conjointly comprised a single unit of information, or index item (Kaiser 1911, § 305; see Sections 3 & 4.3 of the current chapter). Once a statement had been formulated and the various elements of its associated amplification had been collected, it remained to record them upon a material medium and so create a durable physical representation of the index item, one that could be brought together with similarly constituted representations of other index items and stored in such a manner as to be available for consultation when necessary. For Kaiser, the medium of choice was, of course, the index card (See Chapter 6, Section 3.4, beginning).

The physical parameters of index cards provided the material conditions of possibility for their use in SI. Rectangular in form, they came in a variety of sizes, of which the most widely employed in the commercial world were approximately 3 x 5 inch, 4 x 6 inch, and 5 x 8 inch or, more exactly, 7 ½ x 12 ½ cm, 10 x 15 cm, and 12 ½ x 20 cm (Hammond 1911,

176–177; Mares 1909, 19; Perry 1906, 66; Wagemaker 1907, 13). Although Kaiser (1908, § 53; 1911, § 401) did not prescribe any one size for use in indexing, he seems to have assumed that 3 x 5 inch, or 7 ½ x 12 ½ cm, cards—the standard size used by libraries and bibliographic agencies for card catalogs (Institut International de Bibliographie 1905a, 69 & 134; James 1902a, 187, 188; Library Bureau 1903, 18; Sayers & Stewart 1913, 19; cf. Krajewski 2002, 105–106)—would be the norm. He considered sturdiness to be a desirable trait of cards, though he also warned that thick cards could take up as much as one-third more space in a card cabinet than thinner cards “with a strong fibre” (Kaiser 1911, § 370): at any rate, the card had to be of sufficient thickness that its surface would be entirely opaque—an important consideration with regard to legibility. Like many other writers on index cards, card systems, or card catalogs (e.g., Hudders 1916, 29, § 130; Mares 1909, 20–21; Perry 1906, 66; Sayers & Stewart 1913, 17), Kaiser (1911, § 370; cf. 1908, § 51) insisted that “cards should be mathematically uniform in size and thickness”, for irregularities in dimensions would render them more difficult to manipulate once they had been filed. He recommended that cards be typewritten rather than handwritten on cards free of any ruled lines (1911, § 371) on the grounds that typed cards were easier and more time-efficient to consult than those inscribed by hand (1908, § 100). As for the color of cards, he advised that, as a rule, white cards used in conjunction with black typewriter ink were optimal because the contrast between the two would ensure that “the information can be read with greatest ease” (1911, § 371); alternatively, one could use differently colored cards to indicate the different “forms of literature”—that is to say, kinds of documentary materials—from which the information was drawn (1911, § 371; cf. 1908, § 112). Otherwise, index cards were to have a round perforation near their bottom edge along the midpoint of their left-to-right axis (1908, §§ 45, 52): this provided space through which a rod could be passed to hold the card and its fellows in place within the drawer of the card cabinet in which they were filed.

A common assumption among designers of card systems was that each separate index card would constitute a unit record representing a single item of information (Flanzraich 1993, 405). Kaiser (1911) fully shared this view and expected that, as a rule, one index card—which we shall henceforth call a unit card—would bear one index item, though he also acknowledged that, on occasion, the length of an informative condense might prove too great for the spatial limitations of a single card and so require the distribution of an index item over two cards (§§ 356, 374). To be sure, the surface area of a unit card set constraints

on the indexer and called for the “judicious saving of space” through such measures as the avoidance of unnecessary punctuation and verbiage (§ 374). However, it also provided a *tabula rasa* upon which the indexer had the opportunity to display the fruits of his labor in a systematic manner. According to Kaiser, the optimal mode of doing so was to “assign ... a fixed place” on the surface of a unit card to each element of an index item with the stipulation that “[t]hese assigned places do not admit of variation” (§ 375). In his view, such systematic disposition of index items upon unit cards was “of the greatest importance” for the constitution of an effective card index, for it facilitated the work of the indexer and of index user alike:

This [sci., the recording of individual elements of information in an index item in their assigned positions—TMD] will enable us to file the cards on a uniform plan, and it will be comparatively easy to scan hundreds of cards in a very short time, if in search of information which has not been brought out by separate entries [sci., the information contained in amplifications—TMD]. As we aid the sense of touch by having cards of uniform size and thickness, so we aid the ocular sense, by having designated positions on the card for each specific kind of information. To this may be added the advantage to the indexer, for whom this arrangement affords an automatic check as to the completeness of each item indexed (§ 375).

In extolling the use of a standard arrangement for inscribing the different elements of an index item on a unit card, Kaiser was giving voice to another core assumption shared by the compilers of commercial card systems in the business office, card catalogs in general libraries, and card bibliographies in offices of documentation alike: that uniformity in the structured display of information on unit cards promoted the efficient preparation, filing, and consultation of such records and so enhanced the general usability of the card system—be it a catalog, register, or index—of which they formed the basis.

The structuring of the information on a unit card began with a division of its surface into two separate fields representing the two primary divisions of an index item—namely, the *statement field* and the *amplification field* (Kaiser 1911, § 376). Figure 20 shows that the former field occupied an area covering a little over the topmost quarter of the card, which notionally covered three lines (§§ 376, 380, Nos. 1–3) while the remaining portion of the card’s surface was given over to the latter. Kaiser gave indexers leave to draw “[a] double red line” to mark the division between the two fields, if they so desired (§ 376). Insofar as one can judge by the illustrations of subject index cards in his books, he does not seem to have done so in his own work; nevertheless, he clearly did consider the two fields as distinct

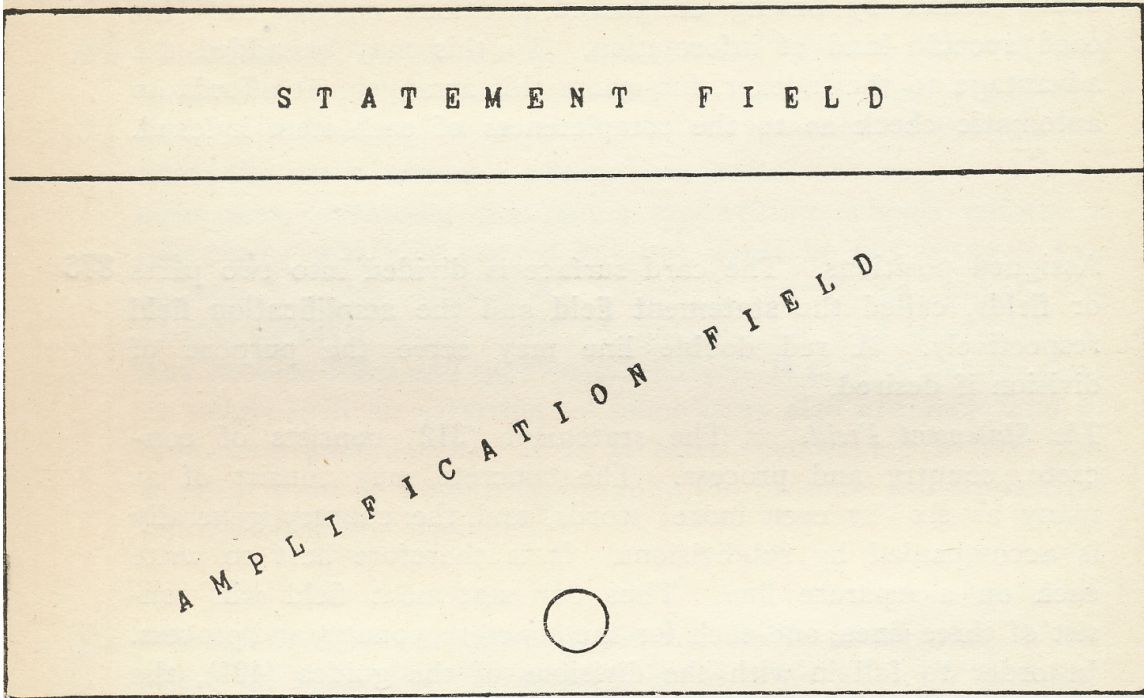


Figure 20: The statement and amplification fields on a unit card (Source: Kaiser 1911, § 379).

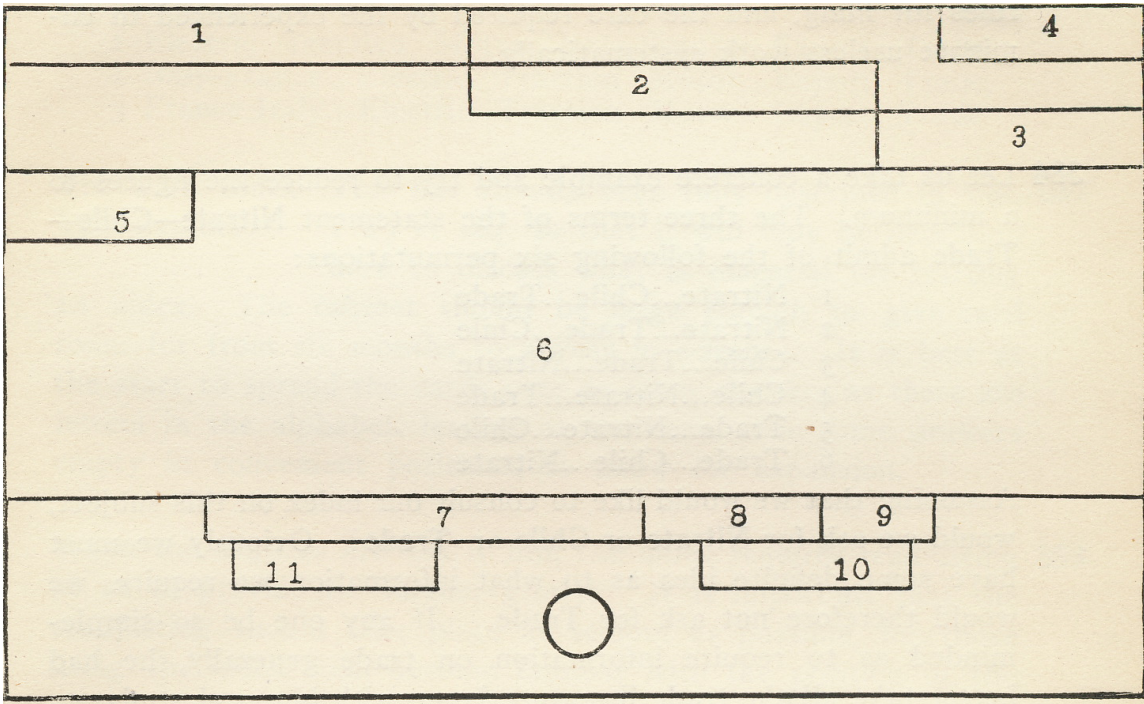


Figure 21: The positions of elements of index items on a unit card (Source: Kaiser 1911, § 381).

units, each of which possessed its own internal structure. Let us briefly consider them in turn.

As its name indicated, the statement field was that region of the card on which the statement of the index item was recorded. Taking the canonical tripartite form [CONCRETE]–[COUNTRY]–[PROCESS] as his model, Kaiser stipulated that its elements were to be distributed over three progressively indented lines (Positions 1–3 of Figure 21; cf. Kaiser 1911, §§ 376, 380, Nos. 1–3). In the first and topmost of these lines, the indexer was to record the term for the concrete (or, in the case of the variant tripartite form, the term for the country), which, ideally was to extend over the leftmost two-fifths of the card's length (Position 1 in Figure 21). The second line was to receive the term for the country (or, again, in the variant tripartite form, the term for the country), which was to be entered at a point situated about two-fifths of the card's total length from its left edge and was to extend over the subsequent two-fifths of the card's length (Position 2 in Figure 21). Finally, the term for process was to be inscribed on a third line, beginning at a point roughly one-fifth of the length of the card from its right edge (Position 3 in Figure 21). The result was the following configuration of the statement's elements over the three lines:

[CONCRETE]
 [COUNTRY]
 [PROCESS].

If a term was bipartite, then the space notionally occupied by [COUNTRY] in the foregoing sequence was left blank on the card (Kaiser 1911, §§ 375, 462–467, 498, 516).

One may well wonder why Kaiser adopted such a layout for inscribing statements on unit cards. Several interrelated factors seem to have informed his choice. In *Systematic Indexing*, he explained that he found it necessary to place the terms on separate lines in order to accommodate long, multi-word terms of concretes and terms of countries featuring subdivisions (Kaiser 1911, § 376). As for the use of progressive indentations, it was analogous to the arrangement of filing terms on unit cards in card registers (See Chapter 6, Section 3.4, esp. pp. 257, 259, above), about which he had written in *The Card System*:

The most important portion of the face of the card is the left upper corner, and this place should always be reserved for the subject of the register ... These *first terms* as they may be called should always be written in capitals so as to distinguish them from other terms and make them more prominent When first terms are accompanied by second and third terms ..., they are also written in capitals but are indented under the first terms to show that they indicate subdivisions (1908, § 98 [emphases his]).

Mutatis mutandis, this rationale held for his treatment of the three terms of the tripartite statement as well. The first term, which functioned as the main filing term, was accorded the most prominent position in the statement field, while the second term and third terms, which served as successive subdivisions thereof occupied subordinate positions signaled both by their placement on lower lines within the field and by their indented position within the line; as with their analogues in the card registers, all three terms were to be typed in capital letters (1908, § 98; 1911, § 377). Furthermore, the differential positions of the three terms aligned them with the positions of the guide cards used to divide card index files into smaller segments and make them more navigable (1911, § 376), a feature of SI about which more will be said in Section 5.2.1 of the current chapter. In short, Kaiser employed the convention of writing the different elements of the statement on successive, progressively indented lines in order to assure sufficient space for those terms in the statement that tended to be more complex in syntax and to give visual cues about the relative importance, and function, of terms within a statement for the purpose of facilitating both filing and searching. His choice of structural mechanism may well have been inspired by the treatment of entries in the domestic directories of the PCM's Bureau of Information, in which the three successive elements identifying a firm—namely, its name, street address and/or city, and country—were likewise written on descending, progressively indented lines, a format also adopted by the CIB for the card directories housed in its reference cabinets (See Figures 1a & 1b in Chapter 4, Section 1, p. 128, above): interestingly, the Bureau's layout appears to have been an adaptation of contemporary conventions for writing addresses in commercial correspondence (e.g., Belding 1905, 9–10; Bray 1908, 16; Burbank 1893, 15–16; Erskine 1906, 6, 7–8; Hotchkiss 1911, 274–275; Ragon 1900, 4–5), which thus may have been the ultimate, if indirect, source for Kaiser's formatting of statements on cards.

Although the statement field was intended primarily for the presentation of the statement, it also contained one element from the amplification—namely, the call number, which was placed in the upper right-hand corner of the card (Position 4 in Figure 21). Situated directly opposite the main filing term, it occupied a position that, according to Kaiser (1908, § 98), was “the place of second importance on the surface of the card”. His location of the call number in that position reflected a practice that was widely diffused across different applications of the card system. At the office, the card records for numerically arranged correspondence files routinely reserved the upper right-hand corner

for entering the number of the filing unit to which a card made reference (e.g., Byles [1911], 22, 24; Hudders 1916, 81, § 369; Library Bureau 1896, 3–4). Many, though by no means all, library card catalogs likewise used this area of the card for giving the class or call number of the book to which it referred (e.g., Sayers & Stewart 1912, 22–24, Figs. 9–13),⁴⁶¹ while the IIB and other bibliographic agencies engaged in compiling card-based bibliographies deployed it for entering the UDC number assigned to a given work (e.g., Institut International de Bibliographie 1905a, 120, § 231 & 147–150, nos. 5–12; Sayers & Stewart 1912, 21, Fig. 8; cf. Pollard 1926a, 14–15). It is evident that, in all these cases, it was the visual prominence of the position and its proximity to that occupied by the primary filing element that motivated its use as a *locus* for class or call numbers. Kaiser’s assignment of the call number to this privileged position was an indice of its importance as a direct *Bindeglied* between index entries and their source documents.

All other components of the amplification were entered in the amplification field, the general structure of which was governed by a simple principle: those parts of the amplification pertaining directly to the informational content taken from the textual unit being indexed preceded those that gave bibliographical data about the textual unit as a documentary source. Appearing in the topmost left corner of the field was the date of information, which occupied the beginning of the line immediately below the final one of the statement field (Position 5 in Figure 21). It enjoyed this prominent position within the amplification field in virtue of its rôle as a filing mechanism for subarranging index items with the same statement: these were arrayed in reverse chronological order, with unit cards bearing the most recent dates of information placed before those with earlier dates (Kaiser 1911, §§ 352, 393; see Section 4.3 of the current chapter).⁴⁶² Immediately following the date

⁴⁶¹ Sayers and Stewart included examples of cards from the New York Public Library, the Harvard University Library, the John Crerar Library in Chicago, the Carnegie Library in Pittsburgh, and the Boston Public Library placing the call or class number in the upper right-hand corner of the entry. By contrast, the Library of Congress preferred to situate the call number to the right of the central perforation near the bottom edge of perforated cards (e.g., Sayers & Stewart 1912, 20 Figure 7) or “near [the] center of [the] lower margin” in unperforated ones (Hastings 1914, 5; cf. p. 4, Sample 1) while Dewey (1898, 25, § 8m & cf. the examples on pp. 29–31, 33–46) preferred to place the call number in two lines, one giving the class number and the other, the book number, in the upper left-hand corner of the card, a practice that was adopted by many librarians, especially in the United States (e.g., Dana 1913, 101–103 [examples]; Hitchler 1915, 26–31; Parsons 1903, [14]–[15], Figures I–VI). In England, Brown (1914, 187, Figure 40) placed the class number in the upper left-hand corner of card entries in classified catalogs, but in the lower right-hand corner in alphabetical, or dictionary, catalogues (pp. 186, Fig. 37, 188, Fig. 42, & 190, Fig. 44).

⁴⁶² Interestingly, the format of bibliographic unit cards for the IIB and affiliated institutions accorded a comparable place—the beginning of the line located immediately under the one bearing the main

of information was the text of the extension, which, as we have noted, could vary in length from a word or two to a fairly long paragraph (see examples [7.11] & [7.16] in Section 4.3 of the present chapter), and for which, accordingly, Kaiser reserved much of the central portion of the card (Position 6 in Figure 21). Above the perforation near the bottom of the card, the title and place of publication, the date of publication, and data relating to the edition, the pagination, or the number of words in the original textual unit were to be entered on a single line (Positions 7–9 in Figure 21, respectively), although, as we have seen, Kaiser sometimes attached statements of the number of words directly to the end of the extension (See examples [7.5] & [7.22] in Section 4.3 of the current chapter, above, & cf. Figure 22, below). Finally, the name of the person who was the author of the textual unit, if known, was to be written on the right-hand side of the line following the title line (Position 10 in Figure 21), while, in the case of textual items that had been published in multiple periodical sources, the name of the original venue of publication, or the indirect author, was to be written on the left-hand side of the same line, immediately below the title of the publication that was actually being indexed (Position 11 in Figure 21). Unlike the elements in the statement field, which, as we have noted, were typewritten exclusively with capital letters, those of the amplification field were inscribed in a normal mixture of upper- and lowercase letters, a convention that rendered them less visually prepossessing.

Kaiser also proposed applying one additional convention to the preparation of unit cards that did not form part of the amplification *per se*, but stood in close connection to it. If an indexer wanted to indicate that a particular index entry contained, or referred to, information that was judged to be especially significant to the work of the organization for which the index was being maintained, he had the option of marking the top edge of the card in ink (Kaiser 1908, § 157; 1911, § 368). Such “marks of relative importance” were intended to allow users of the index “to pick out at once the best information” in the index: as such, they added an evaluative element to the representation of the index item, functioning as, in effect, as recommendations (1911, § 368). Not convinced that this mode of

headings (author’s name and UDC classification number) and preceding the other elements of the bibliographic inscription such as the title, imprint data, and so on (e.g., IIB 1905a, 147–150, nos. 5–10)—to the date of (initial) publication of a book or article and for much the same reason: to sub-arrange cards bearing the same UDC number by date, beginning with the latest and progressing backwards in time (e.g., IIB 1905a, 121, § 233A; Pollard 1926a, 15). The parallel between the position and filing rôle of the date of publication in the IIB’s cards and that of the date of information in Kaiser’s is striking and raises the possibility that the former may have inspired the latter: however, given the lack of any coordinate evidence for such influence, it is perhaps safer to interpret the similarity as a case of convergence between two independently formulated designs.

distinguishing high-value index items was appropriate for all contexts, Kaiser urged that it be used with circumspection: he held that, for the sake of consistency, only a single indexer should determine which items were to be marked in this manner; furthermore, the person making the determination should be highly sparing in his use of these marks, lest they become overused and so lose their discriminative capacity for singling out truly high-quality information.

This, then, was the basic pattern for encoding an index item on a unit card in SI. As a matter of course, Kaiser (1911, § 369, Point 1) considered it important to “writ[e] the result of indexing on cards in accordance with uniform rules” and thus laid great stress on the need for rigorous adhesion to the precepts for the placement of data elements on cards that he had elaborated. Nevertheless, he also recognized that there was some room for variation in the inclusion or omission of certain data elements. Such flexibility varied by field. In the statement field, the only allowable exception to the stipulated pattern was omission of the second term of the statement as, for example, in the unit card pictured in Figure 22, which features a bipartite statement following Statement Form [7.1]: otherwise, the first and third terms of the statement were obligatory, as was the call number in the upper right-hand corner.⁴⁶³ On the other hand, Kaiser (1911, § 378) gave indexers much greater leeway in formulating the amplification field: in his words, “[c]onsiderable latitude may ... be allowed here to fit in with the requirements of a given index”. Amplifications might vary not only in the kind of extension—i.e., descriptive annotation or informative condense adopted—but also in the degree of detail with which the bibliographically oriented data elements were treated. Three examples may serve to illustrate the range of variation. Figure 23 depicts an index item relating to a republished periodical article and its amplification field displays a relatively full set of data elements. First comes the date of information, which is followed by a very concise descriptive annotation. Near the bottom of the card stands the line giving the title, place, and date of publication of the periodical from which the article was indexed (*in casu*, the May 2, 1898 issue of the journal *Tropical Agriculturist*, published in Colombo,

⁴⁶³ A number of example cards given in *Systematic Indexing* don’t have a call number, but Kaiser (1911, § 461) explicitly noted with regard to these (§§ 464–472, 478) that their call numbers had been deliberately omitted. Although he didn’t specify a reason for omission, it is most likely that he did so to simplify the presentation.

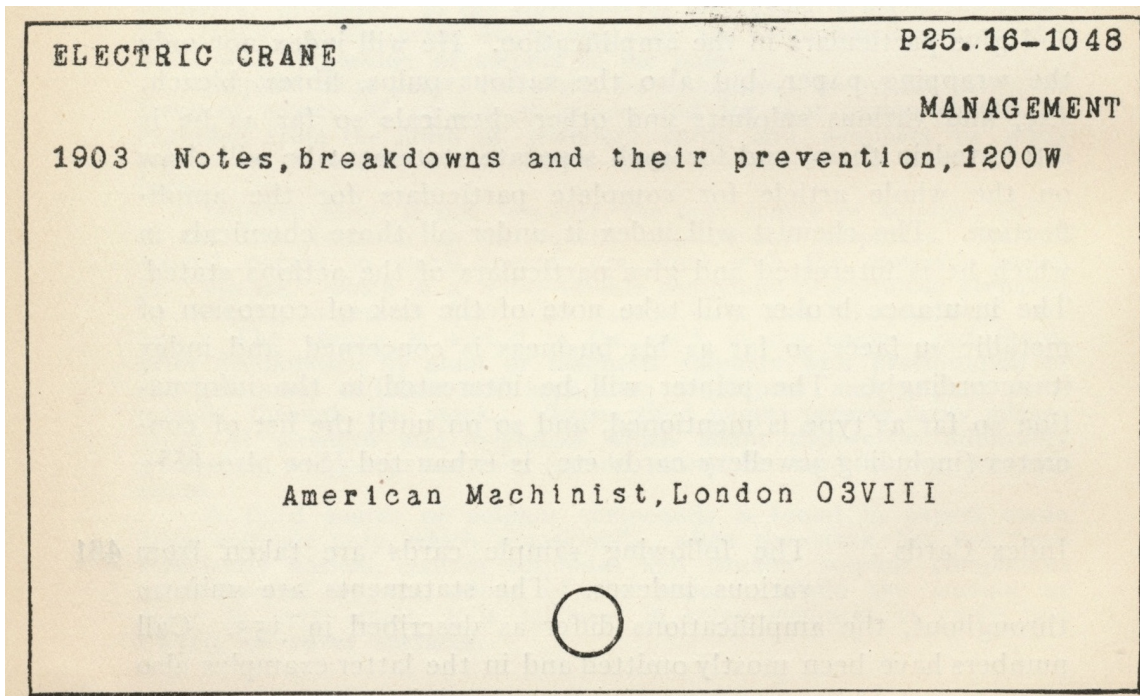


Figure 22: Example of a unit card with bipartite statement, an extension taking the form of a descriptive annotation, and an indication of length in words at the end of the extension (Source: Kaiser 1911, § 463).

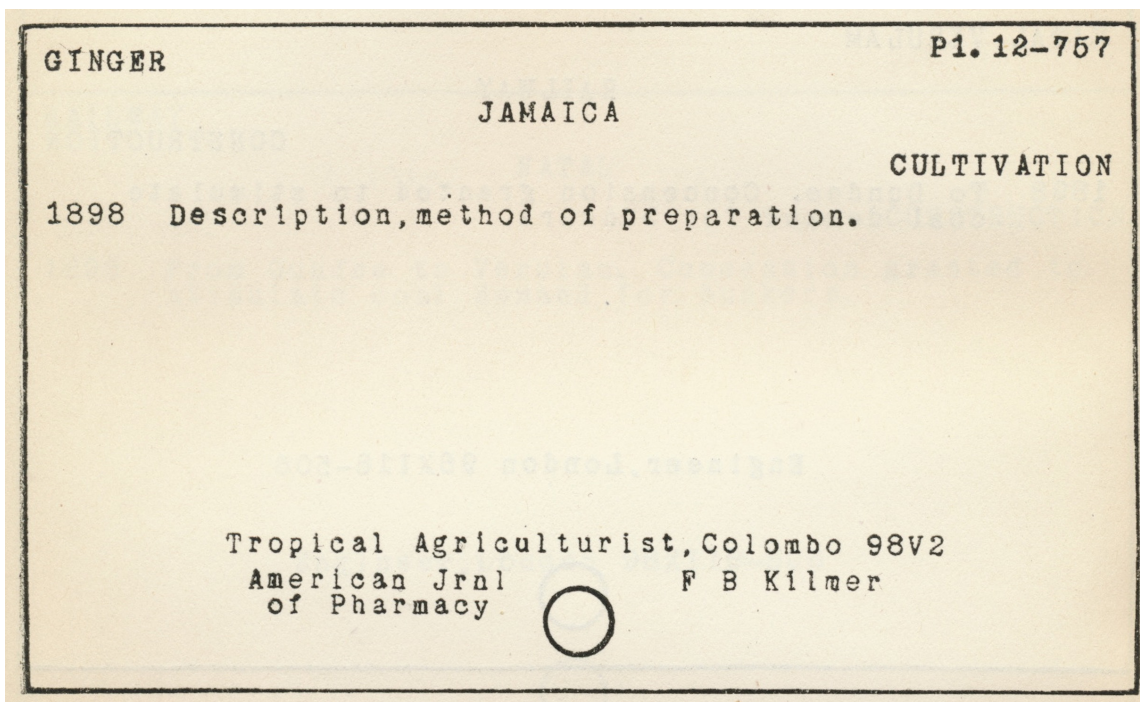


Figure 23: Example of a unit card with tripartite statement, an extension taking the form of a descriptive annotation, and bibliographical information including author and indirect author (Source: Kaiser 1911, § 475).

IMPORT DUTY(GROUND WHITE LEAD)	C709-07X24
AUSTRALIA	
	EFFECT
1907	The doubling of the import duties on dry white lead and ground white lead is obviously intended to foster the creation of a white lead industry in Australia.

Figure 24: Example of a unit card with tripartite statement, an extension taking the form of an informative condense, and no bibliographical information (Source: Kaiser 1911, § 477).

Ceylon), below which are given the author (*in casu*, F. B. Kilmer) and the indirect author, that is to say, the periodical in which the article had originally appeared (*in casu*, the *American Journal of Pharmacy*).

Figure 24, on the other hand, provides an example of a much less structurally complex amplification. As is apparent from the form of the call number (*in casu*, C709-07X24) in its upper right-hand corner (See Chapter 6, Section 3.1; Section 4.3 of the present chapter, end, above), the card represents an index item based on a letter. The amplification field consists solely of the date of information and a short informative condense: no data elements pertaining to the documentary source are present, save for the call number in the statement field. As a rule, Kaiser (1908) dispensed with bibliographical data elements for index items derived from such documentary materials as correspondence (§ 185 [bottommost two cards]), press cuttings (§§ 235-236), and manuscript documents (§118):⁴⁶⁴ in these cases,

⁴⁶⁴ With regard to manuscripts, this tendency is fully borne out in some of the Tariff Commission's index files, in particular its Index to the Iron and Steel Evidence (TCP 5/2/9), which contained index items culled from the (unpublished) oral and written statements of evidence, as well as its Indexes to the Questionnaire for Hemp, Jute, and Linen (TCP 5/2/19) and to the Woollen Questionnaire (TCP 5/2/19), which were composed of index items taken from responses to the Commission's forms of

the user of the index had to take recourse to the intelligence department's numerical registers (See Chapter 6, Section 3.4, esp. pp. 259, 261, above) to identify the textual sources for the information given.

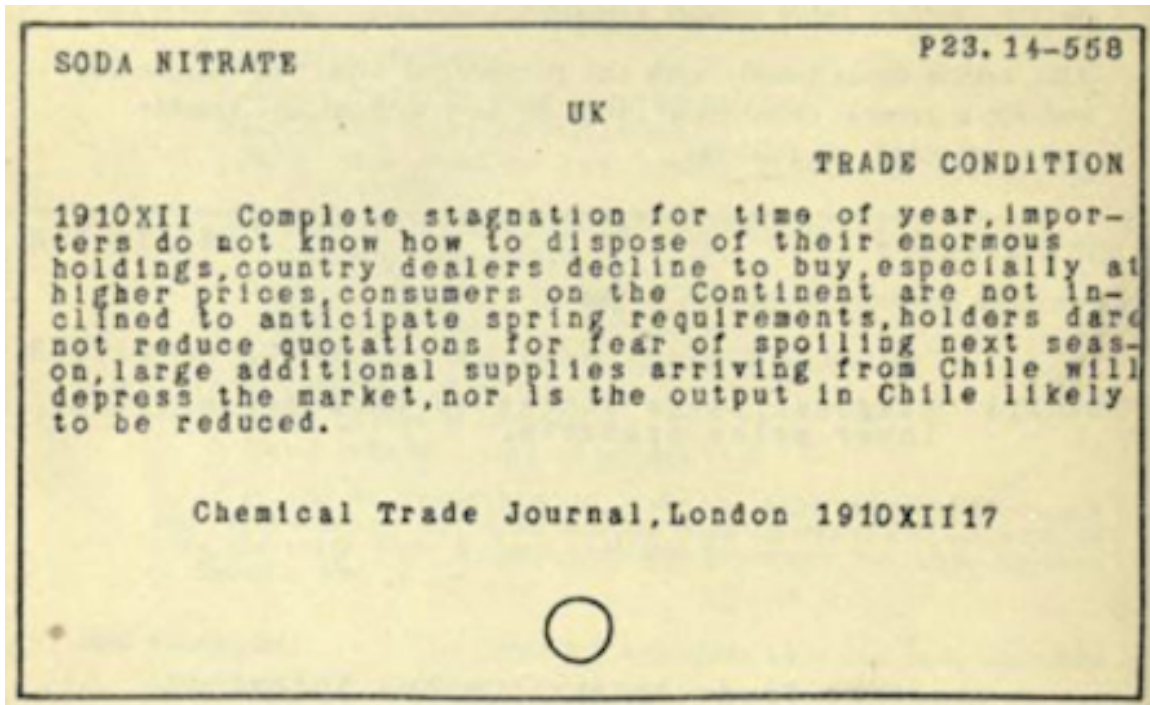


Figure 25: Example of a unit card with tripartite statement, an extension taking the form of an informative condense, and bibliographical information for an anonymous author (Source: Kaiser 1911, § 477).

Finally, the card depicted in Figure 25 strikes a mean between the fullness of the amplification in Figure 23 and the austerity of that in Figure 24. Here, the original textual unit on which the index item is based was an anonymously published article from a trade journal: accordingly, the amplification gives, after the date of information and a fairly long informative condense, a line signaling the title of the periodical, its place of publication and the date thereof, but without any indication of the author. As the foregoing three examples show, the presence or absence of the bibliographical data elements in the amplification field was largely contingent on the documentary form and attributes of the textual unit from which an index item was drawn, whereas those components of the amplification dealing with the informational contents of the textual unit—the date of information and the extension—were a constant presence in index items, even if they varied in form (e.g., simple

inquiry: in the index items from these indexes, not only did the amplification lack all bibliographic data elements save for the call number, but it also omitted the date of information, so that it consisted of the extension alone.

year dates, as in Figures 23 & 24, vs. complex year dates, as in Figure 25, in the case of dates of information) and content (e.g., descriptive annotations, as in Figure 23, vs. informative condenses, as in Figures 24 & 25, in the case of extensions). As with statements, any room for variation was limited to the inner structure of the component elements, while the general structure of the amplification field remained invariant: the indexer could, in many circumstances, leave the position for a given element unoccupied but he was not at liberty, in any circumstances, to alter the positions themselves.

Ultimately, a few simple principles of arrangement seem to have determined the general order of the data elements in the representation of index items upon cards. First, the more important an element in an index item was for the purpose of filing a unit card, searching for it, or locating the textual unit to which it referred, the closer to the top of the card it was to be placed so that it would be more readily visible (cf. Kaiser 1908, § 98): this tenet explains the spatial precedence of the statement field before the amplification field on the card and, likewise, the inclusion of the call number within the statement field. Second, within each of the two fields, the most important element for filing or searching—namely, the first term of a statement in the statement field and the date of information in the amplification field—occupied the visually most salient position in the field—to wit, the upper left-hand corner (cf. § 98), while subsidiary filing elements (the second and third terms of the statement in the case of the statement field and the date of publication in the case of the amplification field) were given less prominent positions below them. Third, within the amplification field, the data elements pertaining to the informational content being represented came before those giving bibliographic data about the textual source of this content—an order of precedence congruent with Kaiser’s conviction that the primary goal of a systematic card index was to provide direct access to subject-related information, insofar as this was possible (See Chapter 6, Section 3.4; Section 1 of the current chapter, above). Underlying these three principles was the supposition that, like most text-bearing objects written in English and other standard European languages, a unit card would typically be read top to bottom and left to right—a basic assumption that informed the use of card systems at the office, in the library, and at the bibliographic agency alike.

Kaiser’s application of the three principles of arrangement to the formatting of index items on unit cards resulted in a structure that encouraged the user of an index visually to take in the content of individual cards by beginning with the statement at the top of the card, passing through the extension in its middle, and ending with whatever bibliographical

data were given at its bottom. To be sure, this progression conformed to his conceptualization of the statement as the defining feature of an index item and the amplification as an extension and completion thereof (Kaiser 1911, § 304; see Section 3 of the current chapter). However, it also had pragmatic implications for the use of unit cards. A person consulting a systematic card index could employ the statement as a means of identifying the subject about which he wanted information, peruse the extension in order to learn about the kind of information pertaining to this subject available in a given textual unit (in the case of descriptive annotations) or to read a condensed version of the information itself (in the case of informative condenses), and, refer to the bibliographical data elements to learn about the documentary source of information, whether this be to assess its reliability or to get a sense of the viewpoint from which it was written; if he felt it necessary to see the document bearing the original textual unit from which the information given by the statement and extension had been derived, he could glance up at the upper right-hand corner of the card to the call number, which indicated the document's location in the intelligence department's files or shelves. In short, the representation of an index item on a unit card allowed one directly to access selected pieces of information about a given concrete or country and to determine whether these were sufficient for one's purposes or whether one had to go further in one's research and consult the documents from which they were derived. Form thus clearly followed function in the structure of the unit records that embodied Kaiser's vision of information divested of its documentary trappings and reconstituted for ready reference within the framework of a systematic card index.

7.5. The Organization of Index Files in Systematic Indexing: Alphabetical Order and Cross-References

The concrete result of systematic indexing, understood in the strict sense of the term as the analysis and reconstitution of information (Kaiser 1911, §§ 295, 369, Point 1, 625; cf. Section 1 of the current chapter, esp. p. 282), was an index item entered upon a unit card. As we have seen, an index item represented a unit of information composed of a number of different elements—the various components of the statement and its amplification—brought together and integrated into a strictly defined record structure (See Sections 3, 4.3, & 4.4 of the present chapter): that is to say, it possessed a complex internal structure but nevertheless constituted a single, self-contained whole. Yet the unit card upon which an index item was recorded was itself an element of a higher unity—namely, the card index file to which it belonged and within which it was stored—and, as such, it had to be brought into

relation with the other unit cards forming part of the file. Kaiser (1911) thus undertook to establish norms of design and organization that would allow an indexer to assign a “fixed place” (§ 663, s.v. “Fixed Place”) to each member of the series of index items comprising an index.

An important preliminary consideration in the design of an index file was its scope. As we have already had occasion to note, Kaiser held that, in the case of any given index, the kinds of subjects that were of interest to the members of the business organization for whom it was created and maintained would dictate which items of information were eligible for inclusion and which were to be left outside of its compass (See Sections 1 & 4.2 of the current chapter). Subject scope, however, primarily affected the informational content of an index file. Another factor conditioning the scope of an index that impinged more directly upon the structure of its files was the kinds of documentary materials from which the pieces of information represented by index items were derived. With regard to these, Kaiser (1908, § 112) envisaged two different ways of articulating an intelligence department’s card index. First, one could set up separate index files for each distinct class of documentary material in one’s collections. On this plan, for example, an intelligence department might maintain one index file for information deriving from correspondence; another for that culled from periodical articles; a third for information extracted from press clippings; a fourth for material taken from books and pamphlets; and so on. Alternatively, one could establish a single file incorporating all unit cards, regardless of the documentary source of their information: this Kaiser called a *central index* (1908, §§ 112, 227, 241; see Chapter 5, Section 3, esp. pp. 171–172, with n. 198, above).

The option between keeping several indexes, each restricted to a specific documentary class, and operating a central index encompassing all classes of documentary materials mirrored the choice between employing separate card registers and maintaining a central register (See Chapter 6, Section 3.4, above). Kaiser held that either form of index was viable and that only the specific needs of a given intelligence department could determine which was the best to adopt in a particular setting. Nevertheless, he observed that, as a rule, a central index brought with it certain efficiencies: in particular, all information on a concrete or country was concentrated in a single index file instead of being dispersed across multiple files and an indexer needed to use only one set of guide cards for a central index instead of preparing a different set for separate indexes (Kaiser 1908, §§ 227, 241). Should one opt for a central index, noted Kaiser (1908, § 112; cf. 1911, § 371),

it is possible to indicate by means of cards of various tints the sources of the information. Information drawn from the correspondence may for instance be written on faint blue cards, that drawn from press cuttings on buff cards, that drawn from periodicals on white cards, from books and pamphlets on salmon cards etc.

This color coding of unit cards, which was, of course, to be aligned with that used for an intelligence department's card register(s) and its card cabinet labels (See Chapter 6, Sections 3.1 & 6.3, esp. pp. 224 & 270, above),⁴⁶⁵ allowed users rapidly to discern, on the basis of a card's hue, from what kind of source, published or unpublished, the item of information that it bore came. In Kaiser's (1908, § 98; cf. § 366, s.v. "Central Registers or Indexes") estimation, it also reflected the fact that, ultimately, "the central index is really a set of indexes filed together, each part having its distinctive colour".⁴⁶⁶

Whether one placed all unit cards bearing index items in a central index or distributed them across several different smaller indexes, it was necessary to organize them into a series within the card file to which they were assigned. Kaiser (1911, §§ 181, 183, 389) understood this process to involve classification and arrangement, two notions that, to his mind, were closely related—so much so that they were not always easily distinguishable. Common to both was the idea of putting "a number of given things ... into a sequence" (§ 98). As Kaiser saw it, "to arrange ... implies *some* purpose or principle in the sequence of what is given", whereas "to classify ... means literally: to make classes, to work out the order of sequence of what is given so as to satisfy a given purpose" (§ 99 [emphasis his]). In his eyes, the chief point of differentiation between the two was that classification enabled the classing of objects in accordance with "a definite purpose", whereas arrangement entailed setting them into order in accordance with a less definite purpose (§ 99). Although this appeal to definiteness of purpose as the primary criterion for distinguishing between arrangement and classification resonated with Kaiser's general valorization of purpose as a factor in the design of classifications (See Chapter 6, Section 3.1), it proved a weak basis for discriminating between the two notions. Kaiser ruefully admitted as much, writing that

⁴⁶⁵ Other writers on filing and indexing also recommended color coordination between index cards, the binders used in vertical files, and labels for card cabinets and vertical files, even when they assumed that a separate card index would be kept for each class of document held by an office (e.g., Byles [1911], 16).

⁴⁶⁶ In signaling that the cards of a central index came from (theoretically) distinct files, Kaiser's mode of color coding played much the same function as the use of differently colored cards to distinguish between title, author, and subject entries would do in a library card catalog incorporating all three kinds, a situation envisaged by a contemporary writer on commercial filing and indexing (Mares 1909, 45–46).

[t]here ought to be a distinction between these two terms, but it seems hardly possible to draw a sharp line of demarkation. A classification must of necessity always be in the nature of an arrangement, but an arrangement need not partake of the nature of a classification. We may arrange without dividing into classes, for instance merely to suit our convenience. On the other hand it may be argued that no arrangement is possible except on the basis of some classification, for arrangement implies some principle or purpose in the disposition of things. The best that can be said is that classification implies a specific purpose, arrangement implies some purpose not specified (Kaiser 1911, § 103).

Where the “specific purpose” diagnostic of classification ended and the “purpose not specified” characteristic of arrangement began, he did not say.⁴⁶⁷

As the foregoing passage indicates, Kaiser deemed classifications to be a specific form of arrangement and, conversely, only some arrangements to be classifications; yet, at the same time, he did not dismiss the claim that all arrangements are dependent upon some kind of antecedent classification. Juxtaposed in this manner, these considerations led, at best, to a definitional vicious circle and, at worst, to contradiction. Faced with this *aporia*, Kaiser settled upon a definition of classifying as “the act of making up a scheme of ordered sequence by which to class afterwards” and one of arranging as “the act of putting into any given order” (§ 104).⁴⁶⁸ These definitions allowed him to hold fast to his intuition that all classifications are arrangements but not all arrangements are classifications without requiring him to pinpoint exactly where the difference between the two lay. They also insinuated that classifying was an intellectual act resulting in a scheme of classification (cf. §§ 101, 104, 119) while arranging was an intellectual and/or physical act of ordering things that could, but need not, be carried out in accordance with a scheme of classification (cf. § 104, 170)—arguably a more productive way of distinguishing the two notions, albeit one that did not fully grasp the definitional nettle. At any rate, Kaiser held that classification and

⁴⁶⁷ Kaiser’s (1911, § 99) sole example of an arrangement as an ordering following “some purpose” does not clarify matters. He noted that, in ordinary language, the “principle or purpose” determining the sequence of items in an arrangement was “generally specified by some qualifying addition, thus: “to arrange geographically etc”. To judge by this example, a sequential ordering of entities on the basis of their geographical provenance or their geographical location would constitute an arrangement. Yet it is unclear why a mode of ordering founded on geographical origin or affiliation should not be considered to reflect “a specific purpose”, and so qualify as an example of a classification, rather than an example of a mode of ordering based on a “purpose not specified”, or arrangement.

⁴⁶⁸ It may be noted, as an aside, that Kaiser’s use of the gerundive forms “arranging” and “classifying” to refer to his formal definitions of arrangement and classification *qua* acts, or processes, served to distinguish them from arrangement and classification as the concrete results of these processes: in adopting these forms, he appears to have sought to evade the semantic vagaries of the categorically polysemous terms “classification” and “arrangement” (See Section 3.6 of this chapter, above).

arrangement led, each in its own way, to the purposeful ordering of entities into a series; it was in virtue of this that both processes were implicated in the constitution of an index file.

The unit cards comprising an index file were to be filed on the basis of the terms, or names, making up the statements that they bore in their respective statement fields (See Sections 3 & 4.4 of the current chapter). We have already seen that, in each statement, the most significant term for filing purposes was its first term, which served as “the term under which a card is filed”, while the second and/or third terms that followed it functioned as subdivisions thereof (Kaiser 1908, § 366, s.v. “First term”; cf. Section 3.5 of the current chapter). The organization of an index file thus depended primarily upon the classification and arrangement of the first terms of statements, which were names of either concretes or countries (Kaiser 1911, §§ 390, 415; cf. Section 3.5 of the current chapter).

“We can deal with names in two ways”, stated Kaiser (1911, § 178), “by their meaning and by their form”. In fact, he drew upon both of these aspects of terms to classify and arrange them within the context of an index file. On one hand, he regarded terms as being formed of one or more words that were, in turn, concatenations of letters (§§ 52, 114, 178; cf. Section 2 of the present chapter). Taking this purely formal feature of terms as a basis, he stipulated that they were to be placed into a sequence based on the conventional order of letters in an alphabetical series—in other words, they were to be arrayed in alphabetical order (1908, §§ 116, 127; 1911, 178, 183, 192, s.v. “Names”, 193, 389). “An alphabetical arrangement ... brings the various names into an ordered sequence and gives them fixed positions”, wrote Kaiser (1911, § 183): in doing so, it fulfilled the basic requirements of filing. However, insofar as this mode of arrangement took into account only the form and not the meaning of terms, it had one undesirable effect on file structure: it scattered index items bearing semantically related but formally distinct first terms throughout a file (§ 212). Now index items entered under several semantically related, but alphabetically dispersed, terms might contain information of interest to a user of the index who had searched under only one of them: because there was no assurance that users would be aware of the presence of these collateral terms, Kaiser deemed it necessary to put in place a mechanism for bringing the latter to their attention (§ 183). His solution was to introduce cross-references among semantically related first terms: as he put it, “in order to give access at one particular point to all similar information distributed under various names, we must connect these names which are related, and this is done by referring from one name to another” (§ 183). A system of cross-references allowed an index designer to construct a file

in which “[t]he cards are arranged alphabetically but in addition the various terms are brought into logical relation” (§ 389) in a manner similar to that of what Kaiser called a “subject classification” (1908, § 116) or of a “logical classification” (1911, § 414)—that is to say, of a classification featuring a hierarchically structured ordering of classes on the basis of semantic affinity.

In utilizing the alphabetical order of index terms as the formal principle for arranging the unit cards in an index file and adding cross-references as a means of linking semantically related, but alphabetically scattered terms, Kaiser adopted a kind of file structure commonly encountered, in different variations, in contemporary knowledge organization tools as diverse as dictionary catalogs, periodical indexes, and back-of-the-book indexes (See Chapter 6, Section 1, esp. p. 190, above). Yet if he elected to use a widespread and, indeed, well-worn template for organizing an index file, he adapted it to fit both his own particular conceptualization of SI and the technological parameters of the card index within which it was to be implemented. Accordingly, it is worth our while to take a closer look at his account of what he took to be the two primary phases of index file structure—namely, alphabetical arrangement and cross-reference structure—and how they were to be applied to the ordering of index items created according to the norms of his indexing method.

7.5.1. The Alphabetical Classification of Terms and Arrangement of Index Items

In the late 19th and early 20th centuries, a question that commanded the attention of many of the leading participants in discussions of cataloging and indexing on both sides of the Atlantic was whether the sequence of subject headings in catalogs and/or indexes should follow an alphabetical or a classified order. Advocates of alphabetical arrangement made their case primarily on the assumption that virtually all persons able to read would know the order of letters in the alphabet (e.g., Barrett 1898, 68; Clarke 1903, 67; Cutter 1876a, 543, with Miksa 1983a, 78 & 80; 2012, 12; Cutter in *A Library Symposium* 1877, 148–149; Doubleday 1901, 525; *Indexes To Periodicals* 1877, 360; McClenon 1918, 468; Poole 1878a, 110; 1878b, 181; Wheatley 1879, 56), whereas relatively few would have a solid acquaintance with the order of classes set forth in a given classification scheme: thus, they argued, more users of an index or catalog would find it easier to locate a given heading quickly and expeditiously in a series of headings arrayed in alphabetical order than in one arranged according to the sequence of classes in a classification, even if the latter

constituted, in principle, a more meaningful order than the former. Kaiser shared this common assumption, which he stated in the following terms:

[w]e all know the sequence of letters ..., for they have been drilled into us from our childhood. They are a matter of common knowledge. This knowledge is an important asset, for we can apply it at any time, we are constantly using it, and just because it is common knowledge we are practically forced to use it even if other symbols or sequences would answer our purpose better. ...

The importance of the fact of common knowledge is borne out as soon as we have to do with any series of names which are based on special knowledge, such as a botanical or zoological classification, which except for the specialist requires an alphabetical key to be of any use at all. Either of these classifications may be called at least reasoned and as such at any rate superior to the arrangement of the ABC. Nevertheless the reasoned sequence has to be translated into the apparently unreasoned arrangement of the ABC, because the latter is our common knowledge, the former is not (Kaiser 1911, §§ 130–131).

Yet, unlike most of his contemporaries, he did not press this point as an argument for the adoption of alphabetical order in an index file.⁴⁶⁹ Rather, he justified his preference for alphabetical order on the negative grounds that the alternative mode of arrangement—namely, the classification of terms on the basis of their meaning—would inevitably prove unsatisfactory—indeed, unworkable—because of semantic difficulties (1908, § 116; 1911, §§ 178, 192, 415).

Kaiser's argument against using a classification of terms by meaning as the basis for structuring an index file rested primarily on two considerations that we have already discussed in different contexts: the categorial heterogeneity of terms and the difficulties attendant on precisely determining their semantic boundaries (See Chapter 6, Section 3.2.2; Section 2.2.1 of the current chapter). The categorial heterogeneity of terms—i.e., the fact that some denoted concretes and others processes—was problematic because it ran afoul of his method of classification, which involved defining a universe of objects to be classified; determining the attributes held in common by objects in that universe—i.e., what Kaiser called common descriptions; identifying the different values that each common description might take—i.e., what he termed degrees; and establishing the order in which common descriptions, which functioned as characteristics of division, would be applied in dividing the universe down to its most specific classes (Kaiser 1911, §§ 116–117, 163–169; see Chapter 6, Section 3.2.2, above for full discussion). This procedure was preeminently well

⁴⁶⁹ In fact, the passage just cited was embedded in a discussion of the use of letters in creating a notation for a classification.

suiting to the creation of schemes of classification for concretes. The linguistic correlate of such a classification was a nomenclature, that is to say, a list of rigorously defined names of the objects classified, in which each name stood, in effect, in a one-to-one correspondence with its referent (§§ 119–121; see Chapter 6, Section 3.2.2, esp. pp. 235–236, above). Because a nomenclature consisted of a limited set of names, or terms, referring to a circumscribed set of (classes of) objects belonging to a single, homogeneous category of entities, it could easily be organized in accordance with the structure of the classification with which it was associated: the order of its component terms would follow the sequence of classes generated by the systematic application of a series of characteristics of division to the objects classified (§ 121). Indexing, however, dealt with discourse about things in the world and the stock of names used to express information about these things was not confined to names denoting objects belonging to a single category—namely, concretes—but also included names of the activities, conditions, and other aspects of things falling under the category of processes (See Chapter 6, Section 3.2.2; Sections 2.2.2.4 & 3.3.2 of the current chapter, above). Kaiser (1911) believed that one could develop separate classifications for concretes and processes (cf. §§ 108–109). However, he assumed that a single classification formed by his method could not encompass both concretes and processes because they belonged to ontologically incommensurable categories (cf. § 187). By the same token, he held that any attempts to classify terms belonging to different categories on the basis of their meaning was doomed to failure, because such terms lacked “a common basis by which to divide them into classes” (§ 178): “bringing names of concretes and names of processes into one sequence [sci., of classes—TMD]”, he insisted, “can not be done under any conceivable circumstances” (§ 187). In short, a truly “logical classification” of terms was possible only within the highly restricted contexts of nomenclatures, which, however, were too limited to deal with the names of the categorially heterogeneous kinds of entities that an indexer had to take into account (§§ 187, 192).

Even if one were to confine one’s attention to terms from a single category, one would still face formidable difficulties in classifying them on the basis of meaning. As we have already discussed in another context, Kaiser held that although different individuals speaking the same language would tend to agree on the core meaning of a given term, each would understand its signification in a slightly different manner: as a result, its semantic boundaries would be, to a greater or lesser extent, indeterminate in practice (See Section 2.2.1 of the current chapter). On this matter, his views coincided perfectly with those of a

later writer on indexing who declared that “[w]ords as ordinarily used are not tools of precision. They have no clear limits of meaning but only a more or less generally agreed concentration of meaning, tailing off into a penumbra of vagueness” (Holmstrom 1953, 40; cf. 1950, 23; 1959, 98). For Kaiser, the lack of firm semantic boundaries was an endemic feature of terms of concretes which, as common terms (See Section 2.2.2.4 of the current chapter, esp. pp. 354–355, above), lacked the determinate reference that individual terms such as terms of countries did. “In comparing the terms of specific countries with those of specific concretes we find a marked difference”, he wrote: “Countries have exact limits by reason of their political boundaries, while with concretes it is impossible to find such limits, we only know approximately the area covered by each term” (Kaiser 1911, § 334; cf. § 423). Among concretes, collective terms were especially prone to exhibit such indeterminacy (§ 112) and, insofar as they referred to broad classes, rather than specific kinds, of objects (§ 110, Point 3), their relative vagueness posed a practical problem for classification. “Sooner or later”, Kaiser observed, “the question will be forced on us: does a given collective term include a given subject or not” (§ 120). If the semantic boundaries of such a term were fuzzy or unclear, there was scope for disagreement about the scope of its extension and, by the same token, about which specific terms could legitimately be considered to designate classes subordinate to it: such uncertainty could not but be fatal to the effectiveness of a classification.

Connected to the problem of vagueness in the definition of collective terms was that of fitting them into a unitary classificatory structure. With regard to this, Kaiser stated that

[w]hen we attempt to bring a number of terms into sequence according to their meaning, we cannot make them fit properly, there will always be terms either too small or too large to fall in with a given scheme of classification.⁴⁷⁰ This is especially the case with collectives. Generally speaking there are no fixed degrees of collectivity, usage has sanctioned certain collectives for its convenience as it were, other possible collectives may mostly be wanting. Thus we have the terms soft goods, drapers’ goods, piece goods, woollen goods etc all covering partly the same field of textiles; they overlap (§ 113 [emphasis his]).

Although the brevity with which Kaiser formulated this passage imparts to it a well-nigh Heraclitean obscurity, the basic outline of its argument can be reconstructed as follows. Logical classifications typically consisted of several hierarchical levels of classes; viewed from the bottom up, each successive level represented a higher degree of collectivity than

⁴⁷⁰ See, already, Kaiser 1908, § 116: “No matter how carefully a classification is planned, there will always be terms that are too large to fit its divisions”.

its predecessor. Now, in an ideal logical classification of terms, each collective term would be readily assigned to the appropriate hierarchical level on the basis of a fixed relation between its meaning and those of the terms immediately subordinate and superordinate to it: in other words, such a “hierarchy of collective terms of subjects ... would be mathematically precise” (§ 290). To clarify what he meant by arranging terms in accordance to fixed degrees of collectivity, Kaiser invoked two series of terms from military language as examples:

[L]et us take some terms which indicate the degrees of collectivity more exactly, for instance: private, squad, company, battalion, regiment, division, army-corps, etc. Here each term bears a definite numerical relation to that preceding it and succeeding it; or let us take: lieutenant, captain, major, colonel, general; here each term again bears a definite relation to its neighbours in the number of qualifications of each individual (§ 114).

Strictly speaking, neither of these examples was appropriate, for neither represented a logical classification based on generic, or at least quasi-generic, relationships: the first series of terms exemplified partitive relationships between progressively larger military units, whereas the second series formed a constitutive classification (See Chapter 6, Section 3.1, above) of military officers, the classes of which were ranked by the degree of authority held by each type of officer *vis-à-vis* the others. Nevertheless, they did convey a sense of the degree of precision that Kaiser believed was necessary to create a truly adequate semantic classification of terms, the hierarchy of which was based on fixed degrees of collectivity.

Now Kaiser (1911, §§ 120–121; 192, 203, Point 1) held that a classifier could create nomenclatures for classifications of concretes in which clear degrees of collectivity were assigned to their component terms. However, the situation was different when an indexer sought to assemble and utilize, *a posteriori*, the various collective terms of concretes that he had extracted from the business literature that he was indexing. In the latter case, Kaiser maintained, it was impossible to bring them together into a single, consistent classificatory structure based on fixed degrees of collectivity (§ 113; cf. § 423), in large part because, as was the case with other names, their common meanings resulted from the vagaries of usage rather than from systematic definition so that it was difficult to set them into precise relationship to one another (cf. Section 2.2 of the present chapter). In this regard, he cited the example of four collective terms commonly used in discourse about textiles: “soft goods”, “drapers’ goods”, “piece goods”, and “woollen goods”. The first of these, “soft goods” was defined as comprising “cloth, and cloth articles” in general (Davidson 1907, 917, s.v.

“Soft”) and generally recognized to be the British correlate to the American locution “dry goods” (e. g., Bell 1904; Harmuth 1915, 146, s.v. “Soft Goods”; Phipson 1896, 432). The second term, “drapers’ goods”, referred to the merchandise sold by drapers, or “dealer[s] in cloth ... and other articles of textile manufacture” (Murray et al., 1888–1928, Vol. 3/1, 641, 1 s.v. “Draper”): it, too, was considered to be a British equivalent to “dry goods” (cf. p. 435, n. 381, above). Kaiser (1911, § 663, s.v. “Overlapping and underlapping”) observed that “[g]enerally speaking”, the terms “soft goods” and “drapers’ goods” “cover much the same field, but some goods are included in the term drapers’ goods which are excluded from soft goods, such as combs, hairnets, buttons, pins, etc’’: that is to say, “drapers’ goods” included not only textile products *per se*, but also various kinds of small articles and sundries associated with sewing, clothing, and adornment.⁴⁷¹ The third term, “piece goods” was defined as “all textile fabrics woven in lengths, to be sold by the yard” (Harmuth 1915, 120, s.v. “Piece Goods”; cf. Murray et al., 1888–1928, Vol. 7, 838, s.v. “Piece-goods”),⁴⁷² while “woollen goods” designated textile fabrics and articles made from short- and medium-stapled, carded wool (or more exactly, from mixtures of such wool and other fibers).⁴⁷³

⁴⁷¹ For a sense of the range of goods that drapers sold in the Edwardian era, cf. Richardson 1904, 1: “Originally the term “Draper” meant “one who sold cloths,” but in modern practice it has become applied, with and without qualification, to an immensely wider range of enterprise, There is Fancy or Light Drapery, in which is included the sale of fancy Silk and Cotton Goods, Laces, Ribbons, Gloves, Collars, Ties, Scarves, Blouses, Embroidery, Handkerchiefs, Corsets, Hosiery, Ready-made Underwear, Baby Linen, &c., also Haberdashery, Small Wares, Needles, Cottons, Tapes, Hooks, Bindings, Milliners’ and Dressmakers’ Trimmings, &c.; there is Household or Heavy Drapery, consisting of Bed Linen, Calicoes, Counterpanes, Towels, Blankets, Flannels, Woollen Goods, Prints, &c.; and Furnishing Drapery, including Carpets, Mats, Linoleums, Cretonnes, Tapestries, Window-blinds, and all kinds of Upholsterers’ Requisites”. However, as Kaiser (1911, § 663, s.v. “Overlapping and underlapping”) observed, “the goods handled by drapers will differ in different localities” and so the extension of the term would vary by place.

⁴⁷² As textiles sold by the yard, piece goods were typically understood to be pieces of cloth from which other goods, such as clothes or drapery, were made: as such, they obviously did not include ready-made clothing. However, there was some disagreement regarding whether the category of “piece goods” covered other textile manufactures. According to one contemporary British writer on warehousing, who defined “piece goods as “material ultimately bought or sold by the yard”, “[t]his definition must not be understood to exclude such articles as table cloths, table napkins, sheets, towels, blankets, or curtains. Although these may be bought and sold by number, they are priced according to the number of yards they contain, and must be considered as coming under the definition” (Brooks 1902, 3). Not all persons interested in commercial matters, however, shared such an expansive understanding of piece goods: for instance, British government reports on foreign and colonial commerce tended to distinguish between piece goods (as pieces of textile not yet made up into other finished products) and blankets and rugs, shawls, and hosiery (e.g., Great Britain. Commercial Mission to South Africa 1903, 121–122).

⁴⁷³ On the definition of woollen cloth and goods, see, e.g., Hooper 1907, 94–96; Pitman’s Commercial Readers [ca. 1907], 165–170; *The Advertiser*, 21 May 1906, p. 6 (“The Woollen Industry. What are Woollen Goods?).

Kaiser (1911, § 113) noted that these four terms “cover[ed] partly the same field of textiles” and so “overlap[ped]”: however, he did not discuss in any detail how this affected the relationships between them. Despite his silence, it is not difficult to see how overlapping might lead to classificatory difficulties, especially if the goal of classification was to yield a single sequence of terms based on semantically-based hierarchical relationships. For one thing, “soft goods” could be viewed either as a (near-)synonym to “drapers’ goods”—after all, both were perceived to be equivalents of “dry goods”—or as a term subordinate to the latter, for drapers sold other wares in addition to soft goods in the strict sense of the term and so soft goods could be understood to constitute a kind of drapers’ goods. In other words, whereas it was clear that the extensions of the two terms overlapped considerably, there was no fixed way of expressing this in a classification. Second, “piece goods” and “woollen goods” designated kinds of soft goods and so both could be viewed as terms subordinate to “soft goods”. Yet, they did not name classes formed from a single characteristic of division, for piece goods were defined by the physical form—namely, pieces cut in certain standardized lengths—that textile fabrics took, while the definition of woollen goods had its basis in the material of which the products in question were made. Linguistic artifacts of different ways of dividing the class of soft goods, the terms “piece goods” and “woollen goods” also overlapped in their extension, as was evidenced by the existence of the term “woollen piece goods” (e.g., Great Britain. Board of Trade 1905a, 291 & 293–313 [Tabular statements of import duties]; Hayter 1894, Vol. 2, 18–19, under Class II, Order 15), which designated woollen cloth cut by the yard. Of course, viewed from the perspective of classificatory structure, “woollen piece goods” was subordinate to “piece goods” and “woollen goods” alike: in other words, it stood in a polyhierarchical relationship to these terms.

Now if an indexer preparing an index were to attempt to arrange the foregoing terms into a single classificatory sequence, proceeding from least to greatest degree of collectivity, in accordance with the ideals of mathematical precision enunciated by Kaiser, various points of the series would occasion problems. “Woollen piece goods” would cause little difficulty, for it was obviously the most specific term of the five. However, there was no fixed criterion by which to determine which of its two superordinate terms—“woollen goods” or “piece goods”—represented a lower degree of collectivity than the other and, therefore, whether the first three terms in the series should follow the sequence “woollen piece goods, woollen goods, piece goods” or “woollen piece goods, piece goods, woollen

goods”.⁴⁷⁴ “Soft goods” indisputably had a wider extension than both “piece goods” (since it included textile goods that were not cut into preformatted pieces by the yard, such as ready-made clothing) and “woollen goods” (since it included textile products made from materials other than carded wool, such as, for example, worsted wool, silk, cotton, hemp, or linen), and so could be securely placed after them. However, there then remained the problem of deciding whether “drapers’ goods” was to be taken as a synonym of “soft goods” or a superordinate term thereof. This opened the door to yet further complications. If “drapers’ goods” were interpreted as being superordinate to “soft goods”, then it would simply come last in the series. However, if it were taken to be synonymous to “soft goods”, then one would be left with the dilemma of where to place it in the sequence. We have already seen that, as a rule, Kaiser did not endorse the substitution of one term for another (See Section 2.2.3 of the present chapter) and, accordingly, both “drapers’ goods” and “soft goods” could not but form part of the series. However, inasmuch as each successive position in the sequence indicated a hierarchical relationship between positionally contiguous terms, one would be hard pressed to find a place for “drapers’ goods”, for placing it either before or after “soft goods” would imply a relationship other than that of synonymy and two terms obviously couldn’t occupy the same position in the sequence. In short, whereas one could establish a basic hierarchical structure, in which “woollen piece goods” was subordinate to

⁴⁷⁴ In theory, one could attempt to determine the degree of collectivity either intensionally or extensionally. Intensional determination would require ascertaining that “piece goods” had a narrower intension than “woollen goods” or *vice versa*. This, however, was clearly impossible, because the semantic bases for the definition of “piece goods” and “woollen goods”—the physical form of soft goods vs. the material substance of which they were made—were incommensurable and thus there were simply no grounds on which to compare the two terms from an intensional point of view, save for the purely structural consideration that either could be an immediate subdivision of the term “soft goods” by the addition of a single characteristic of division. Extensional determination, which undoubtedly was closer to the spirit of Kaiser’s thought (See Section 2.2.4 of the current chapter, esp. pp. 355–360, above), would require that one determine whether the number of objects in the world classifiable as piece goods was less than that of those classifiable as woollen goods or *vice versa*: the term referring to the lesser number of objects would have a smaller extension and, accordingly, occupy a smaller degree of collectivity than its fellow. Unlike intensional determination, this manner of proceeding would be methodologically sound since it deployed a single, quantitatively based criterion by which to compare the extensions of the two terms. However, it could hardly be considered definitive, for the extensions of the two terms were constantly changing as piece and woollen goods alike were being produced and destroyed. Thus, even if one were able to estimate their relative degrees of collectivity for a given time, there was no assurance that these would remain the same: indeed, one could not discount the possibility that “woollen goods” might have a lesser extension than “piece goods” at one time and that the converse state of affairs might obtain at another. In short, of the two possible methods by which to determine relative degree of collectivity, extensional determination offered a much better approach than did intensional determination: it did not, however, provide resources for identifying truly fixed degrees of collectivity, at least in the sense envisaged by Kaiser.

“woollen goods” and “piece goods”; “woollen goods” and “piece goods” in turn were subordinate to “soft goods”; and “soft goods” was either equivalent with, or subordinate to, “drapers’ goods”, there were points where no fixed degrees of collectivity, at least in the strict sense conceptualized by Kaiser, could be discerned and where, accordingly, the placement of one term before another in the sequence would require a more-or-less arbitrary decision on the part of the indexer or classifier. Needless to say, such arbitrariness violated Kaiser’s ideal of an order based on precisely fixed relationships and added an unwelcome element of unpredictability to the arrangement of terms in the series.

In Kaiser’s estimation, the categorial heterogeneity of terms, the indeterminacy of their semantic boundaries, and the difficulty of bringing various collective terms into a single classificatory sequence all served to render their arrangement by meaning untenable as a basis for ordering the index items in a file. Thus, he argued, the only viable method of arranging terms was by their form—that is to say, by reference to the letters of which they were composed (Kaiser 1908. § 116; 1911, §§ 114, 178, 183, 192–192, 203, Point 2, 212, 389, 415; cf. Chapter 6, Section 3.2.2, above). This, of course, entailed arraying terms into a single sequence on the basis of alphabetical order, a process that Kaiser termed “alphabetizing” (§ 181). To his mind, alphabetizing was a form of classification, for it followed the basic procedure of classifying that he had outlined for concretes—namely, defining a highest collective, or universe of objects to be classified; identifying common descriptions, or characteristics of division that could be applied to all members of the universe; determining the degrees, or classes in array, associated with each common description; and applying these structures to successive divisions of the objects falling under the highest collective (See Chapter 6, Section 3.2.2, above). In this case, he wrote, “our highest collective is *names*, their common description is *letters of the alphabet*, and the degrees are a b c d etc.” (Kaiser 1911, § 181). Unlike classifications of concrete objects, which typically consisted of several common descriptions, each possessing its own distinct array of degrees (e.g., §§ 165–166), the classification of names, or terms, by form involved “only one common description and one set of degrees”, which served as the sole basis for the “scheme of division” (§ 181). This meant that one began to divide a universe of terms by noting their initial letters and arranging the terms in accordance to the alphabetical order of these; once this initial division had been effected, one then turned to the second letter of each term within each section and ordered the terms in accordance with alphabetical sequence, and so on until each term occupied a fixed place in the overall sequence of terms: in Kaiser’s words,

“the same principle of division must be applied successively until there remains but one word in each section or there are no more letters left by which to divide” (§ 181).⁴⁷⁵ Figure 26 shows a (partial) diagrammatic representation of the process of alphabetizing for terms

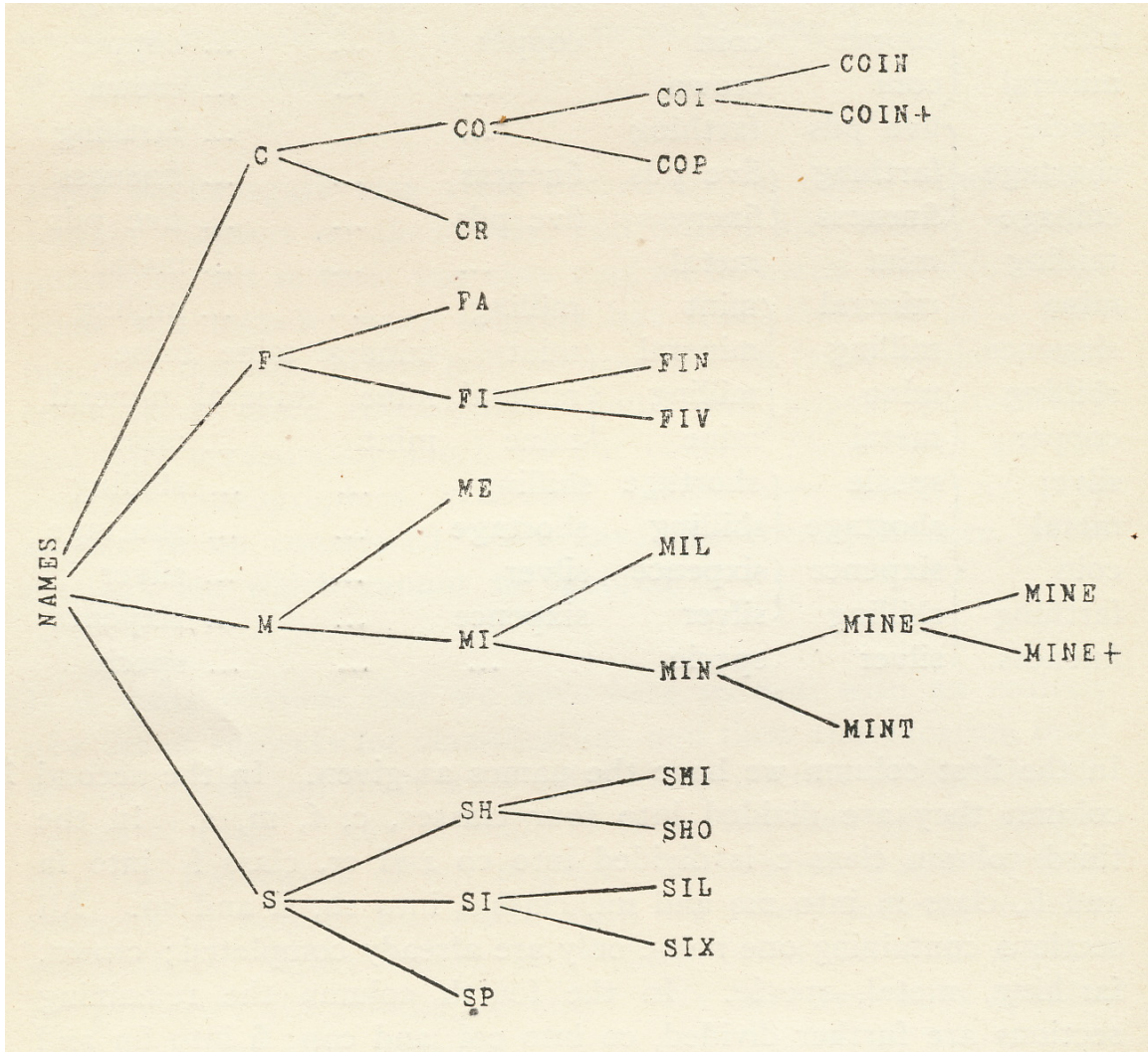


Figure 26: Alphabetization as a form of classification (Source: Kaiser 1911, § 182).⁴⁷⁶

⁴⁷⁵ An interesting parallel to this conception of alphabetizing *qua* classification occurs in a contemporary book on “the logical bases of education”, the author of which drew a distinction between “disjunctive classification”, in which “each step of classification [is] on a new basis [sci., characteristic of division—TMD]” and “subsumptive classification”, in which “each sub-class [is] given a definite place in a hierarchy of classes exhibiting successive developments of one principle: as an example of the latter, he noted that “the ordinary alphabetical arrangement of an index or a dictionary is based throughout on the conventional order of letters in the alphabet” (Welton 1911, 238)—a point that Kaiser illustrated in far greater detail.

⁴⁷⁶ This diagram selectively represents successive stages in the alphabetizing of the following set of coin-related names: “coin”, “coinage”, “copper”, “crown”, “farthing”, “fineness”, “five pds”, “metal”, “milling”, “mine”, “mineral”, “mint”, “shilling”, “shortage”, “silver”, “sixpence”, and “specie” (Kaiser

beginning with the four letters “c”, “f”, “m”, and “s”; the tree structure generated by the successive grouping of letters in accordance to alphabetical sequence demonstrates the classificatory nature of the undertaking.

At first blush, Kaiser’s characterization of alphabetering as a form of classification may strike some modern students of KO as somewhat unusual, for, ever since the 19th-century debates on the relative merits of alphabetical and classified catalogs (e.g., Barrett 1898; Bowman 2006, 68–75; Brault 1972, 12–20; Cutter 1876a, 529–549), commentators on cataloging, bibliographic classification, and subject indexing in librarianship and documentation have tended to distinguish between alphabetical arrangement and classification, limiting their definition of the latter primarily to the organization of subjects on the basis of the semantic, or conceptual, relationships obtaining among them (e.g., Bliss 1935, 1939, 8, 172–173; Hudon & El Hadi 2010, 11–12, 16–20; Jacob 2004a, 530–531; 2004b, 86–87; Pollard & Bradford 1930, 42–43; Slavic 2007, 581). However, Kaiser was hardly alone in upholding the thesis that alphabetical arrangement constitutes a mode of classification. Some late 19th-century writers on logic took much the same view. One eminent logician wrote that

alphabetical arrangement is so familiar to every one that scarcely anything need be said about it beyond insisting that it as much deserves the name of classification as any arrangement can:⁴⁷⁷ in fact it carries out the ideal of the hierarchical disposition of the classes involved more completely than almost any other. Its obvious merit consists in the extreme celerity with which it isolates the element we are in search of, the alternatives being 24 at every step,⁴⁷⁸ and all but one being instantly laid aside (Venn 1889, 327–328).

Another spoke of “index classifications” in the following terms:

1911, § 179). In each case, the division is represented only up to the point where the term in question is alphabetically differentiated from all the other terms in the set. In the case of COIN+ and MINE+, the “+” indicates that further division has to be carried out to distinguish COINAGE from COIN and MINERAL from MINE, respectively.

⁴⁷⁷ At this point, our author added the following footnote: “Where, as in this case and in the chronological arrangement, the things can be placed *lineally*, we more often speak of the arrangement as an *order* than as a classification” (Venn 1889, 327, n. 1). From this footnote and the phrasing of the sentence to which it was appended, it is evident that he perceived his identification of alphabetical arrangement as a form of classification to be a matter of controversy.

⁴⁷⁸ The statement that, at each step of an alphabetical classification, there were 24 alternatives—two less than the number of letters in the English alphabet—indicates that our writer had in mind an indexing convention in which the letters “I” and “J” were treated as a single letter, as were “U” and “V”. This convention, ultimately derived from neo-Latin orthographical practices, was discouraged by contemporary authorities on indexing (e.g., Wheatley 1879, 59 & 71, Rule 3; 1902, 66 & 135–136, Rule 3).

Under classification we may include all arrangements of objects or names, which we make for saving labour in the discovery of an object. Even alphabetical indices are real classifications. No such arrangement can be of use unless it involves some correlation of circumstances, so that knowing one thing we learn another. If we merely arrange letters in the pigeon-holes of a secretaire we establish a correlation, for all letters in the first hole will be written by persons, for instance, whose names begin with A, and so on. Knowing then the initial letter of the writer's name, we know also the place of the letter, and the labour of search is thus reduced to one twenty-sixth part of what it would be without arrangement" (Jevons 1958 [1877]. 714).

In their eyes, alphabetical arrangement represented a type of classification in which the attribute(s) of the objects being classified serving as the basis of division—*in casu*, the letters comprising names—were arbitrarily selected in order to fulfill a particular purpose on the part of the classifier—*in casu*, the ready location of a given name or term: as such, it was considered to be an "artificial classification" or a "classification for a special purpose" (Venn 1889, 326). These ideas spilled over, to a certain extent, into the discourse of librarianship and Documentation: for instance, in his influential treatise on the theory of library classification, the American Richardson (1901, 9, 11, 60–61, 235–236) identified "alphabetical classification" as a paradigm example of "artificial classification", while the British librarian-author of a brief "outline of the theory of classification" declared that "[t]he best known form of classification for a special purpose is the alphabetical index" (Coulson 1911–112, 70) and the documentalist Otlet (1934, 379–380, § 412.32–33) likewise spoke of "*classification alphabétique*".⁴⁷⁹ The notion of alphabetical classification also found a place in the workaday discourse of administration and commerce. For example, schedules of railroad rates in Great Britain and its Australian colonies included "alphabetical classification[s]" of "goods" or "merchandise traffic" (Darlington 1893, 404–449; Victorian Railways 1899, 22–35) and authorities on commercial filing and indexing referred to the organization of correspondence files, customer lists, and card ledger accounts by clients' names as "alphabetical classification" (Cope 1913, 29–45; Nesbitt-Evans 1904, 321), as,

⁴⁷⁹Richardson's identification of "alphabetical classification" as a form of "artificial classification" was still cited as authoritative by some theorists of library classification as late as the 1950s (e.g., Tauber & Associates 1954, 181). Among documentalists, on the other hand, the notion of alphabetical classification was restated in somewhat different terms by the English indexer and documentalist Holmstrom (1948a, 79; 1948c, 502, 504, 509), who spoke of alphabetical indexing as "a classification not of ideas but of the noises which people make when they talk about those ideas, those noises being arranged in an arbitrary conventional sequence, that of the alphabet" and so referred to it as "Phonetic classification". This choice of name was unfortunate, for it failed to make the distinction between *spoken* sounds and *written* symbols, two series that do not stand in a strictly one-to-one relation to one another, as the famous example of "ghoti" as a possible writing for "fish" (on which, see Zimmer 2010) illustrates.

indeed, some authors of treatises on office filing systems would continue to do into the 21st century (e.g., Bhatia 2005, 70; Institute of Leadership and Management 2003, 28). Kaiser's account of alphabetical arrangement as a form of classification thus reflected, and elaborated, a widely diffused view, albeit one that had, and continues to have, a fairly low profile within the various professional discourses on knowledge organization.

The basic principles of alphabetical arrangement *qua* classification enunciated by Kaiser were relatively unproblematic for terms consisting of a single word. However, like all other proponents of alphabetical organization, he had to confront the thorny issue of how to deal with terms consisting of more than one word. Kaiser identified two different ways in which such terms might be set into order. First, an indexer might treat a multiword term "as if one word" and so disregard any spaces or punctuation between its component words in determining its alphabetical position: this constituted *absolute alphabetizing* (Kaiser 1911, § 213). Alternatively, one might choose to "tak[e] each word of the [term] separately"—that is to say, to include the spaces and/or punctuation separating its component words as factors in determining its place in the alphabetical sequence of terms: this resulted in what Kaiser, adapting a technical expression from the vocabulary of library cataloging (See Glossary, s.v. "Alphabetico-classed"), named an *alphabetico-classed* arrangement (§ 213). Absolute alphabetizing obviously corresponded to what later writers on alphabetical arrangement would term "letter-by-letter" arrangement, whereas alphabetico-classed arrangement was equivalent to what would come to be known as "word-by-word" arrangement (e.g., Aitchison, Gilchrist, & Bawden 2000, 103; Bakewell 1972, 161–162; Borko & Bernier 1978, 50–51; Frické 2012, 46–48; Holmstrom 1953, 34–35; 1959, 98–99; Knight 1979, 121–124; Milstead 1984, 48; Mulvany 2005, 116–117; Rowley & Hartley 2008, 334; Wellisch 1995, 14–18; 1999, 5, §§ 4.1.2–4.1.2.2): the differences between them are illustrated in Figure 27 below.

Today, authorities on alphabetical indexing generally tend to favor the word-by-word over the letter-by-letter arrangement (e.g., Anderson 1997, 32, § 9.3; ANSI-NISO 2005, 63, § 9.2.6.1; Browne & Jermy 2007, 104–105; Wellisch 1999, 5, §§ 4.1.2.1–4.1.2.2; but cf. Mulvany 2005, 118–119). In the late 19th and early 20th centuries, however, there was considerably much less unanimity on this score. Among anglophone writers on library cataloging, some advocated versions of word-by-word arrangement (e.g., Anderson 1902, § 49; 11, Cutter 1891, 116–117; 1904, 114–116, Rules 316–317, 321; Edmands 1887, 327–328; Quinn 1899, 120; Steele 1912–1913, Rules 1–3), whereas others preferred forms of letter-by-letter arrangement (e.g., Brown 1916 [1914], 135, Rule 29; Hawkes 1912–1913,

**Absolute Indexing
(= Letter-by-letter)**

gas
gas burners
gas engines
gas heating
gaskets
gasoline
gasoline-fueled vehicles
gasoline pumps
Gaspé peninsula
gas pipes
gas supply
gastrectomy
gastric juice
gastritis
gas turbines
gas welding
gasworks

**Alphabetic Classed
(= Word by-word)**

gas
gas burners
gas engines
gas heating
gas pipes
gas supply
gas turbines
gas welding
gaskets
gasoline
gasoline-fueled vehicles
gasoline pumps
Gaspé peninsula
gastrectomy
gastric juice
gastritis
gasworks

Figure 27: Absolute alphabetering vs. alphabetic-classed arrangement (Source: Wellisch 1995, 16 [altered]).⁴⁸⁰

265–266, Rules 6 & 7; Linderfelt 1890, 72, §§ 482–483); by the same token, some commentators on indexing recommended the former (e.g., Wheatley 1879, 59 & 71, Rule 4; 1902, 137–140, Rule 4; Wheeler 1905, 512, Rule 1), while others inclined toward the latter (e.g., Fletcher, in Second Session 1887, 432). For his part, Kaiser (1911, § 214) held that absolute alphabetering and the alphabetic-classed arrangement each had its “advantages and disadvantages”. In his view, the chief difficulty with absolute alphabetering lay in the fact “it cannot draw a distinction when a name consists of both one and several names” (§ 218). To illustrate this rather opaquely phrased critique, Kaiser cited the example of the proper names “De Land” and “Deland”, the forms of which were, in principle, indistinguishable when viewed from the perspective of the letter-by-letter approach of absolute alphabetering: to determine which of these names was to precede the other, one could only take recourse to the word-by-word method of alphabetic-classed arrangement (§ 221). Conversely, the primary weakness of the alphabetic-classed approach lay in the fact that “it must determine whether a given name consists of one or more words” (§ 218). In ordinary written language, the same compound name was sometimes spelled as two words (e.g.,

⁴⁸⁰ For Kaiser’s own examples, which are too lengthy and complex to be reproduced here, see Kaiser 1911, §§ 215–216, 219–220.

“electro-plated” or “corn flour”) and sometimes as one (e.g. “electroplated” or “cornflour”). In all such cases where common usage was not settled, a term could conceivably occupy at least two different places in an alphabetical sequence (e.g., “corn flour/cornflour” would precede “corned beef” if spelled as “corn flour” but follow it if written as “cornflour”), depending on whether it was treated as a single-word term or a multiword term. One thus had to decide whether to treat such orthographically polymorphic expressions as single-word or multiword terms: this complication was obviated in absolute alphabets, where all terms were filed as single-word terms with the result that “there can only be one place for each term” (Kaiser 1911, § 218; cf. Bakewell 1972, 161).

Kaiser’s balanced consideration of the pros and cons of absolute alphabets and alphabetico-classed arrangement did not preclude him from forming a judgment about which was to be preferred in the context of card indexes. “For small lists of names”, he wrote, “either method may be adopted” (Kaiser 1911, § 217). However, in the case of “very large lists of names”, he continued, the alphabetico-classed method “has a decided advantage over” absolute alphabets because “it is easier to arrange and easier to consult and by reason of the first words forming classes gives a better perspective view over the material as a whole, and generally it costs less in labour” (§ 218). Of the four grounds that Kaiser gave for his rather breathless endorsement of the word-by-word approach embodied by the alphabetico-classed method of arrangement, the most interesting from a theoretical point of view was his assertion that “by reason of the first words”, multiword terms formed classes “giv[ing] a better perspective view over the material as a whole”. On this account, a series of terms sharing a first word in effect named kinds of objects that constituted classes of the type of thing designated by that word: for example, the index terms ARTIFICIAL ASPHALT, ARTIFICIAL BAIT, ARTIFICIAL BUTTER, ARTIFICIAL CAOUTCHOUC, ARTIFICIAL CHAMPAGNE, ARTIFICIAL DIAMOND, ARTIFICIAL FERTILIZER, ARTIFICIAL FLOWER, ARTIFICIAL FUEL, ARTIFICIAL GEM, ARTIFICIAL GUM, ARTIFICIAL GUTTAPERCHA, ARTIFICIAL HORSEHAIR, ARTIFICIAL ICE, ARTIFICIAL IVORY, ARTIFICIAL LEATHER, ARTIFICIAL MANURE, ARTIFICIAL MARBLE, ARTIFICIAL MUSK, ARTIFICIAL PEARL, ARTIFICIAL RUBBER, ARTIFICIAL SANDSTONE, ARTIFICIAL SILK, ARTIFICIAL STONE, ARTIFICIAL WHALEBONE, ARTIFICIAL WINE, ARTIFICIAL WOOD, and ARTIFICIAL WOOL (Kaiser 1908, § 117; cf. p. 635, Figure 38, below) all fell under the concept of [ARTIFICIAL

THINGS] signified by the word ARTIFICIAL and so denoted classes of artificial things.⁴⁸¹ In suggesting that multiword terms embodied a kind of *de facto* classificatory structure, in which the first word represented a general class of things and each successive word qualified it in such a way to indicate a subclass or, in some cases, an aspect thereof,⁴⁸² Kaiser not only implied that word-by-word alphabetical arrangement aids collocation (cf. Bakewell 1972, 161; Wellisch 1995, 14–15) but also recognized that alphabiting could have semantic implications, at least within the framework of the alphabetic-classed approach (cf. Kaiser 1911, § 203, Point 3).

Although Kaiser deemed the alphabetic-classed approach to be generally preferable to absolute alphabiting in the case of large indexes, he acknowledged that its use required the elaboration of rules with regard to the forms of terms to circumvent potential problems in filing. Two such rules were directly tied to alphabetic-classed filing. First, there were cases in which a noun served both as a single-word term and as the first word in a multiword term: these raised the question whether the grammatical form of the noun *qua* single-word term should be singular or plural. Consider, for example, the noun “watch” (referring to a portable timepiece), the noun phrase “watch case” (referring to the metal covering for a watch), and the noun phrase “watch hand case” (referring to a portable receptacle for

⁴⁸¹ This argument, which held for compound terms of the grammatical form [[ADJECTIVE] [NOUN]] (e.g., “Black Copper”) and [[NOUN] [NOUN]] (“Gold Earrings”) alike (cf. Kaiser 1911, §§ 215 & 227 for examples of the latter), differed signally from Cutter’s (1876b, 43; 1904, 73) view that, in most cases where a noun phrase consisted of noun preceded by an adjective, “the noun represents a class”, while “the adjective limits the noun, and makes the name that of a subclass”. According to Cutter’s analysis, in an index term such as ARTIFICIAL GUM, the term GUM represented the class (or genus), while ARTIFICIAL served as the qualification (or difference) that, in combination with the class name, resulted in the specific subject ARTIFICIAL GUM. In Kaiser’s analysis, on the other hand, ARTIFICIAL served as the point of departure, denoting the class of artificial things in general, while GUM referred to a specific kind of artificial thing that fell within this broader class. However, Kaiser was not entirely consistent in this, for, as we shall see, at times, he adopted *de facto* the kind of analysis that Cutter had championed.

⁴⁸² Cf. Kaiser 1911, §§ 215 & 227, where he presented “gold” and “copper”, respectively, as examples of first words shared by a series of compound terms. It should be noted that the second words in those examples covered both terms for concretes (e.g., “Gold Bangles”, “Gold Brooches”, “Gold Goods”, “Gold Laces”, “Gold Match Boxes”, “Gold Plate”, “Gold Rings”) and terms of processes (e.g., “Gold Casting”, “Gold Dredging”, “Gold Mining”, “Gold Stamping”) so that the analysis became more complex: strictly speaking, one would have to distinguish between the semantic structure [[GOLD THINGS] + [SPECIFIC KIND OF THING]] in phrases featuring terms for concrete, such as “Gold Bangles”, and one taking the form [[GOLD] + [ACTION PERFORMED UPON GOLD]] in phrases containing terms of processes, such as “Gold Casting”. With multiword terms of concretes, then, the final noun represented a subclass of the class of things denoted by the first word in the term, whereas with terms of processes, it signified a (particular kind of) aspect, or (accidental) attribute, of gold.

carrying watches, akin to a suitcase).⁴⁸³ If one were to use the plural forms of these as index terms, *WATCHES would follow *WATCH CASES and *WATCH HAND CASES in alphabetical sequence, whereas, if these terms were formulated in the singular number as WATCH, WATCH CASE, and WATCH HAND CASE, WATCH would precede the two compound terms. In this matter, Kaiser expressed a pronounced preference for the latter approach. In *The Card System*, he peremptorily stated that “[a]ll terms used for filing the cards should wherever possible be expressed in the singular as they would occur in a dictionary” on the grounds that “[t]he plural “S” is of no assistance and should therefore be discarded” (Kaiser 1908, § 102), an injunction that he later expressed, in similarly uncompromising terms, in *Systematic Indexing* (1911, § 319; cf. Section 4.2 of the current chapter, esp. p. 513, above). Elsewhere in the same work, he struck a less strident tone, noting that if an indexer desired to use the plural form and found the resultant order acceptable, then “there can be no objection” (1911, § 397); nevertheless, he maintained, “I would recommend the singular as more correct logically and more economic both in writing and filing”. Kaiser’s insistence on using the singular form for virtually all terms of concretes, including what present-day linguists would designate as count nouns (cf. p. 380, n. 333, above), stood in sharp contrast to the practice of most contemporary writers on cataloging and indexing, who tacitly tended to use the plural form for subject headings referring to countable things, a convention that has, *mutatis mutandis*, become the norm in present-day indexing in the English-speaking world (e.g., Aitchison, Gilchrist, & Bawden 2000, 22, § D.3.2.1; Anderson 1997, 15, § 6.2.4; ANSI-NISO 2005, 28, § 6.5.1; Mulvany 2005, 87; Wellisch 1995, 430–431).

The second rule dealt with the problem of whether compound terms denoting subjects should always be given in their ordinary, natural-language form (e.g., “copper coin”) or whether it was ever legitimate to invert them (e.g., “coin, copper”) for indexing. Here, practice varied across the various professional domains involved in knowledge organization. Within the realm of library cataloging, Cutter (1876b, 42, Rule 76; 1904, 72, Rule 175) stipulated in the *RDC* that one should “[e]nter a compound subject-name by its first word, inverting the phrase only when some other word is decidedly more significant or is often used alone with the same meaning as the whole name”. Although this rule countenanced the inversion of terms as an option, Cutter considered this practice to be deeply problematic because most inversions involved an expression of classificatory relationships that ran counter to the principle of specific entry (See Glossary, below, s.v.)

⁴⁸³ This example is adapted from Kaiser 1911, §§ 395 & 397.

upon which his design dictionary catalog was based (Cutter 1876b, 43; 1904, 73): for example inverted subject names such as *COINS, COPPER; *COINS, GOLD; *COINS, NICKEL; and *COINS, SILVER would result in entry under a general class term—in *casu*, COINS—rather than under words directly denoting the qualifications that defined the species of that class—in *casu*, COPPER, GOLD, NICKEL, and SILVER. Accordingly, as one recent commentator has observed, he expected that inversions would be used only in cases when they did not express classificatory relationships (Miksa 1983a, 141). Thus, for example, Cutter accepted the forms EGYPT, ANCIENT and EGYPT, MODERN, in which antiquity and modernity were *aspects*, not *kinds*, of the concrete individual subject of Egypt: his rationale was that “individuals should not be divided”, as would happen to Egypt *qua* subject if it were split into *ANCIENT EGYPT and *MODERN EGYPT (Cutter 1876b, 42, with n. †; 1904, 72 with n. †). Similarly, SPECIES, ORIGIN OF THE was a legitimate rendition of the phrase “Origin of the Species” because SPECIES represented “the most significant word” in the phrase, whereas “the word Origin here [was] by itself of no account”: moreover, because of the grammatical structure and semantic content of the original phrase, there was no possibility of a classificatory relationship between the two elements of the inverted form. The net effect of Cutter’s rule, then, was that “almost all compound subject names” were to be entered in their normal forms, with only a few being inverted on the condition that the inversion did not violate the spirit of specific entry (Miksa 1983a, 141).

Cutter’s guidelines on how to treat compound headings affected the contemporary discourses of cataloging (e.g., Bishop 1906, C118) and indexing (e.g., Clarke 1905, 25–29) alike. Yet, if the principles that he set forth received due acknowledgement, his strictures on inversions involving classificatory relationships were subjected to a certain amount of loosening. For example, catalogers admitted such forms of subject headings as PORCELAIN, FRENCH instead of FRENCH PROCELAIN (e.g., Hanson in Catalog Section 1906, 236), INSURANCE, FIRE instead of FIRE INSURANCE (Hitchler 1915, 45), and LIBRARIES, SPECIAL instead of SPECIAL LIBRARIES (Colegrove & McVety 1917, 60), while writers on indexing developed arguments for the use of inverted subject terms such as ANATOMY, COMPARATIVE; ANATOMY, HUMAN; and ANATOMY, MORBID, despite the fact that this clearly went against the spirit of Cutter’s original rule (Clarke 1905, 27–28). Even in the case of noun phrases for which the rule allowed inversion, indexers often took inversion to much greater lengths than Cutter envisaged, countenancing such forms as REVOLUTION, AMERICAN, DECISIVE BATTLES OF for “decisive battles of the American Revolution”

(Nichols 1892a, 410, §15). Indexers working in domains less closely associated with general librarianship generally felt little compunction about using inversions. Authors on commercial filing and card employed forms such as IRON, GALVANIZED instead of GALVANIZED IRON or INSURANCE, ACCIDENT instead of ACCIDENT INSURANCE as examples of acceptable compound index terms (e.g., Hudders 1916, 13, §§ 60 & 94, §§ 417–418), while compilers of administrative documents, such as alphabetical classifications of goods for railway rates and governmental catalogs of stores of goods for the use of quartermasters, routinely took recourse to elaborately inverted terms, examples of which include SALTS, EPSOM, CRUDE for “crude Epsom salts” (Victorian Railways 1899, 32); ENGINES, LOCOMOTIVE, SPARE PARTS FOR for “spare parts for locomotive engines”;⁴⁸⁴ and TANKS, CAST-IRON, PORTABLE, WITH PUMPS, FOR STATION PLATFORM for “portable, cast-iron tanks with pumps for station platform.”⁴⁸⁵ In short, some form of inversion of compound terms was present, to a greater or lesser extent, in most indexing contexts: Kaiser (1911, § 225) considered it to be an “almost universal practice”.

In contrast to most of his contemporaries, Kaiser took an uncompromisingly firm stand against any inversion of terms, observing that “[i]t would be difficult to find a practice which leads to so much confusion and unnecessary work” (Kaiser 1911, § 225). He amplified this statement with the following example:

Let us take the term *street railway*, its inverted form would be *railway, street*. Now let us add the term *electric street railway*, of which the inverted form would be either *street railway, electric*; *railway, street, electric*, or *railway, electric, street*. If we adopt *street railway*, then the *railways* are split up, if we adopt *railway, electric*, then the *railway, street* are split up. To be at all consistent we would have to adopt *railway, street, electric*. Similarly, if we add *car*, we have successively *car, railway car, street railway car, electric street railway car*. All these terms except the first one would have to be inverted. But when it is all done, what has been gained? We certainly have all the names together under *car*, but whatever we have gained under the division *car* we have lost under other divisions. Our labour is absolutely in vain (§ 225 [emphases his]).

The gravamen of this critique lay in the fact that, although inversion allowed an indexer to collocate within an index all the compound terms containing a given noun under that noun, any advantage that this conferred was offset by the linear structure of terms, which compelled the choice of only one of a compound term’s component words as its entry word.

⁴⁸⁴ *Commercial Intelligence*, 14 June 1911, p. 28 (“Purchase of Government Stores in India. Government Catalogue of Indian Manufactures”).

⁴⁸⁵ *Commercial Intelligence*, 28 June 1911, p. 24 (“Purchase of Government Stores in India. Government Catalogue of Indian Manufactures”).

If an indexer was committed to entering a given compound term only once in a card index so as to avoid needless duplication, this constraint meant that the compound term could be filed only under the particular word chosen as entry word: this is what Kaiser meant when he stated that “whatever we have gained under the division [X] we have lost under other divisions”. Kaiser considered this to be problematic, especially if an inverted term consisted of three or more words, for an indexer’s understanding of what word in a compound term should serve as an entry word might not match the expectations of those consulting an index: as a result, the latter would not be able to predict where in the file one was to look for the term in question. Because Kaiser did not distinguish between preferred terms and lead-in terms pointing to them by means of SEE references (e.g., Aitchison, Gilchrist, & Bawden 2000, 17, § D.1; Cutter 1904, 70, Rule 178, & 105–106, Rules 285–286; cf. Section 5.2.2.2 of this chapter, below), he seems not to have thought of using such references as a means of directing the users of an index from different forms of a compound word (e.g., *ELECTRIC STREET RAILWAY; *STREET RAILWAY, ELECTRIC; and *RAILWAY, ELECTRIC, STREET) to the inverted form chosen by a given indexer (e.g., *RAILWAY, STREET, ELECTRIC). In the absence of such an expedient as an aid to users, it is perhaps unsurprising that he drew the conclusion that “confusion is very often the result” of term inversion (Kaiser 1908, § 101).

Even in the case of compound terms consisting of only two words, Kaiser (1911, § 226) took a very dim view of inversion. In this regard, he instanced the example of an index including the single-word term COPPER; compound terms in which COPPER was used “in the substantive sense” as a head noun (e.g., ANTIMONAL COPPER, DRY COPPER, ELECTROTYPE COPPER, WHITE COPPER), and compound terms in which COPPER appeared “in the adjective sense” as a noun modifier (e.g., COPPER ASHES, COPPER COIN, COPPER KETTLE, COPPER SLAG). If such an index did not make use of inverted terms, the single-word term COPPER would be immediately followed by those multiword terms in which COPPER featured as a noun modifier, while all those terms in which it appeared the head noun would be scattered throughout the index (§ 227); if, on the other hand, the index did permit inversions, then the latter terms could be altered so that the noun COPPER preceded its qualifying adjective (e.g., ANTIMONAL COPPER would be transformed to COPPER, ANTIMONAL; DRY COPPER, to COPPER, DRY; and so on), thus collocating all the terms under the entry word COPPER (§§ 228–229). Yet, Kaiser insisted, the introduction of inverted terms in the latter case conferred no appreciable benefits over leaving the terms in question in their original, uninverted state:

[T]he advantage supposed to be derived from it [sci., inversion—TMD] is purely an illusion. The term *copper coin* may be viewed from the aspect of *copper* and from the aspect of *coin* and if we are interested in both aspects, then no arrangement will be satisfactory which does not indicate the term both under *copper* and under *coin* (§ 226, [emphases his]).

Although Kaiser—rather inconsistently—used an uninverted index term to make his point, the substance of his argument is not hard to discern. Just as a person interested primarily in coins might be more apt to prefer the form COIN, COPPER over that of COPPER COIN, so might a person interested in a specific type of copper—say, dry copper—prefer the form DRY COPPER to that of COPPER, DRY.⁴⁸⁶ Not all seekers after information would have the same preferences and some might not even have preferences in one direction or the other: as a result, Kaiser claimed, “[i]t is ... quite impossible to construct any rules concerning the inversion of terms which would be acceptable to even the majority [sci., of users—TMD]” (§ 226). Accordingly, he “strongly recommend[ed]” that, in cases such as those of terms relating to COPPER, no inversions be carried out (§ 226): rather, cross-references were to be made from the single-word term COPPER to all those terms in which COPPER was the head noun of a noun phrase preceded by a qualifying noun or adjective.⁴⁸⁷

Kaiser’s stipulation that cross-references, rather than inversions of terms, should be used as a means to bring together semantically related but alphabetically scattered terms within an index had its basis in his belief that “inversions of terms ... are merely a clumsy attempt at classification” (Kaiser 1926, 22, § 9) and that “the classification attempted by inversions can be supplied more accurately and in a more manageable way by means of references” (1908, § 101). His valorization of a cross-reference system, or syndetic structure, provided yet another rationale for his categorical rejection of term inversion. As Kaiser

⁴⁸⁶ “Dry copper” was a metallurgical term referring to copper containing cuprous oxide, which a contemporary dictionary described in the following terms: “Copper in its molten stage dissolves and retains red oxide of copper Cu_2O : this is called Dry-copper. Pigs of copper containing cuprous oxide in solution present a longitudinal furrow or depression on their upper surface, while the metal, known then as dry copper, when fractured, has a purplish red color, duller in luster, and void of the fibrous structure evidenced in pure copper, while its malleability is much impaired both in the hot and cold state” (The Anglo-American Encyclopedia and Dictionary 1904, Vol. 8, 1555, s.v. “dry copper”).

⁴⁸⁷ In recommending that cross-references be made from COPPER to terms such as BLACK COPPER, CEMENT COPPER, DRY COPPER, REFINED COPPER, and so on, Kaiser tacitly adopted the mode of analysis espoused by Cutter, in which the noun COPPER represented a genus or kind and the qualifying adjectives (or nouns) preceding it represented qualifications of more specific kinds of copper (See p. 571, n. 481, above): as we have already noted, this interpretation of the semantic relationships between these different forms of terms ran counter to his analysis of such terms as COPPER ASHES or COPPER NAIL, in which COPPER—in the sense of [COPPER THINGS]—denoted the more general kind and the following noun represented a specific kind of copper thing.

explained, the design of the syndetic structure of SI was “based on the assumption that no terms have been inverted”, for “[i]nversion of terms makes it much more difficult to connect related terms, it makes it impossible to connect them systematically” (1911, § 230). On this view, inversions introduced an element of unpredictability as to where in the sequence of entries any given term was to be sought and so made it difficult for the indexer clearly to establish a system of cross-references: by contrast, “the exclusion of all inversions of terms” assured that every first, or filing, term in an index statement had “a known position according to its alphabetical composition” that could be determined with “absolute fixity” (§ 415). In short, the inversion of terms in an index file was to be avoided because it interfered with the syndetic structure of SI. Furthermore, the very fact that a system of cross-references served as a substitute for collocation rendered inversion otiose: as Kaiser put it, “[a] system of references carried out properly shows how useless it is to attempt to bring together related terms by means of inversions” (§ 230).

For Kaiser, then, the optimal mode of alphabiting was one in which single-word and multiword terms were arranged in a sequence based on alphabetico-classed—that is to say, word-by-word—order and multiword terms were entered in their ordinary, natural-language forms, without any inversion of their component words. Because, in SI, terms never appeared in isolation but only within the framework of a statement consisting of two or three terms, his protocols for alphabization took account of the structure of statements. In conformity with his tenet that the full canonical form of a statement consisted of three terms (See Sections 3 & 3.5 of the current chapter), Kaiser (1911, §§ 391, 393) set out, for filing purpose, a template wherein a statement consisted of three elements—a “first term”, “second term”, and “third term”)—of which the first term was always a term denoting a concrete or country, the second term was always a term referring to a country or a concrete, and the third term was invariably a term signifying a process. Thus, to ascertain the alphabetical place of a statement within a series of different statements, it was necessary to progress stepwise from the first to the third term, a process that Kaiser outlined as follows:

The statement on the cards is written on three lines, one each for the three main divisions concrete (or country), country (or concrete) and process. To find the proper place for a card the first term or main division is considered first (it may consist of one or more words), the alphabetical place for the whole term is found. Either there are already cards in that particular position with the same first term, or there are none. In the latter case the proper position for the new card has already been found and it is inserted. In the former case we have a number of cards with the same first term as that on the card to be filed, and our further consideration is limited to these cards. Such cards all having their first term alike are alphabeted

among themselves by their second terms and we therefore find the proper place for the second term on the card to be filed. If there are cards with both first and second terms alike, they will be divided among themselves by their third terms, and we proceed to find the proper place among those for the third term on the card to be filed (§ 393).

Because terms for concretes, countries, and processes alike might consist of several words, it was necessary, at each step of the process to determine the alphabetical sequence within each term on a word by word bases: as Kaiser warned his readers, “[c]are is required ... to consider each term as a whole, and not to proceed to the second and third term until the first term is completely dealt with. Again the words of each term must be dealt with separately” (§ 395). In essence, then, Kaiser’s idealized procedure of alphabetizing involved two different, but interdependent, levels at which alphabetical sequence was to be determined: at the level of the statement, the indexer proceeded term by term from the first term to the third term, and within each term, from the first word to the last word.

Within this basic framework of alphabetization, there were two features of statements that required the development of two further rules of arrangement, one at the level of the statement itself and the other at the level of the term. With regard to statements, we have already seen that these could take tripartite forms (i.e., [CONCRETE]–[COUNTRY]–[PROCESS] or [COUNTRY]–[CONCRETE]–[PROCESS]) or bipartite forms (i.e., [CONCRETE]–[PROCESS] or [COUNTRY]–[PROCESS]), the latter being viewed as reduced forms (*[CONCRETE]–∅–[PROCESS] or *[COUNTRY]–∅–[PROCESS]) of the former (See Section 3.5 of the present chapter). Kaiser, who outlined the process of alphabetization with reference to the canonical tripartite form, thus had to deal with the question of how to file bipartite statements alongside tripartite ones. Although he did not discuss this point in detail, the examples that he gave clearly indicated that bipartite statements were to precede tripartite ones in an index file: thus, for instance, WATCH–TRADE came before WATCH–SWITZERLAND–TRADE, while BRAZIL–TRADE preceded BRAZIL–BRAZILNUT–TRADE (Kaiser 1911, §§ 394, Card Nos. 1 & 3; 407, Card Nos. 3 & 5). Phrased in more formal terms, bipartite statements in which the positional slot for the second term was left empty always came before tripartite ones in which it was filled by a word or words: thus, to adapt a favorite slogan of adherents of word-by-word alphabetization, “nothing [came] before something” (Edmands 1887, 327; Wellisch 1999, 5, § 4.1.2.1) in determining the order of

bipartite statements *vis-à-vis* tripartite ones.⁴⁸⁸ Kaiser's rationale for adopting this order was that the bipartite statements were more general than tripartite ones, since the latter indicated that the information was restricted to a specific geographic area, whereas the latter left the geographical applicability of the information open (cf. Kaiser 1911, § 396).

As for the alphabetization of multiword terms, Kaiser does not seem to have considered terms for concretes or those for processes to pose any particular difficulties. However, terms of countries demanded special attention, for they often included geographical subdivisions (e.g., UK, LONDON) or two-country dyads (e.g., USA-UK) in which different punctuation marks occurred in the middle of the term as a whole (See Sections 3.2 & 3.6 of the current chapter, esp. p. 501, above): it was necessary to make provisions for dealing with those in a consistent manner.⁴⁸⁹ Kaiser (1911, § 398) stipulated that, in cases “[w]here divisions of countries or second countries which are brought into relation with the first are given, we have two alternatives”. These alternatives he laid out as follows:

⁴⁸⁸ One latter-day commentator (Foskett 1982, 127–128) has noted that Kaiser's mode of alphabetization resulted in a “systematic arrangement of subheadings”, in which process terms from bipartite statements always came before country terms from tripartite ones in sequences such as the following:

1. STEEL-SMELTING
2. STEEL-WELDING
3. STEEL-GREAT BRITAIN, SHEFFIELD-PRODUCTION
4. STEEL-UNITED STATES OF AMERICA, PITTSBURGH-SMELTING.

So far as it goes, this is an acceptable analysis of how of the statements would be arranged in a given file (though, one should note that, in the case of statements in which a country name was the first term, such as GREAT BRITAIN-IMMIGRATION, GREAT BRITAIN-STEEL-PRODUCTION, the process terms of bipartite statements preceded the terms of concretes of tripartite ones). However, it does not take into account that underlying this surface order was a “deep structure”—namely,

1. STEEL-∅-SMELTING
2. STEEL-∅-WELDING
3. STEEL-GREAT BRITAIN, SHEFFIELD-PRODUCTION
4. STEEL-UNITED STATES OF AMERICA, PITTSBURGH-SMELTING

—in which it was the systematic absence of “second terms” in bipartite statements that led to the fact that their terms of processes always preceded countries (or concretes) in tripartite ones. In other words, the creation of systematically “classed” arrangements of subdivisions thus seems to have been largely an artifact of Kaiser's *de facto* application of the “nothing before something” rule to the ordering of statements.

⁴⁸⁹ To be sure, terms for concretes also featured special punctuation—namely, brackets to enclose qualifying words, whether as a means of disambiguation (e.g., FILE (TOOL) vs. FILE (FURNITURE)) or as a way of combining two separate terms into a single complex compound (e.g., IMPORT DUTY (MACHINERY); LABOUR (TINPLATE)) (See Section 3.6 of the present chapter, esp. pp. 491, 498–499, above). However, the presence of the brackets in these cases was relatively unproblematic for alphabetical ordering, for the words so enclosed always came at the end of the term as a whole and so could be treated simply as the last words in a compound.

Divisions are indicated by a comma, the relation between two countries by a hyphen. The cards may be so arranged that all the commas come together first and all the hyphens come afterwards, i.e. they are arranged in two separate alphabets; or commas and hyphens may be ignored and the names following them are arranged in one alphabet. In the former case all the divisions of a country will come together, and all the second countries with which the first country is in relation will be together; in the latter case they will be mixed. The choice between these two alternatives must be made in accordance with individual requirements. If an index is likely to have many divisions under each country and if they are used much, it is best to keep commas and hyphens separate. For a general index it is best to ignore them (§ 398).

As this passage suggests, the punctuation marks were to become operative elements in filing only in indexes featuring highly granular geographical coverage of regions within countries as well as relations between countries. In such indexes, commas indicating the subdivision of a country preceded the hyphens signifying relation between two countries, a sequence that gave priority to terms expressing the internal partitive relationship(s) of a country *qua* individual to its component parts over terms highlighting a given country's external relationship(s) to other countries: in other words, Kaiser quite deliberately added a classificatory element to the subarrangement of complex terms of countries. In card indexes with less detailed geographical coverage, on the other hand, he gave indexers the option of leaving the punctuation out of account for filing purposes, apparently so as not to burden them with a refinement that might be *de trop* for their particular needs. Here, then, was an example of flexibility within an otherwise tightly defined process of ordering the inner structure of multiword terms within a statement.

Taken in conjunction with the basic principles of word-by-word alphabetizing, Kaiser's protocols for the arrangement of index units on the basis of their statements yielded alphabetical sequences of first terms that were subdivided by alphabetically arrayed second terms, which were, in turn, subdivided by third terms likewise ranged in alphabetical order. This, however, did not end the process of subdivision, for a number of different index items might share the same statement (See Section 3 of the current chapter). In that case, one had to take recourse to elements in the amplification of the index item. "If there are cards with all three terms alike, that is to say with identical statements," wrote Kaiser (1911, § 393), "then they are differentiated by the date of the information, the latest date coming first." As was noted earlier, the date of information occupied a prominent position in the amplification field of a unit card—a position analogous to that held by the first term of a statement in the statement field—because of its rôle as means of subdivision (See Section

4.4 of the present chapter, esp. pp. 544–545, above): in fact, Kaiser (1911, §§ 394–395) considered it to constitute a “4th term” following the three terms of the statement. His characterization of the date of information as a “term” on a par with the first, second, and third terms comprising a statement naturally raises the question whether he conceptualized it as a “virtual” category of time to be set alongside those of concrete, country, and process: in other words, one may well wonder whether he was on the cusp of creating a quadripartite categorial system. Tempting as such a supposition may be, there are two reasons to doubt that the date of information enjoyed anything like categorial status. First and foremost, Kaiser’s nomenclature of terms used for filing purposes—“first term”, “second term”, third term”, and “fourth term”—clearly alluded to the syntactic relations between the terms in question rather than to their semantic content, which, as we have seen, was crucial to the definition of the categories *qua* categories: thus, insofar as the date of information was brought into relation with the terms of a statement as a fourth term, it was on syntactic grounds. Second, the date of information *qua* fourth term was itself liable to further subdivision, for, as Kaiser went on to state, “[i]f there are cards with all four terms alike, they may be differentiated again similarly by the date of publication” (§ 395). This provision for the subdivision, if necessary, of the statement and date of information by the date of publication of the textual unit from which the information connected with the statement had been taken created, in effect, a secondary temporal subdivision—a move that Kaiser presumably would not have made if he were thinking in terms of a categorial system rather than of a series of subdivisions. At any rate, his deployment of the date of information and date of publication as additional mechanisms for subdivision indicate that, in SI, alphabets alone did not always suffice to establish the position of a unit card within an index file: especially in indexes containing a large number of index items, it was necessary to harness yet other aspects of an index item—in *casu*, two different pieces of chronological data—in order to determine its place in the sequence of unit cards.

The alphabetical arrangement of index entries constituted the centerpiece of a broader filing process. Kaiser (1911, §§ 392, 447, Step 6) prescribed that prior to filing index items, the person responsible for doing so should “verify and check” the unit cards to ascertain that there were no errors in their statements—in particular, that the geographical subdivisions of terms of countries were entered correctly—and that the indexer had prepared a “full complement of cards”—that is to say, that there were “as many cards as there are concretes and countries in a statement” (§ 447, Step 5; cf. Section 3.5 of the

current chapter, esp. pp. 482–483, above). Once he had completed this task of quality control, the filer was to follow the protocols for alphabetization and place the index items into their proper place in the index file (cf. § 447, Step 7). The result was a series of alphabetically ordered and chronologically subdivided index items such as that illustrated in Figure 28, in which each entry represents a unit card bearing a distinct index entry.

Figure 28—which derives directly from Kaiser and is to be read from the bottom up, a convention that he used in order to imitate, on the printed page, the experience of looking into a card drawer (§ 395, n. *)—exemplifies most of the principles and rules that we have discussed in the preceding pages. First, we may note that the first terms are arranged in word-by-word alphabetical sequence, so that the single-word term WATCH, couched in the singular, comes before WATCH CASE, which, in turn, precedes WATCH HAND CASE. Within

Card No.	First Term	Second Term	Third Term	Fourth Term
8.	WATCH HAND CASE	SWITZERLAND–GERMANY	EXPORT	1900
7.	WATCH CASE	SWITZERLAND, BASEL	TRADE CONDITION	1897
6.	WATCH CASE	SWITZERLAND, BASEL	TRADE CONDITION	1897
5.	WATCH CASE	SWITZERLAND, BASEL	TRADE CONDITION	1897
4.	WATCH CASE	SWITZERLAND, BASEL	EXPORT	1897
3.	WATCH	SWITZERLAND, BASEL	CUSTOMS CLASSIFIC.	1897
2.	WATCH	SWITZERLAND	TRADE	1897
1.	WATCH		MANUFACTURE	1897

Figure 28: An example of an alphabetical filing sequence in SI (Source: Kaiser 1911, § 395 [simplified]).

the series of cards bearing statements with the first term WATCH (Card Nos. 1–3), the position of each card is determined by the alphabetical sequence of its second term: the null content of the second term of Card No. 1, which renders its statement a bipartite one, gives it ordinal precedence over Cards No. 2–3, the statements of which are tripartite, while the fact that the second term of Card No. 2 consists of a country name alone (*in casu*, SWITZERLAND), while that of Card No. 3 features a country name followed by a subdivision (*in casu*, SWITZERLAND, BASEL) requires that the former is placed before the latter in the series. The four cards bearing statements with the first term WATCH CASE (Cards 4–7) have identical first terms and second terms: hence, it is necessary to refer to the third term to distinguish them further. Of these, the first card has a process term (EXPORT) that alphabetically precedes that which occurs on the three subsequent cards (TRADE CONDITION): accordingly, it takes the fourth place in the overall series of cards. The remaining three cards (Cards No. 5–7) all bear the same statement: accordingly, it is

necessary to take their respective “fourth terms”, or dates of information, into consideration (§ 396). In this case, the fourth term is identical for all three cards as well: thus, the indexer would have to have recourse to the dates of publication to determine their filing order, with “[t]he highest date coming first,” so that “the most recent information will be uppermost” (§ 396). Finally, one may note the order of the second terms, which Kaiser devised in such a way that a single-word term (in Card No. 1) came before those compound terms with geographical subdivisions (in Cards No. 2–7), which, in turn, preceded the single example of a compound term denoting a relation between two countries (Card No. 8): although this particular pattern did not play a rôle in determining the order of index items in the example at hand, it nevertheless reflected the ideal arrangement of complex terms of countries if the statements to which they belonged were to share a common first term within an index requiring detailed treatment of geographical matters. All in all, then, the figure neatly encapsulates, albeit in simplified form, the results of applying Kaiser’s norms for alphabetical classification and arrangement of cards within an index file.

7.5.2. Guide Cards, File Structure, and Cross-Reference Structure

An index file consisted primarily of unit cards bearing index items, which served as the material vehicles for the recorded information that it contained. However, it would have been sorely incomplete if it were confined to such cards alone. For one thing, as we have already noted, unit cards were of uniform size (See Section 4.4 of the current chapter): thus, a card drawer containing them alone would have offered indexers and users alike a monotonous vista of serried rows of top edges of cards offering no indication of the location of key “landmarks” of the file, such as the points in the sequence where a series of index items pertaining to a new first term—be it a concrete or country—began. Labels appended to the outer face of a given drawer might give an indexer or user an idea of the extent of its contents (Kaiser 1908, §§ 15, 48–49; 1911, § 413): however, there was still a need of a mechanism to mark key topographic features in the series of cards itself so as to render searching within it easier. Moreover, we have seen that, in Kaiser’s view, an alphabetical arrangement of unit cards inevitably scattered semantically related first terms and that, as a consequence, he deemed it necessary to build up a series of cross-references to indicate to the user where collateral information pertaining to a subject of interest might be found (See Section 5 of the present chapter). Inasmuch as cross-references did not form part of the amplifications of unit cards, there was need of a physical medium by which to indicate them.

For Kaiser, the instrument by means of which one could both indicate the inner structure of a card index file to its users and record the cross-references relating semantically related but alphabetically dispersed terms to one another was the guide card.

7.5.2.1. Guide Cards and the Structuring of Alphabetical Card Files

Guide cards, or guides, were a particular kind of card that shared the same dimensions as ordinary unit, or record, cards (Kaiser 1908, § 54) but differed from the latter in two important respects.⁴⁹⁰ First, and foremost, they had projections, or tabs, variously described by contemporary sources as extending from 1/2 to 3/4 of a centimeter (e.g., James 1902b, 229; Library Bureau 1903, 21) or from 1/4 (or 3/8) to 1/2 of an inch above the top edge of the card's body (James 1902a, 187; Libraco Limited 1912, 2; Perry 1906, 68; Sayers & Stewart 1912, 19). The projections could be cut at different lengths in proportion to the total length of the card. They ranged from ones that covered, more or less, the total length of the card, through those that were cut to a half, a third, a fourth, or a fifth of its length, to yet smaller sizes if need be. Figure 29 illustrates the standard kinds of guide cards based on tab length (cf. Libraco Limited 1912, 2, "Guide Cards"; Mares 1909, 28; Perry 1906, 69, Form 9; Sayers 1926, 270): of these, fifth-, third-, and half-cut cards were the most frequently used in business contexts (e.g., Hudders 1916, 44, § 200). In addition to having tabs, guide cards differed from ordinary unit cards in that they were made of sturdier, stiffer boards and possessed thicker bodies than the latter (Mares 1909, 26; Perry 1906, 68). The reason for this, Kaiser (1908, § 54) surmised, was "to give sufficient strength to the tab" of the card; other commentators emphasized the durability that the additional thickness imparted to the card as a whole (James 1902b, 229; Perry 1906, 68). Like unit cards, guide cards came in different colors—the most frequent were buff, blue, and salmon (Perry 1906, 68)—and, accordingly, some contemporary proponents of the card system encouraged color-coding them in card catalogs and indexes (e.g., Institut International de Bibliographie 1905a, 70 & Planche III; Libraco Limited 1912, 2; Sayers & Stewart 1912, 57, § 80). Kaiser (1911, § 412), on the other hand, assumed that only one color would be used for such cards in any single index: in his estimation, "[w]hite guides are decidedly best for contrasting the writing", but since they ran the risk of soiling easily, it was generally "better

⁴⁹⁰ Note, however, that some manufacturers preferred to make the height of the body of the guide card slightly lower than that of unit cards on the grounds that this would "facilitat[e] the removal of record cards near the guides" (Perry 1906, 68).

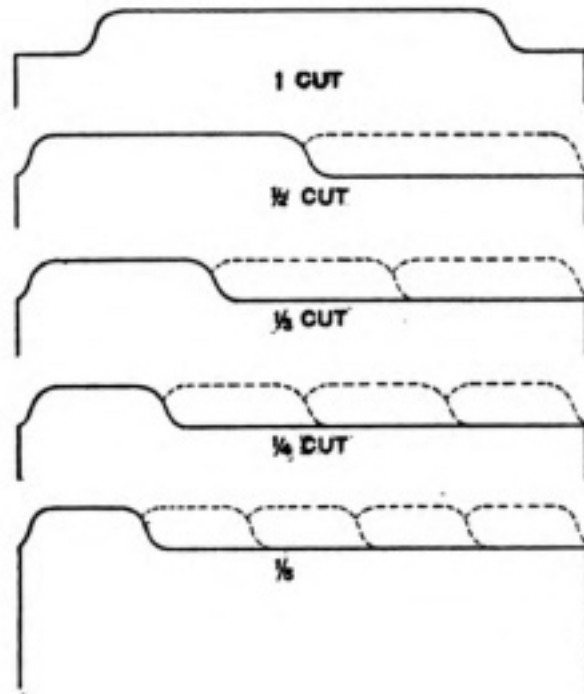


Figure 29: Different cuts of guide cards (Source: Housel, & Gilman 1916, 15, Figure 15).

to use cards of a faint tint, buff, blue, etc” for this purpose.⁴⁹¹

According to contemporary writers on card systems, a key function of guide cards was that of dividing card files into smaller, more manageable sections (e.g., Perry 1906, 68): indeed, at Otlet’s Institut International du Bibliographie (1905a, 70), they were known as “division cards” (*fiches divisionnaires*). Inserted within a sequence of unit cards, guide cards bestowed upon it an internal structure: thus, in the words of one French authority on office organization, they constituted “the immutable elements (*éléments immuables*) of the order of a method or a system of arrangement (*classement*)” (Heller 1910, 56). However, the rôle of guide cards went well beyond the physical partitioning of unit cards into groups. Their tabs were inscribed with headings indicating the subjects concerning which the unit cards associated with them bore information (James 1902b, 229): they thus afforded persons

⁴⁹¹ See the color illustrations of sample card drawers in Kaiser 1911 § 549–559A, in which the guide cards in each drawer are uniformly of one hue, either buff (§§ 549–552, 558A–559A) or salmon (§§ 553–557). The differences in color apparently signaled that the drawers depicted were to be understood as coming from different indexes: this corresponded with Kaiser’s *dictum* that if an office or intelligence department was maintaining more than one index (See Section 5 of the current chapter), it was “desirable to have different colour guides for each” of the indexes (Kaiser 1908, § 156).

perusing a given card drawer a compendious overview of the distribution of subjects across the series of cards that it housed. By the same token, they served as devices for manually navigating the contents of a card drawer, for a person consulting a card index could readily find information on a subject of interest to him by going directly to the guide cards bearing its name instead of laboriously thumbing through the series to find the relevant unit cards. In this way, guide cards served as “Finger Posts” to the unit cards among which they were inserted (Libraco Limited 1912, 1). As such, it was claimed, they enhanced the use of card files in a number of ways: “[p]roperly used”, claimed the author of a promotional brochure published by a British card manufacturer, “they save not only considerable time in referring and filing, but also wear and tear on the cards ..., as the guides direct instantly to the place of search” (p. 1). The importance accorded to guide cards as mechanisms for facilitating the search for, and location of, information within a card file is underscored by the fact that it was in virtue of their capacity to “point, or guide to the entries or references indicated” by their headings that they seem to have acquired their name as guides in the first place (James 1902b, 229).

Kaiser’s understanding of the significance of guide cards mirrored this *communis opinio*. Judging them to be “one of the most useful elements in the card system” (Kaiser 1911, § 399) and, indeed, “necessary for all card files” (1908, § 137), he valued them as signposts to the internal structure of a file that afforded “quick” and “direct” access to unit cards bearing information on subjects of interest (1911, §§ 314, Point 3; 644, Point 3): indeed, inasmuch as they facilitated the consultation of a card file, they constituted, in his view, “a labour-saving device” (1908, § 137). As for their specific rôle, he stated in *The Card System* that

[t]he main object of the guides is to mark divisions or sections. When the guides are inserted in the files the tabs project from the body of cards ... and as the names of the divisions are printed on these tabs, these headings are always visible, and thus an excellent means is provided by which any given ... sectional heading may be located quickly (§ 55; cf. § 366, s.v. “Guides”)

Both the structuring and indicative functions of guide cards are visually manifest in Figure 30, below, which depicts a drawer from one of the Tariff Commission’s card index files (on which, see Chapter 5, Section 3, esp. pp. 170–174, above). On one hand, the tabs of the guides, staggered across different positions along the lengths of the cards, jut out conspicuously above the otherwise homogeneous series of unit cards, breaking it up into smaller segments. On the other, each of the protruding tabs is inscribed with a typewritten heading that indicates a given subject (or a subdivision thereof): this allows a person refer-

ring to the file rapidly to discern where, within it, cards pertaining to that particular subject (or to alphabetically contiguous subjects not accorded separate guide cards) are to be found.

If guide cards were to provide an effective key to the position of specific subject-based divisions within a file, it was necessary to apply them in a manner that reflected the conceptual structure underpinning the arrangement of the file's unit cards. Within the framework of SI, this meant conforming the structure of the system of guides to the structural template of the unit that served as the basis for the alphabetical arrangement of unit cards: the statement consisting of a first term, a second term, and a third term (See Section 5.1 of the current chapter).

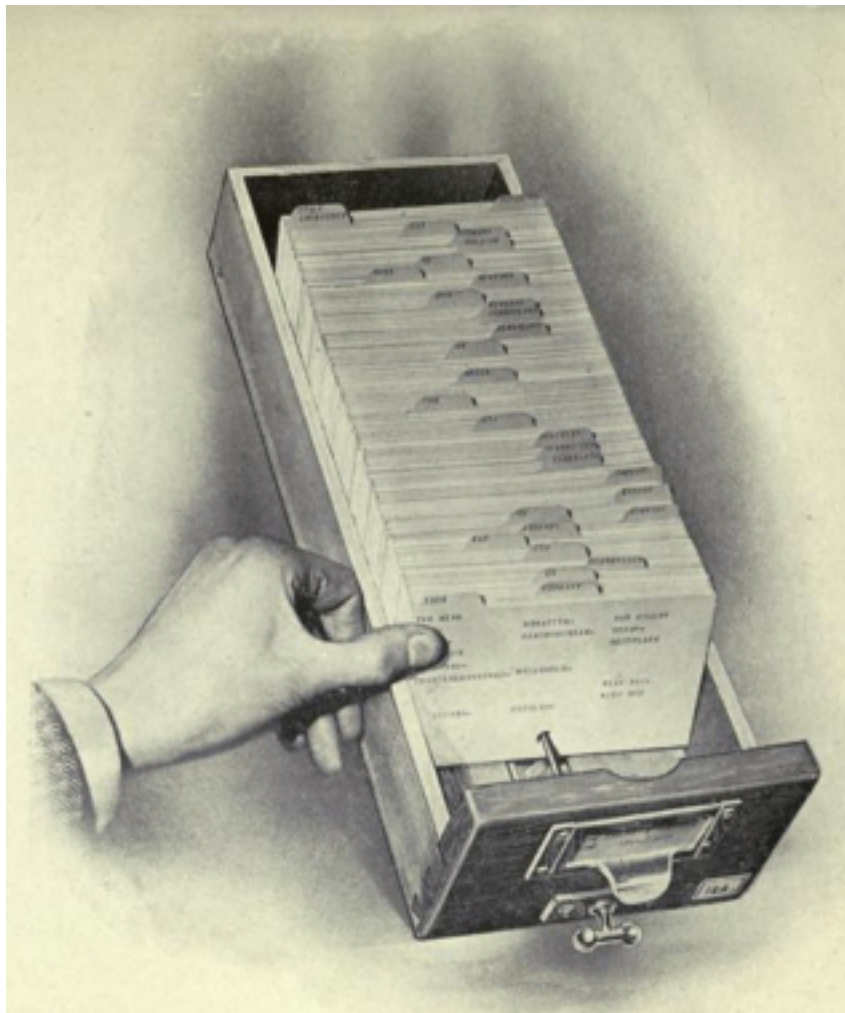


Figure 30: Card drawer with guide cards (Source: Kaiser 1908, § 119 [rotated])

Before one could do so, it was necessary to make a determination regarding the kind of guide cards—one-cut, half-cut, third-cut, fourth-cut, fifth-cut, or some yet smaller cut—that were to be employed. This was a matter of no small importance because the size of the tab determined the number of divisions that could be represented by means of staggered positions across the length of a card: for example, half-cut guides, in which the tab was one-half the total length of the card, allowed for two positions, one on the left and one on the right; three-cut guides, in which the tab was one-third the total length of the card, yielded three positions, one on the left, one in the center, and one on the right, and so on (See p. 585, Figure 29, above). Now Kaiser (1908, §§ 54 [emphasis his], 366, s.v. “Guides”) deemed the number of positions to be a fundamental feature of guide cards, so much so that he referred to half-cut guides as “*two position* guides”, third-cut guides as “*three position*” guides, fifth-cut guides as five position guides, etc. Basing himself on the axiom that guide cards “should be so applied as to give the maximum amount of indication”, he argued that, since “guides are made in various positions”, it stood to reason that “wherever possible these positions should in themselves indicate something” (§§ 137–138): that is to say, the various tab positions of a particular set of X-position guides should be mapped onto some set of categories that they would henceforth signify. In this regard, Kaiser (1911, § 399) drew a bold analogy between the use of the tab positions of guide cards as a means of indicating categories of division and the use of fixed positions within strictly demarcated fields to denote different kinds of information on unit cards:

It has been recommended that the information on each index card should be distributed according to a fixed plan, so that the same element of information will be found on all cards in the same place As far as applicable we shall follow out the same plan for the guides. Just as with the index cards the position itself is indicative of some definite information (absent or present), so the position of the guides will indicate something, irrespective of what is written on it [*sic*].

In other words, it was not simply the heading inscribed on a given guide card that communicated information about the particular division of the file that it preceded: the location of the guide’s tab within the series of available tab positions likewise revealed something about the nature of latter.

Kaiser (1908, § 142; 1911, §§ 400–401, 408, 410) favored using a system of five-position guides for most subject indexes, even though this meant contending with small

tabs on which to inscribe headings.⁴⁹² To be sure, he was not dogmatic on this matter and made allowances for the deployment of other kinds of guide cards in certain contexts.⁴⁹³ Nevertheless, he took five-position guides, which, in his estimation, struck the right balance between “giv[ing] ready access to a general index” and keeping “the number of guides ... down to a minimum” (1911, § 410) as his norm and, accordingly, we shall, for the sake of simplicity, confine our attention to these alone. Kaiser drew a direct correlation between fifth-cut guide cards and the basic tripartite form of the statement (on which, see Sections 3, 3.5, & 4.4 of the current chapter). As he saw it, the two leftmost guide cards—the *first* and *second guides*, as he called them—were used to represent the first term, which, it will be remembered, could be a term denoting either a concrete or a country; the next two guides—the *third* and *fourth guides*, proceeding from left to right—indicated the second term, which could be either a term for a country or a term for a concrete; while the *fifth guide*, which stood at the rightmost end of the series, served as an indicator of the third term, which was invariably a term for a process (Kaiser 1908, § 142; 1911, §§ 402–404): Figure 31 offers a visual representation of this mapping of guide cards to terms. The order of the three groups of guides corresponded to the disposition of the component terms of the statement in the statement field of unit cards, where, as we have already seen, the first term appeared in the leftmost corner of the field, the second term appeared on the line below it, a little to the left of the central axis of the field, and the final term appeared on a third line, on the right-hand side of the field (See Section 4.4 of the present chapter). Kaiser (1911, § 399) explicitly acknowledged that “one of the objects of this distribution was to coordinate the terms on the cards with the various positions of the tab of the guides”: In this way, the structure of the statement served as a bridge between unit and guide cards.

⁴⁹² With 3 x 5 inch, or 7 ½ x 12 ½ cm cards, which Kaiser took as his norm, each tab would have measured 1 inch, or 2.5 cm in length.

⁴⁹³ For example, Kaiser (1908, §§ 140, 142) envisaged that persons maintaining “[s]mall indexes” might get by with a system of three-position guides, which he also advocated for use in alphabetical card registers. Furthermore, he noted that some larger indexes might require the use of six-position guides (1911, §§ 401, 404). He noted that he himself had tried to use six-cut guide cards, apparently with 3 x 5 inch, or 7 ½ x 12 ½ cm, cards but found the tabs too small to take headings easily: accordingly, he recommended that these be used only with cards of a larger size. Finally, in the case of “very specialized”, or “technical”, indexes, he envisaged that the indexer might use a combination of three-position and five-position cards. Three-position cards were to be reserved for terms of concretes, which, in technical indexes, might prove to be quite long; otherwise five-position cards were to be used for terms of countries and processes. For a discussion of this alternative system, see Kaiser 1911, §§ 408–410, 429, 544, 546, 553–555. Although we shall not discuss this alternative system in detail here, we shall briefly consider its consequences for the making of cross-references in Section 5.2.2.2 of this chapter.

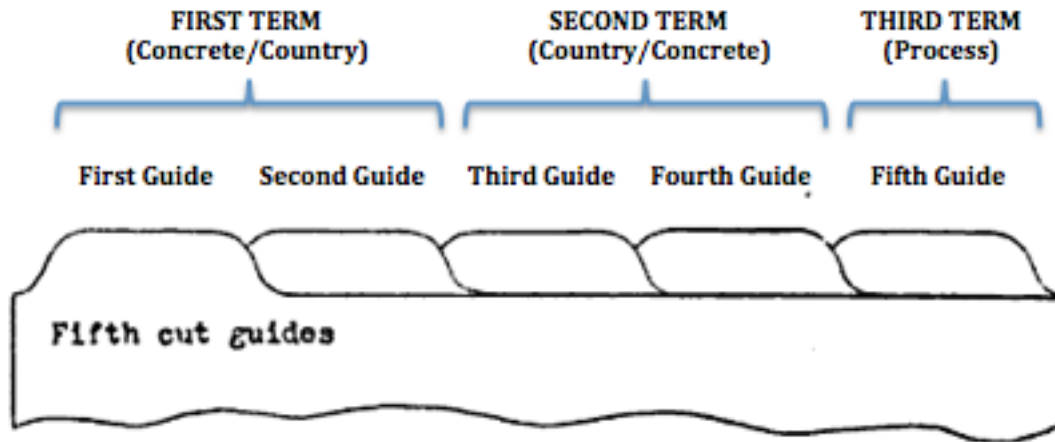


Figure 31: The mapping of the component terms of statements onto fifth-cut guides (Sources: Hudders 1916, 44, § 200 [image of guides]; Kaiser 1911, §§ 400–404)

To Kaiser’s mind, the five guides of the five-position system set forth above represented an expansion of a notional three-place system. Invoking the canonical statement form [CONCRETE]–[COUNTRY]–[PROCESS] as his point of reference, he observed that the three terms of a statement “are indicated by separate guides”: “the left extreme guide indicates the concretes, the centre guide the countries, and the right extreme guide the process” (Kaiser 1911, § 400). Thus, he wrote, “[w]e now have three guides in three distinct positions, each indicating a separate kind of terms [*sic*]” (§ 400). In light of the fact that terms of concretes and terms of countries frequently consisted of compound or complex multiword names, there was need to make additional provision for the different “alphabets”—i.e., the new alphabetical sequences initiated by each consecutive word in a multiword term—among the guide cards. Thus, wrote Kaiser,

[w]e ... use the intermediate guide between the left and the centre to indicate the second alphabet of the concretes, and the intermediate guide between the centre and the right to indicate the second alphabet of the countries. We thus obtain five guides, two for the concretes, two for the countries and one for the process (§ 400).

Within this conceptualization of the five-position guides as analogs to the component terms of statements, the first, third, and fifth guides occupied primary positions, so to speak, in the sequence, while the second and fourth guides were supplementary to the first and third. In the case of guides associated with the first term, noted Kaiser, “[i]f the term consists only of one word, the first guide only is used, if it consists of two or more, the words are divided between the two guides” (§ 402); the same held for guides associated with the second term as well (§ 403). With regard to the repartition of compound or complex first terms among

the guides allotted to them, he left the choice to indexers, observing that “[t]he character of our business will generally determine how the division is to be made” (§ 402): in his estimation, the choice would generally be unproblematic, since “by far the largest number of first terms naturally divides into two”. As for second terms, two-country dyads and most country subdivisions likewise could be easily distributed across the tabs of two guide cards. More problematic were the relatively rare cases of triple divisions, in which a country term was to consist of the name of a country, followed by the name of one of its states or regions, and, finally, by the name of town or city (See Section 3.2 of the current chapter). In such situations, Kaiser (1911, § 403) averred,

it may become necessary to make provision for three guides. The third guide would correspond to the country and the fourth to the state. If it is essential to provide guides also for the towns, then it is best to use distinct colour guides of the fourth position and file them behind those of the states. As an alternative the states may be indicated by third guides of separate colour and the towns by fourth guides.

In other words, countries and states would occupy successive places in the position occupied by the third guide or states and towns would do the same in the position held by the fourth guide. This measure, which ran counter to Kaiser’s general tendency to use one color for index guides, neatly illustrates how he attempted to work around the physical limitations imposed by the technology that he adopted for the implementation of his indexing system.

Kaiser’s identification of the first, the third, and the fifth guides as direct correspondents to the first, second, and third terms of statements did not mean that he accorded them equal weight. “Of the[] five guides the first and third will always be the most important”, he asserted, “because they give the key to the concretes and countries and as such they will be used more frequently than the other guides” (Kaiser 1911, § 401). This privileging of the primary guides associated with terms of concretes and countries clearly reflected Kaiser’s assumption that these two categories of entities were the primary objects of interest of persons involved in the world of business (See Section 3.5 of the present chapter, esp. p. 481, above). By the same token, it was congruent with his understanding of the principle underlying the arrangement of unit cards in an index file constructed according to the norms of SI, regarding which he wrote:

[a]ll the cards are arranged in one alphabet A–Z, this alphabet consists of names of concretes and countries only i.e., the first term of the statement on each card. For subdivisions the cards with like concretes are split up by countries, and the cards

with like countries are split up by concretes i. e. by the second term of the statement on each card (§ 390).

Insofar as the first and third guides corresponded with the beginning of the first and second terms of a statement, which, in turn, were correlated with the two primary categories of SI, it stood to reason that Kaiser would foreground them. Here, again, it is not difficult to discern the lingering influence of the distinction between monographic and geographic subjects that animated the knowledge organization régime at the PCM during his tenure there (See Chapter 3, Sections 3.1 & 3.2; Section 3.4 of the current chapter, above).

Although Kaiser explicitly stated that first and third guides alike were the most important ones within a five-position system, he modified this view somewhat in favor of first guides alone when it came to the practical question of how many guides should be allocated to a card file. This was a matter of great consequence, for it would clearly be inefficient to use a guide card to mark every single distinct term occurring across the statements in a given file. The insertion of a guide to mark any change in term at each of the five guide positions would result in a file parceled out into a very large number of very small divisions, a situation that, in Kaiser's view, would not conduce to making a file more searchable: as he pointedly, if exaggeratedly, put it, "[a]ccess is exactly the same if in the one case we use no guides at all and in the other we use a guide for every card!" (Kaiser 1911, § 409). It was thus necessary to develop a policy that would chart a *via media* between the use of too few guide cards, which would fail to provide sufficient guidance to persons consulting a file, and the deployment of too many guide cards, which would clutter up the file, create extra work for the indexer, and run the risk of needlessly confusing users of the index: in short, Kaiser wrote, what was needed was "a system of guides which will give

- 1 the maximum of accessibility
- 2 the minimum number of guides" (§ 408).

Kaiser's solution was to accord primacy to first terms as the starting points and nuclei for the division of a file by means of guide cards. He declared that "it is absolutely essential that the first guides for both concretes and countries should be complete, i.e., there should be as many guides as there are dissimilar first terms on successive cards" (§ 411). In other words, it was obligatory to make out a first and, if necessary, a second guide card for every distinct main, or first, term occurring in an index: to these mandatory guide cards he gave the designation *fixed guides*. All other positions of guides, which served as successive subdivisions of the subset of cards filed under a common first term, were optional and to be

added only when the number of cards filed under the first guide had increased to such a point that subdivision was warranted: thus, averred Kaiser (1911, § 405 [emphasis his]), “the second, third, fourth and fifth guides become *only* necessary successively when there is a more or less extensive accumulation of cards under a first guide”. “In consulting an index”, he continued,

we *must* begin with the first guide; so long as there are only a few cards with the identical first term, there will be no other guides. Where there is an accumulation of cards under the first guide, we pass on successively to the second, third, fourth and fifth guides (§ 405 [emphasis his]).

Like other proponents of card systems, Kaiser used a quantitative criterion for the determining the point at which subdivisions of a given segment of a card file should be made. Most contemporary authorities on card indexing or cataloging recommended that new guide cards should be inserted roughly every 20 (e.g., Hudders 1916, 49, § 219; Leffingwell 1917, 82, 85; Libraco Limited 1912, 2; Library Bureau 1903, 17) or 25 cards (e.g., Miller 1921, 29; Sayers & Stewart 1912, 58, § 91), though some writers suggested a somewhat lower number, as, for example, the American creator of a “topical classification of electrical and railway engineering references”, who advised that “[i]n commercial indexes there should be a guide card between every ten to twenty reference [sci. unit—TMD] cards” (Parsons 1906, 133).⁴⁹⁴ For his part, Kaiser (1908, § 57; 1911, § 411) assumed that a given division of a card file could reach 20 to 40 cards before it required further subdivision with an additional guide, which, in turn, would be subdivided when it had reached a critical number of cards, and so on: however, some of the illustrations of card files in *The Card Office* and *Systematic Indexing* suggest that he did not exclude altogether the subdivision of divisions containing fewer than twenty cards if this was deemed useful (1908, § 119; 1911, § 552). At any rate, insofar as guide cards allowed one to set upper limits on the number of cards in any one division of an index file, they contributed materially to the “control of quantities” that Kaiser considered to be a key function of classification in general (See Chapter 6, Section 3.1, above) and of SI in particular (Kaiser 1911, § 626).

⁴⁹⁴ It is worth noting that this quantitative approach to subdivision was not limited to the design of card indexes alone. Within the realm of library cataloging, Cutter (1876b, 75, discussion of Rule 199; 1904, 123, discussion of Rule 340 [emphasis his]) adopted a similar numerical criterion for making topical subdivisions under subject headings in a printed dictionary catalog: “As the number of titles under each heading increases in number so does the opportunity and need of division. ... It is not worth while in a printed catalog to make very minute divisions. The object aimed at,—enabling the enquirer to find quickly the book that treats of the branch of the subject which *he* is interested in,—is attained if the mass of titles is broken up into sections containing from half a dozen to a score.”

Kaiser's stipulations that each and every distinct first term in an index be accorded a fixed guide and that all other guides be gradually added as subdivisions in response to the numerical increase of unit cards within the various divisions of a card file went hand-in-hand with a developmental model of the guide system that he briefly sketched out. In its earliest stages, an index file consisted of a relatively few unit cards and so required only first guides to indicate the different first terms—be they terms for concretes or countries—that it contained (Kaiser 1911, § 545 & 549). As the index grew and the number of cards associated with certain of the first guides came to exceed the 20 to 40 card limit, subdivisions would be made, typically with third guides (§§ 545 & 550), so that now the guide system indicated the division of some first terms of concretes by some second terms of countries and, conversely, the division of some first terms of countries by some second terms of concretes. In time, as the number of cards continued to increase, second guides, marking either subdivisions of countries or those of countries would be added alongside the first and third guides (§§ 545 & 551). Finally, when an index file had reached a "very advanced stage" of growth, fourth and fifth guides, which, Kaiser claimed, were generally not useful for indexes consisting of fewer than 10,000 cards, would make their appearance as well (§§ 411, 545 & 552). At this stage, it was crucial that the file have a full complement of the fixed guides—namely, the first and second guides denoting distinct first terms—since they would form the starting point of any search within the index. "After these", Kaiser observed, "the third guides are those most frequently required" (§ 411). As a rule, he noted, the number of fifth guides, which indicated third terms, or terms of processes, would be relatively few, for "when we come to the processes, the cards have been divided or sifted already by four previous guides, so that there is not much likelihood of a large accumulation of cards under the third term" (§ 404). This rationale governed Kaiser's decision to allot only one guide to terms of processes: needless to say, it dovetailed with his assumption that, as a rule, processes would be of interest to businessmen only insofar as they were related to a concrete or a country (See Section 3.5 of the current chapter, esp. p. 481, above).

Such, then, was Kaiser's general protocol for the distribution of guides within a card index file. Fixed guides were obligatory for every different first, or main, term occurring in a file; otherwise, "[a]ll except the fixed guides [could] be interposed at such intervals or at such a time as [would] conveniently keep pace with the development of the index" (Kaiser 1911, § 411). Figure 32, which is a diagrammatic rendition of the sequence of guides in the card drawer depicted in Figure 30 above, provides an example of the results of this

process.⁴⁹⁵ This extract from the Tariff Commission’s Index of Evidence for its Report on the Iron and Steel Industry exemplifies a file in a fairly advanced stage of development, as is apparent from both the restricted number of first terms and the presence of fourth and fifth

Card no.	FIRST TERM		SECOND TERM		THIRD TERM
	First Guide	Second Guide	Third Guide	Fourth Guide	Fifth Guide
31	ITALY				
30					PRICE
29	IRONSTONE				
28			USA		
27				GERMANY	
26				BELGIUM	
25			UK		
24		TUBE			
23				ALABAMA	
22			USA		
21				FURNESS	
20				CUMBERLAND	
19				CLEVELAND	
18			UK		
17			SPAIN		
16		ORE			
15			USA		
14				COLONIES	
13				COATBRIDGE	
12				CARNFORTH	
11					IMPORTS
10					EXPORTS
9					DUMPING
8			UK		
7			GERMANY		
6		BAR			
5			USA		
4				COATBRIDGE	
3			UK		
2			GERMANY		
1	IRON				

Figure 32: The five-position system of guides applied to a drawer from the Index for Evidence for the Tariff Commission’s Report on Iron and Steel (Source: based on Kaiser 1908, § 119 [= Figure 30 above])

guides. The initial first term—the term for concrete IRON (Card No. 1)—is subdivided only by second terms representing countries (Cards No. 2–5), one of which features a city

⁴⁹⁵ For a comparable diagram of a different card drawer produced by Kaiser himself, see Kaiser 1911, §§ 407 [diagram] & 556 [illustration of card drawer]. A comparable example is also given in Mills 1968, 185, loosely based on Kaiser 1911, § 552.

subdivision (Card No. 4) of the country UK, which appears on a fourth guide. The second first term in the sequence, [IRON] BAR (Card No. 6) is subdivided by three countries, one of which, the UK is subdivided first by processes inscribed on fifth guides (Card Nos. 9–11) and then geographically by both cities (Card Nos. 12–13) and the collectivity of British colonies (Card no. 13) (See Section 3.2 of the present chapter). The following first term, [IRON] ORE (Card No. 16), is only subdivided by countries, two of which, UK and USA (Cards No. 18 & 22) are further divided by smaller geographical units, the former by cities or districts (Cards No. 19–21) and the latter by a state (Card No. 23). The subsequent first term, [IRON] TUBE (Card No. 24), likewise has country subdivisions. Interestingly, one of these, UK, has conjoined to it the foreign countries BELGIUM and GERMANY (Card Nos. 26–27). In this case, the fourth guide does not indicate a smaller geographical unit within the United Kingdom but rather the second country in a two-country dyad (See Section 3.6 of the current chapter, esp. pp. 502–503, above): nevertheless, within the logic of the guide system, this second country represents a division of the set of cards pertaining to the manufacture and trade of iron tubes in the United Kingdom no less than an actual geographical division would. The final two first terms, IRONSTONE (Card No. 29) and ITALY (Card No. 31) each appears to have had only a few cards associated with it, as a glance at the back of the drawer depicted in Figure 30 shows: nevertheless, IRONSTONE has been subdivided by the process term PRICE (CARD No. 29).

Taken as a whole, the repartition of guide cards in Figure 32 reflects a basic pattern in which the obligatory first and second guides mark the presence of a first term denoting a concrete or a country and the third guides referring to second terms occur with some degree of regularity as subdivisions of the first terms. By contrast, the treatment of the terms of countries indicated by the third guides is less even: those denoting the United Kingdom are further subdivided either by the name of a smaller geographical unit, be it city or district, or by those of trading partners, be these foreign countries or British colonies, while those naming other countries, for the most part, receive no further subdivision. This imbalance is understandable in light of the fact that the investigation for which the information in the index file had been collected was primarily concerned with assessing the state of the iron and steel industries in the United Kingdom and the effects of tariffs upon them (See Chapter 5, Section 2, above): it thus stood to reason that there would be more unit cards pertaining to iron and iron manufactures in the United Kingdom than to those in other countries and that, accordingly, the divisions for the former would require greater

subdivision than those for the latter. Finally, it may be noted that the fifth guides referring to the third term are sparse, largely for the reason that Kaiser had given—namely, lack of need for further division at that level because of the relatively small numbers of cards under the prior subdivisions. All in all, the figure neatly exemplifies Kaiser’s general tenet that the first and third guides were of especial importance, while the others were added as the divisions marked by the fixed (i.e., first and second) guides and third guides required subdivision. Configured in this way, the guides served as a series of visual landmarks in a card file enabling persons consulting it to locate rapidly the set of cards associated with a given first, or main, term—either a concrete or country—and, if need be, to locate within that set various subsets relating the main term to a second term—again either a country or a concrete—and/or a third term—a process. Needless to say, many second and most third terms subdividing a given main term did not have their own guide cards: cards with statements containing these were located by going to the nearest guide card preceding them in the relevant position in the system of guides and manually inspecting the cards until one came to them.

In Kaiser’s (1911, § 433) view, systems of guides provided essential scaffolding for what he called “[c]onsulting the [i]ndex” and, accordingly, they featured prominently in his protocols for search. “Before we turn to the cards”, he wrote, “we must ask ourselves: on what concrete or country (or both) is information required” (§ 433). The user, then, had to determine the term or terms for which he wanted to search in the index or, to use the idiom of present-day information retrieval (IR), he had to formulate a query. Kaiser categorized queries along two dimensions: whether the query terms were simple (i.e., one-word) or compound (i.e., multiword) and whether the query involved only a main term or a main term and its second term. This led to him to identify four structurally distinct forms of query (§ 433 [emphases his]):

[7.23]. “Concretes *or* countries of simple terms”
(e. g., “coal”, “Spain”; §§ 434–435)

[7.24]. “Concretes *or* countries of compound terms”
(e. g., “electric tramway”, “Basel in Switzerland” [i.e., “Basel, Switzerland”]; §§ 436–437)

[7.25]. “Concretes *and* countries of simple terms” (e.g., “coal in Spain”; § 438)

[7.26]. “Concretes *and* countries of compound terms”.
(e.g., “leaf tobacco in Paris” [i.e., “leaf tobacco in Paris, France”], “wheat flour trade between Austria and Germany”; §§ 439–440)

Regardless of the form of query, a search always commenced by going to the alphabetically relevant drawer of an index, finding the exact place of the term in the sequence of first guides and inspecting the latter to see if any of the terms written on the tabs matched the user's query term (Kaiser 1911, §§ 434–445). The absence of a guide with a tab bearing a term matching the query term meant that the index did not contain any items of information relating to the latter (§§ 411, Point 1; 434, 445). In that case, it was necessary to reformulate the query. For his part, Kaiser advised that a user search again under a collective term (cf. Section 2.2.2.4 of the current chapter, esp. p. 361 with n. 320, above) semantically related to the absent term on the grounds that “while there may be no information on a given specific, there may be a good deal of information on some collective including that specific” (Kaiser 1911, § 445). For example, if one searched for *Scissors* and did not find a first guide bearing that term, one was to search for a more generic term such as *Cutlery*, which referred to metal “instruments possessing a cutting edge, such as surgical instruments, knives, scissors, swords, etc.” (Hawkins 1908, 178, s.v. “Cutlery”), the rationale being that the extensions of the cards filed under the broader term might include potential information pertaining to the specific term *Scissors*, even though that information might not be “as specific[] as desired” (Kaiser 1911, § 445). Curiously, in this case, Kaiser did not discuss the alternative possibility of searching under synonymous, or near-synonymous, terms, though these might be present in the file in the file as well.

When, on the other hand, the term on the first guide matched the whole query term (in the case of simple terms) or the first word(s) thereof (in the case of compound terms), the search proceeded in various ways depending upon the nature of the query. In the case of queries featuring single simple terms (i.e., Query Form [7.23]), once one had located the first guide with the desired term, be it one denoting a concrete or country, one could inspect any fifth guides subdividing it as an aid in filtering down the kind of information about the subject in question (Kaiser 1911, §§ 434–435). Queries taking the form of a single compound term (i.e., Query Form [7.24]) required that, once the person undertaking the search had located the first guide bearing the initial word(s) of the query term, he inspect the second guides following it to see if there were any matches with the remaining words: thus, for example, a search for *Electric Tramway* would involve finding a first guide bearing the index term ELECTRIC and then seeing if one of the subsequent second guides bore the term TRAMWAY (§ 436). A person desirous of finding index items pertaining to a city rather than a country—for example, Basel in Switzerland—had to calibrate his search to reflect that fact

that cities were treated as subdivisions of countries and that, accordingly there was no direct entry for them in the index (§ 437). In a case such as this, it was necessary to formulate the query in such a way that the name of the country in which the city was located preceded the name of the city: the person conducting the search had to first search among the first guides of the index file to find the one bearing the name of the country—*in casu*, SWITZERLAND—and then, again, to search under the second guides following the guide in question to see if any of them bore the name of the city—*in casu*, BASEL.

Queries featuring both a first term and a second term—that is to say, a term for a concrete and a term for a country or, conversely, a term for a country and a term for a concrete—constituted variations on the foregoing patterns. Someone whose query consisted of simple first and second terms (i.e., Query Form [7.25])—for example, *Coal in Spain*—was to initiate the search by examining the first guides in the appropriate section of the index file to find the guide card whose tab carried the relevant first term: once this had been located, he was to inspect the third guides following the card in question to locate the second term among them (Kaiser 1911, § 438). Because tripartite statements were, as a rule, entered twice in an index under the forms [CONCRETE]–[COUNTRY]–[PROCESS] and [COUNTRY]–[CONCRETE]–[PROCESS] (See Section 3.5 of the present chapter, esp. 482–483, above), one could either begin with the first term as a term for concrete—*in casu*, COAL—and then search for country subdivision—*in casu*, SPAIN—or, *vice versa*, one could take as one's point of departure the first term as a term for country—*in casu*, SPAIN—and search under the terms of concretes subdividing it—*in casu*, COAL: “[t]he same set of cards could should in fact be in both places”, noted Kaiser (1911, § 438). If, on the other hand, both the first and the second terms of a query were compound terms (i.e., Query Form [7.26]), then the searcher would first find the first guide matching the initial word of the first term, then move on to the second guides behind this guide to locate the other elements of the first term, then proceed to the appropriate third guide following the second guide, and, thence, go on to the fourth guide: for example, if the query was for *Leaf Tobacco in Paris* (i.e., Paris, France), then one would turn successively to the first guide LEAF, then the second guide TOBACCO, then the third guide FRANCE, and finally, the fourth guide PARIS, or, conversely, begin with FRANCE, then move to PARIS, then go on to LEAF and, finally, TOBACCO (Kaiser 1911, §§ 439). As for queries about a concrete in relation to two different countries, no fewer than three different alternative searches were possible, corresponding to the three different statements that were written to accommodate two-country dyads (See Section 3.6

of the current chapter, esp. p. 502, above). For instance, a search for information on trade in *Wheat Flour* between *Germany* and *Austria* might commence with a first guide WHEAT, proceed to a second guide FLOUR, thence move to a third guide GERMANY, and, finally, conclude with a fourth guide AUSTRIA; or, alternatively, begin with a first guide GERMANY, then go to a second guide AUSTRIA, thence to a third guide WHEAT and, then, a fourth guide FLOUR; or, yet again, start with a first guide AUSTRIA, advance to a second guide GERMANY, thence to a third guide WHEAT and, finally, a fourth guide FLOUR (Kaiser 1911, § 440): these were correlated with the statement forms WHEAT FLOUR—GERMANY—AUSTRIA—[PROCESS], GERMANY—AUSTRIA—WHEAT FLOUR—[PROCESS], and AUSTRIA—GERMANY—WHEAT FLOUR—[PROCESS], respectively. There were other, yet more intricate queries involving two compound terms, the particular details of which need not detain us here: it is sufficient to note that they followed, by and large, the same patterns as those discussed above (§§ 441–444).

Although Kaiser focused his attention on queries about concretes and/or countries, he did not altogether neglect the possibility that the users of an index might want to search for information on a process. We have already seen that a fundamental structural feature of all of Kaiser's statement forms was the use of terms of processes exclusively as subdivisions of terms of concretes and/or countries, with the result that they invariably stood in the final position in a statement (See Section 3, Statement Forms [7.1]–[7.3], and Section 3.5 of the current chapter). By the same token, terms of processes always appeared on the fifth and rightmost guide in a guide system: this meant that “there [we]re no entries for processes” as such in a card index (Kaiser 1911, § 446). Accordingly, Kaiser's counsel to those who might seek information on processes was the following

if we wish to follow up a given process, all that is required is to attach it to a concrete or a country and we may proceed as before. Thus if information on *emigration* be required, that term will probably be found under most countries (§ 446 [emphasis his]).

In other words, a searcher first had to think of the terms of concretes and terms of countries with which the term for a given process was most likely to be associated and then had to find the subdivision for the process term under each of the former terms, going through the first and/or second terms of the statement to get at the third term. Special guides, enumerating all the terms of concretes with which a given process term was connected, could be made to expedite such searches (§ 655; see Section 3.5 of the present chapter).

Whatever the form of query, then, the essential feature of Kaiser's protocols for searching an index file was that the searcher was to locate the guide(s) relating to the first term—be it simple or compound—before going on to the guide(s) relating to its second term and/or its third term. This mode of search entailed a certain spatial approach to the physical examination of the card file: a person visually scanning a given card drawer began by inspecting the series of guide cards arrayed along its left-hand side until he located the one(s) bearing the (elements of) the first term for which he was seeking: once he had done so, he proceeded from the guide cards on the left-hand side of the drawer to those on its right-hand side and from its front to its rear in order to trace the cards for the second and/or third terms subdividing the first term in question. This process of searching followed the physical disposition of the system of guides and their staggered tabs, which, in turn, was correlated with the structure of the statement: in other words, search was systematically correlated with the strictly defined syntactic configurations of terms within statements. Here, then, was yet another cardinal rôle for the statement within the overall articulation of a card index: as Kaiser (1911, § 314, Point 3) put it, "it provides the means"—more specifically, the underlying structural template—"for a system of guides which assure quick access to the indexed material".

To Kaiser's mind, the highly structured procedure of search that he outlined was simplicity itself, at least with regard to the four basic forms of query that we have considered above: "[i]t will be noticed that with but a few minutes practice anybody may consult the index with perfect ease", he claimed (Kaiser 1911, § 440). In virtue of their structural, almost algorithmic consistency, the search protocols for SI were, indeed, simple but one may well wonder whether "a few minutes practice" would have sufficed to prepare neophyte users of an index to utilize it "with perfect ease". For one thing, consulting an index designed according to the norms of SI required that the user have a basic familiarity with the structural patterns of statement forms and, especially in the case of terms of concretes and countries, with the internal syntax of complex terms (on which, see Section 3.6 of the current chapter). By the same token, it required that the user formulate his or her query terms in conformity to the internal syntax of terms prescribed by Kaiser. In the case of queries using simple terms such as *Coal*, *Spain*, or even *Coal in Spain*, this was easy and unproblematic. However, queries featuring complex compound terms—in particular, complex terms of countries—demanded adjustment of the searcher's natural language patterns to conform to an artificial syntactic pattern. Most notably, queries in searches for

information about a given city invariably had to take the form of the name of the city preceded by the name of the country in which it was located: Basel had to be searched for as *Switzerland, Basel* rather than simply *Basel*. In short, although the system was simple, it was not, by any means, intuitive, for the user had to habituate himself to the structural patterns of SI in order to pose queries effectively: only once such habituation had taken place would he be able to reap the full benefits of the system of guides as a mechanism for locating particular index items within a card index file.

7.5.2.2. Guide Cards and the Cross-Reference Structure of Systematic Indexing

As we have had occasion to note, the basic arrangement of index items within a card index file was alphabetical. Unit cards were placed in a sequence based on the alphabetical order of the main, or first, terms of statements; each subset of cards pertaining to a given main term was subdivided by the second terms of statements, which were also aligned in a sequence on an alphabetical basis; and these, in turn, were further subdivided by the third terms of statements, which were likewise arrayed in alphabetical sequence (See Section 5.1 of the current chapter). In conjunction with the rule that a separate first (and, if need be, second) guide be made for each different first term in an index, whether it denoted a concrete or to a country, this mode of organizing a file ensured that users of the index would have “direct access to every concrete or country” about which it held information (Kaiser 1911, § 648).

Kaiser, however, held that the alphabetical ordering of main terms (and their successive subdivisions) was, by itself, incomplete as a mode of organization. The rationale for his view was that, in an alphabetical arrangement of terms, “[e]ach name has a fixed place in accordance with the letters of which it is made up, but since no account is taken in alphabeting of the meaning of the terms, related terms are scattered” (§ 212; see Section 5 of the present chapter, esp. p. 555, above). In his estimation, the dispersal of semantically related but formally distinct terms within an index file constituted an impediment to full access to the information on a given subject, for a person consulting the file might not be aware of all the terms in an index referring to subjects related to the one for which he was searching and so might overlook index items bearing information of potential utility to him: as he put it, “[b]y alphabeting we provide access to our names by their form, but there being no limit to the number of names, it follows that only those names are accessible to us which we happen to know” (Kaiser 1911, § 183). Given that users of an index would not, as a rule,

be in a position to know or predict precisely which terms related to the ones for which they were searching had their own entries in the index file, there was need for a mechanism to indicate to them the semantic connections between terms.

Kaiser's solution was to create linkages among semantically related terms by means of cross-references—or simply references, as he called them.

In order to give access at one particular point to all similar information distributed under various names, we must connect those names which are related, and this is done by referring from one name to another. The making of these references may be looked upon as an attempt to supply the logical connections of terms in various directions, i.e., the cross classifications of each term (Kaiser 1911, § 183; cf. Section 5 of the current chapter, esp. pp. 555–556, above).

The “one particular point” to which he referred in this passage could be any given name, or term, that served as the first, or main, term of a statement and so had its own first guide card, on the body of which were enumerated other terms in the index that stood in some “logical”—i.e., semantic and, in particular, classificatory—relationship to it (Kaiser 1908, § 144; 1911, §§ 414, 416, 430–431, 590). Inasmuch as a system of references brought together the various terms related in meaning to a first term on its guide card and so allowed the user of an index to ascertain, at a glance, where else in the index files information on subjects related to the one in which he was interested might be found, it fulfilled the function of what Kaiser (1908, § 89 [emphasis his]) called “*concentration*”—that is to say, the collection of multiple items (*in casu*, terms) at a single point.⁴⁹⁶ The result of including references was an index file the organization of which could, in Kaiser's (1911, § 389 [emphases his]) words, be “conveniently but roughly described as *an alphabetical arrangement with a logical key*”. Only through the use of the logical key supplied by references, he argued, “is it possible to gain access to all the terms available and therefore to all the information in our possession” (§ 230); only by “bringing together related terms somewhat in the manner of a logical classification” could one “complete the structure of the card index” (§ 414) and so make the latter “yield the maximum of service” (§ 212) to its users.

Kaiser's argument that a system of references between semantically related terms should supplement the alphabetical arrangement of main terms in an index file was a

⁴⁹⁶ Kaiser's use of the term “concentration” derived from the general dictionary meaning thereof as “the act of collecting or combining into or about a central point” (Whitney & Smith 1911, Vol. 2, 1162, (a) s.v. “concentration”): on this view, the guide card of the first term was, of course, the central point at which the indexer collected together terms semantically related to it.

variation on what was already a well-established theme in the closely related discourses of library cataloging and indexing alike. Within the realm of library cataloging, Cutter (1876b, 47 [emphases his]) had given classic expression to the idea in his *RDC*, writing of the dictionary catalog that

[i]ts subject-entries, individual, general, limited, extensive, thrown together without any logical arrangement, in most absurd proximity—*Abscess* followed by *Absenteeism* and that by *Absolution*, *Club-foot* next to *Clubs*, and *Communion* to *Communism*, while *Christianity* and *Theology*, *Bibliography* and *Literary history* are separated by half the length of the catalogue—are a mass of utterly disconnected particles without any relation to one another, each useful in itself but only by itself. But by a well-devised network of cross-references the mob becomes an army of which each part is capable of assisting many other parts. The effective force of the catalogue is immensely increased.

On this view, the alphabetic arrangement of headings for specific subjects within a dictionary catalog afforded “facility of reference” (p. 47) to users unwilling or unable to contend with the intricacies of a classed arrangement of subjects: however, it presented individual subject headings as self-contained, isolated atoms bearing no meaningful relation to the others in their proximity. The addition of cross-references to each subject heading served to “bind together the different parts of the catalogue” and so to “bring them into one systematic whole” (Cutter 1876a, 536), in effect conferring upon it at least “some of the advantages of classification and system” (Cutter 1876b, 47). The semantically determined connection of otherwise scattered headings rendered a dictionary catalog “syndetic” (Cutter 1876a, 536, n. 1; 1876b, 15, s.v. “Syndetic”; see also Glossary). Cutter’s framing of the rôle of cross-references in an alphabetically ordered catalog did not leave the literature of indexing untouched. The British librarian-author of an early 20th-century manual on indexing adopted and developed it in the following manner with regard to periodical indexing:

the alphabetical arrangement of subjects, whatever they be—classes, subclasses or species—may be fairly likened to a democratic community; they are all reduced to one dead level of uniformity; all indication of relationship by mere proximity is abolished in favour of a method whose sole, but at the same time overwhelming advantage is that of quick and ready reference. It is by virtue of a knowledge of these relationships, that are no longer indicated by local or topical grouping, that the indexer contrives a system of entry perfectly intelligible to searchers. Thus, if a class is indexed its items must be followed by a cross-reference to the included subclasses and species, and, of course, the converse must take place when a species is indexed, that is, there must be cross-references from the species and classes in which the species is included. “By a well-devised system of cross-references,” says Mr. Cutter, “the mob becomes an army of which each part is capable of assisting many other parts” (Clarke 1903, 67; 1905, 17–18).

The notion of adding cross-references reflecting a classificatory structure to an alphabetical list of subject entries thus had currency on both sides of the anglophone Atlantic.

When Cutter (1876b, t.p.) originally formulated his views on the relationship of cross-references to alphabetical arrangement, he did so within the framework of a discussion of “rules for a printed dictionary catalogue” and the later application of his formulation to periodical indexing assumed that the resultant indexes would take the form of printed volumes as well. Although Kaiser conceived of cross-references within the framework of a different kind of index—namely, an analytical index to pieces of information scattered across a collection of heterogeneous documentary materials rather than a catalog of books or an index of periodical articles (See Section 1 of the current chapter)—and within a different technological régime—namely, that of a card index rather than a printed one—, his understanding of their rôle within the overall economy of an alphabetical index was broadly congruent to that of Cutter and his followers. Like them, he viewed cross-references as a means of incorporating elements of classification—or, better, classificatory structures—into an index.

We know that our index gives information on all manner of concretes and countries. The terms on the cards range from the most minutely specific to the highest collective; the intermediate stages are all more or less represented, then there are synonymous terms. ... (Kaiser 1911, § 415; cf. § 230).

Obviously, within an alphabetically arranged sequence of terms, the classificatory relationships among collective and specific terms, as well as the equivalence relationships between synonyms, could not be directly expressed by the position of terms. By recording semantically related terms on guide cards, the indexer could indirectly indicate these relationships to an inquirer consulting an index. In this way, stated Kaiser, “the related terms ... appear[ing] in the body of the guide ... provide a substitute for a logical classification” (1911, § 416; cf. 1908, § 144).

Whereas Kaiser’s general understanding of the function of cross-references in an alphabetic subject index reflected what had become a widely diffused idea shared by many librarians and indexers with backgrounds in librarianship, his conceptualization, design, and implementation of cross-references was based upon the particular structural features of SI. As already noted, his starting point was the stipulation that cross-references were to be made only among the first, or main, terms in an index file. In virtue of the syntactic constraints upon the structure of the statement forms (See Sections 3 & 3.5 of the current chapter), there were only two different categories, or kinds, of such terms—terms of

concretes and terms of countries: thus, as he declared, “every first term on the cards must either be a concrete or a country” (Kaiser 1911, § 415). For the purposes of establishing cross-references, these two categories of terms were to be strictly distinguished from one another so that, as Kaiser put it, “[c]oncretes are connected with concretes, countries are connected with countries, so far as they bear any relation to each other” (§ 416). In practical terms, this meant that the body of a guide card for each term for a concrete in an index would only bear other terms of concretes that were semantically related to it, whereas the body of a guide card for each term for a country would likewise be associated only with related terms of countries: this would create, in effect, different intra-categorical classificatory networks, one for concretes and the other for countries, each representing a different kind of relational semantics (See Section 2.2.4 of the current chapter).

7.5.2.2.1. Cross-references and Guide Cards for Terms of Countries

The structure of cross-references for terms of countries was relatively unproblematic and so it is convenient to consider them first. As we have already had occasion to observe, the relational semantics of these terms was founded primarily on hierarchical partitive relationships (See Section 2.2.4 of the current chapter): on one hand, the name of a country could be related to broader collective terms such as the name of the continent or of a larger geographical region of which it formed part; on the other, it stood in relation to more specific terms denoting smaller geographical units located within the country that it designated, such as the names of states or towns. Observing that “when the country is in the leading position [sci., is a first term—TMD], it has the first guide for the country as a whole and the second guide for its divisions”, Kaiser (1911, § 420) outlined two alternative modes of entering related terms upon guide cards.

The first involved enumerating on a given country’s (or broader geographical region’s) first guide the names of the countries or regions with which it stood in relation. “Thus”, wrote Kaiser (1911, § 420 [emphases his]), “the guide marked *Chile* will refer to such terms as *South America*, *Latin America*, *Spanish America* etc; the guide *UK* will refer to *Europe*, *Northern Europe*, etc”. Conversely, the guides for collective terms such *South America* or *Europe* would list the names of the various countries located within their boundaries. An example of this mode of cross-references is the guide card for S(OUTH) AMERICA pictured in Figure 33, which features both a collective term denoting a broader region to which South America belongs (*in casu*, LATIN AMERICA), as well as a number of more specific

terms naming South American countries (e.g., ARG(ENTINE) REP(UBLIC), BOLIVIA, BRAZIL, CHILE, ECUADOR, PARAGUAY, PERU, URUGUAY, VENEZUELA, and so on). With regard to the formal structure of the index, an important aspect of this mode of making cross-references was the fact that each of the related terms enumerated on the guide card represented a main term in the index that had its own first guide, upon which a reciprocal reference would be made: thus, for example, the guides for each of the countries or regions

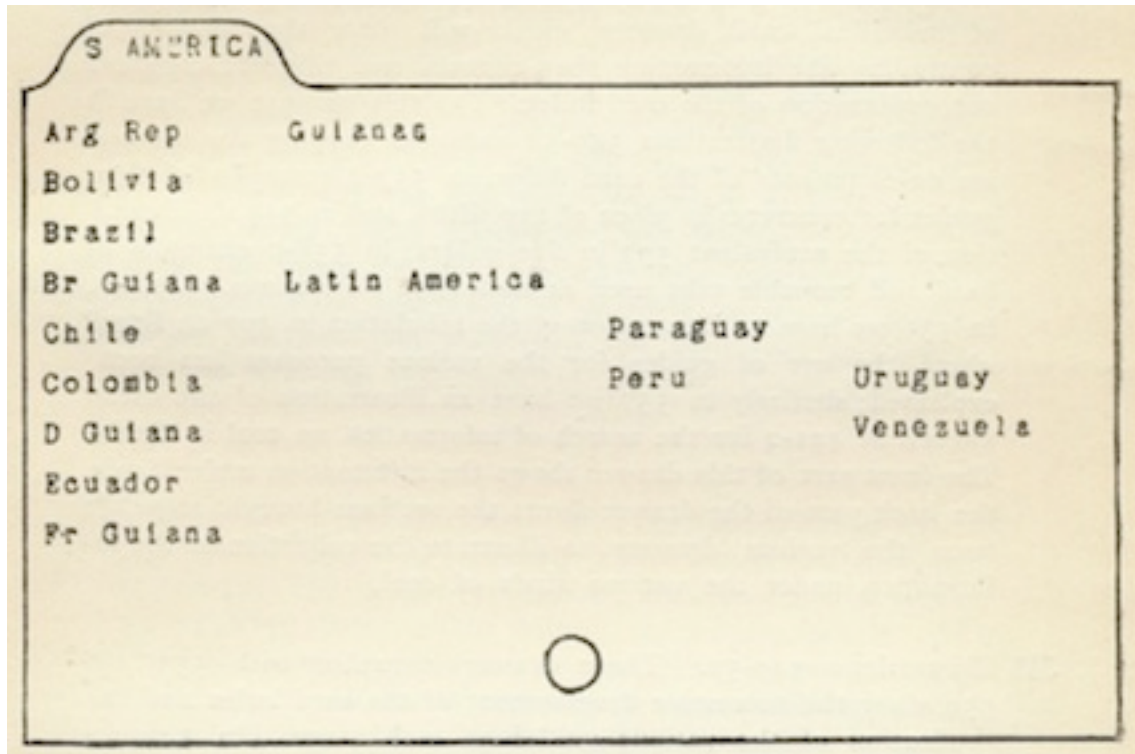


Figure 33: Guide card for the term for country SOUTH AMERICA (Source: Kaiser 1911, § 542).

listed on the card in Figure 33 would include S(OUTH) AMERICA in its list of related terms, as does the one for CHILE reproduced in Figure 34 below. Kaiser observed that, as a rule, only the first guide for a country was used to relate it to other countries in this way. The only exceptions were “cases like *British Colonies*, where the first guide is *UK* and the second guide *Colonies*. In this case it may be found convenient to refer on the second guide *Colonies* in their various specific names *Australia, Bahamas, etc*” (§ 420 [emphases his]).

An alternative way of making cross-references for terms of countries took as its point of departure the fact that, with regard to their internal structure, such terms could have subdivisions (e.g., USA, NEW YORK) and form part of two-country dyads (e.g., USA-UK) (See Sections 3.2 & 3.6 of the current chapter). Now the names of the subdivisions of a given

country and those of the other countries in the two-country dyads of which it was the first element were inscribed on the second guides that followed its first guide in the index file (See Section 5.2.1 of the present chapter): thus, the indexer had the option of listing these secondary names on the first guide. Kaiser (1911, § 421 [emphases his]), who considered this practice to be “specially useful when there are many cards under each country”, cited as a hypothetical example “the first guide *Chile*”, which “will refer to *Antofagasta, Concepcion, Iquique, Russia, Santiago, UK, Valparaiso* etc”. Regarding this list of related terms, he wrote:

it will be noticed that besides the divisions of the country itself it also gives the foreign countries with which *Chile* is connected. Thus from the above enumeration it will at once be evident that the index contains no information as to the relations between *Chile* and the *United States*, but it does contain information as to the relations between *Chile* and the *United Kingdom* (§ 421).

The manner in which such related terms were entered on a guide card can be seen in Figure 34, which depicts an actual example of a first guide for the country term CHILE, the details of which differ, to some degree, from the hypothetical instance just cited. Apart from

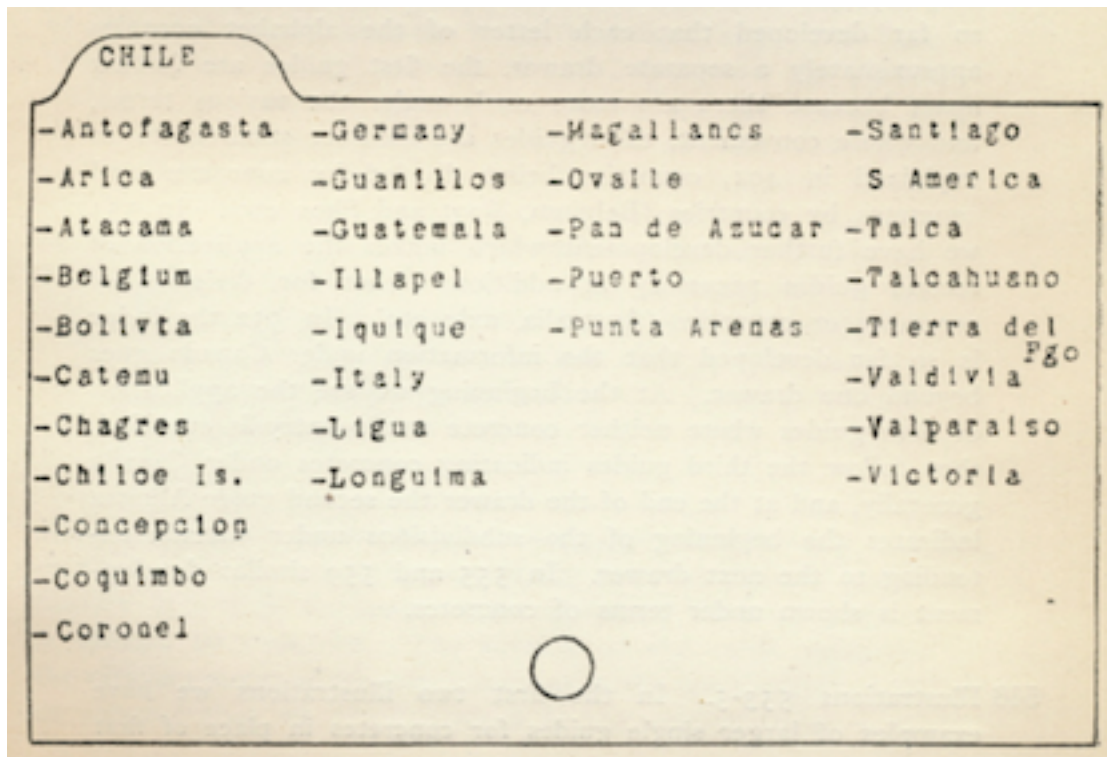


Figure 34: Guide card for the term for country CHILE (Source: Kaiser 1911, § 542).

the collective term S(OUTH) AMERICA, of which CHILE was (and is) manifestly part, the related terms occurring on this guide are (1) those naming various subdivisions of Chile,

including cities (e.g., ANTOFAGASTA, ARICA, CONCEPCION, IQUIQUE, PUNTA ARENAS, SANTIAGO, TALCAHUANO, VALDIVIA, and VALPARAISO) and regions (e.g., CHILOE IS(LANDS), PAN DE AZUCAR, and TIERRA DEL FUEGO), and (2) those designating various foreign countries forming two-country dyads with CHILE in the index (i.e., BELGIUM, BOLIVIA, GERMANY, GUATEMALA, ITALY, and the Australian state of VICTORIA). The presence of a dash in front of a name indicates that it is to be found on one of the second guides following the first guide CHILE. This notational convention, it should be noted, effaced the distinction that Kaiser had made for complex terms of countries on unit cards, according to which a comma indicated a country division (e.g., "CHILE, VALPARAISO") and a hyphen represented a two-country dyad (e.g., "CHILE-GUATEMALA") (See Section 3.6 of this chapter, esp. p. 501, above): rather, it presented both purely as subdivisions of the first guide CHILE. Insofar as the second countries in a two-country dyad also occurred as first terms in the index (e.g., GUATEMALA, which subdivided the first guide CHILE and so appeared on the latter as "-GUATEMALA" would have its own first guide GUATEMALA, on which CHILE would appear as "-CHILE"), while the cities and subregions of a country did not (cf. Section 5.2.1 of the current chapter), the use of a dash for both visually conflated two different kinds of guide subdivisions that arguably would have better been kept separate.

In Kaiser's eyes, the primary difference between the two modes of creating cross-references for terms of countries lay in whether the names enumerated on the guide card for a given term directed the user to other first terms or whether they pointed him to second guides subdividing the guide card in question. "By the first plan", he observed, "we provide access to possible information on a given country, which is not under its specific name; by the second plan ... we merely collect the second terms⁴⁹⁷ of a given country in one place" (Kaiser 1911, § 422). Of the two, he considered the first to be "in the nature of a necessity", while the second represented a "convenience" (§ 422). To be sure, the two methods could be combined on a single guide, as the example in Figure 35 shows: there, the guide card for the collective term BRITISH WEST INDIES includes both the names of component territories and islands treated as distinct countries and so entered as separate first terms in the index (e.g., ANTIGUA, BARBADOS, GRENADA, JAMAICA, MONTSERRAT, ST CHRISTOPHER, VIRGIN

⁴⁹⁷ Note that in this context, "second term" did *not* mean, as it usually did, the second categorial term in a three-term sequence, which would have been a term for a concrete (i.e., [COUNTRY]-[COUNTRY]-[PROCESS]), but rather refers to the second element in a complex country term, be it a subdivision of a country (i.e., [SUBDIVISION] in [[COUNTRY], [SUBDIVISION]]) or a second term in a two-country dyad (i.e., COUNTRY₂ in [[COUNTRY₁]-[COUNTRY₂]]).

BRITISH WEST INDIES			
Antigua	Grenada	St Christopher	Turks Is.
Bahamas	Grenadine Is.	St Lucia	-UK
Barbados	Jamaica	St Salvador	-USA
-Canada	Leeward Is.	St Vincent	Virgila Is.
Dominica	Montserrat	Tobago	W Indies
	Nevis	Trinidad	Windward Is

Figure 35: Guide card for the term for country BRITISH WEST INDIES (Source: Kaiser 1911, § 541).

IS(LANDS), and so on) and the names of countries that form the second component of a two-country dyad and so have been entered on second guides following BRITISH WEST INDIES itself (i.e., -CANADA, -UK, and -USA) as well as being entered under first guides of their own. Kaiser considered this combination of different cross-references types to be “only practicable for indexes of medium size”: in the case of “very large indexes”, he recommended that they be “kept apart” (§ 422).

7.5.2.2.2. Cross-references and Guides for Terms of Concretes

Terms of countries tended to have relatively “few related terms in a collective sense”, they were capable of “exact definition”, and the kinds of relationships that they contracted among themselves—hierarchical partitive relationships between collective and specific country terms (e.g., SOUTH AMERICA and CHILE) and between specific country terms and their subdivisions (e.g., CHILE and VALPARAISO in “CHILE, VALPARAISO”), as well as associative relationships between specific country terms (e.g., CHILE and GERMANY in “CHILE–GERMANY”)—were likewise restricted both in number and type: Kaiser (1911, §§ 420, 423) thus considered the creation of cross-reference structures for them to be a fairly straightforward affair. By contrast, he deemed the “management of the related terms of

concretes” to be a “rather more difficult” task (§ 421). His primary reason for this judgment was one that we have already encountered in his argument for classifying names by form rather than meaning within an index: namely, the fact that the definitions of terms of concretes—in particular collective terms—tended to have indeterminate semantic boundaries, with the result that, in many cases, it might be uncertain whether a given specific term should be included within the purview of a given collective term or not (See Sections 2.2 & 5.1 of the current chapter). In addition to facing the definitional vagaries of collective terms of concretes and the classificational dilemmas to which they gave rise, the indexer had to contend with the question of which terms to choose as related terms for any given concrete (Kaiser 1911, § 418). This was no small matter, for, in comparison to the limited number of geographical names serving as terms of countries, the number of terms of concretes that could be extracted from textual units and set into relation with each other was very large, so that any given term could potentially be brought into relation with a number of different terms. It is against this background of semantic indeterminacy and the question of term choice that Kaiser (1911, § 423) considered the four ways in which, according to him, terms might be linked up to one another:

1. by bringing together under each collective all its specifics,
2. by referring from each specific to its various collectives,
3. by connecting concretes where one is applied to the other,
4. by connecting synonymous terms.

Let us briefly examine these different kinds of cross-reference structures in turn.

With regard to the relationship between a given collective term and the specific terms falling under it, Kaiser (1911, § 423), observed that “there are various degrees of collectivity, but they cannot be expressed in a fixed nomenclature”. That is to say, a single collective term could stand in a superordinate relationship to a number of different specific terms, not all of which could be fitted neatly into a single classificatory structure or, to put the matter another way, a single collective term might contract cross-classificatory relationships with various of its subordinate terms. To take a simple example, the collective term BRIDGE could cover, *inter alia*, the specific terms IRON BRIDGE, RAILWAY BRIDGE, and SUSPENSION BRIDGE (cf. § 539), yet each of the latter represented a different mode of specifying the generic term BRIDGE: IRON BRIDGE did so with respect to the material of which a bridge was made; RAILWAY BRIDGE, with respect to the mode of transportation that a bridge supported; and SUSPENSION BRIDGE, with respect to the structural design of

a bridge. Given that these three species of bridge each represented a kind of bridge in which the feature differentiating it from other kinds was a particular aspect or attribute of a bridge—a common description, to use Kaiser’s own terminology—, there was no non-arbitrary way of bringing the terms designating them into a single, rigorously defined classificatory structure or nomenclature (See Chapter 6, Section 3.2.2; Section 5.1 of the current chapter, above). That is to say, there was no single “natural” rationale for, say, subdividing the generic term BRIDGE first by terms for bridges specified by their constituent material—e.g., BAMBOO BRIDGE, IRON BRIDGE, and WOODEN BRIDGE—and then subdividing the latter by terms for bridges specified by the kind of transportation that they fostered—e.g., FOOT BRIDGE, RAILWAY BRIDGE—rather than *vice versa*. Insofar as there was no fixed criterion for determining the succession of common descriptions (cf. Section 5.1 of the present chapter, esp. pp. 559–562, above), it was best simply to enter on the guide card of a collective term such as BRIDGE specific terms representing all the different common descriptions by which it might be specified rather than attempting to create a single, graded hierarchical structure subordinating terms of one common description to those of another. To be sure, this did not entail an abandonment of multilevel hierarchical structures, for these could be generated for particular clusters of terms: as Kaiser (1911, § 424 [emphases his]) illustrated with the example of the term HARDWARE, “[t]he guide [sci., for the term *Hardware*—TMD] will give *hammer, lock, hoe, chisel, screw, nail* etc, but each of these specifics must in turn be treated as a collective, specifying the various *kinds of hammers, locks, screws, etc*”. Nevertheless, it did mean that the guide card for a single collective term was likely to include in its list of related terms subordinate terms specified by several different common descriptions instead solely of terms representing the degrees of a single common description, as would be the case in a nomenclature.

Whereas a single collective term could stand in a superordinate relationship to specific terms derived from a number of different common descriptions, Kaiser (1911, § 423) noted that, conversely, “a given specific may be claimed by various collectives according to the aspect from which it is viewed”. To illustrate this, he cited the case of the term COAL, which could be subsumed by the collective terms FUEL, RAW MATERIAL, MINERAL, CONTRABAND, and so forth (§ 424), for, among other things, coal is a fuel, it is a raw material, it is a mineral, and, in certain circumstances, it is a contraband good—i.e., a good the import or export of which is prohibited “by the laws of a particular kingdom or state, or by the law of nations, or by special treaties” (Whitney 1906, Vol. 2, 1231, I & II.2 s.v. “contraband”). As

this example shows, a term for a specific kind of concrete (*in casu*, COAL) could stand in a subordinate relationship to several different collective terms, each of which signified a different general kind of concrete (*in casu*, FUEL, RAW MATERIAL, MINERAL, and CONTRABAND): in the terminology of modern KO, it could contract *polyhierarchical relationships* with broader terms (e.g., Aitchison, Gilchrist, & Bawden 2000, 60; ANSI-NISO 2005, 49–50; Austin 1984, 206–207; Broughton 2006b, 127–128; Chmielewska-Gorczyca 1997; Zeng, Žumer, & Salaba 2011, 26; cf. Frâncu 2003, 180; Frické 2010, 50–51; 2012, 78–79; Gilchrist 1971, 13; Riaz 1989, 80; Soergel 1974, 78–81; 1985, 253–254; Wellisch 2000, 52, s.v. “Polyhierarchy”). Although polyhierarchy was rarely discussed in Kaiser’s day—indeed, there was no special term to identify it as such—,⁴⁹⁸ it was not an unknown phenomenon. One contemporary British writer on logic, for example, identified it as a feature in the structure of the vocabulary of everyday language, writing that

[c]ommon words, whilst less precise than the terms of a scientific nomenclature, differ from them also in this, that the same word may occur in different genera. ... In fact, every word stands under as many distinct genera, at least, as there are simple or indefinable qualities to be enumerated in its definition (Read 1898, 290).

In a later characterization of polyhierarchical relationships, Kaiser (1926, 26, § 20) would say much the same thing, albeit in slightly different terms: “any commodity ... has a number of properties and may be viewed from a number of different aspects. Logically it belongs to just as many classes or classifications as it has aspects”. To his mind, the fact that polyhierarchy allowed an indexer to express a given term’s relationships to multiple collective terms and so to represent the different aspects or perspectives from which it could be considered (e.g., coal *qua* fuel, coal *qua* raw material, coal *qua* mineral, and coal *qua* contraband) seems to have been sufficient reason for making it part of the cross-reference structure of SI.

Kaiser’s explicit embrace of polyhierarchy as a feature of the hierarchical ordering of cross-references found few parallels in the discourse of knowledge organization of his time. In discussing the syndetic structure of dictionary catalogs, Cutter (1904, 80, note to Rule 188 [emphasis his]) had recognized that a single specific subject could be subsumed under several different subject classes, noting that “[f]rom *Cathedrals*, for example, one would naturally refer to *Christian Art* and to *Ecclesiastical Architecture*, because works on those

⁴⁹⁸ The term “polyhierarchy” and paronyms thereof do not seem to have entered into the vocabulary of classification and indexing until the (late?) 1950s and early 1960s (cf., e.g., Wagner 1960, 133, s.v. “Polyhierarchical”).

subjects will contain more or less on cathedrals”: however, he endorsed only a very limited use of the cross-references from specific to general terms that provided the occasion for polyhierarchy.⁴⁹⁹ Among writers on subject-based bibliographic classification, the one who came closest to Kaiser in giving an explicit characterization of polyhierarchy was Wyndham Hulme, who observed that “a specific class in literature is not, as in logic, confined to the membership of a single generic class. It may be and generally is a strand common to the fabric of many classes” (Hulme 1950 [1911–1912], 18; cf. Sayers 1922, 235). Yet he drew a far different conclusion from this than Kaiser did, for he immediately went on to state that

we must recognize at the outset that co-ordination⁵⁰⁰ by a selected property means distribution⁵⁰¹ in respect of the remainder. For instance, the Electro-metallurgy of Iron belongs equally to Iron and Electrometallurgy. Co-ordination with the former heading means the distribution of specific classes appertaining to the latter, and *vice versa*. As one cannot serve both God and Mammon a selection must be made between the two, and the rejected genus must be satisfied with a reference, e. g.—

Electrometallurgy—
(of specific metals) classed with the Metallurgy of the metal extracted
(Hulme 1950 [1911–1912], 18).

Phrased in a more modern idiom, Hulme’s contention was that, in a subject classification for books, “systematic [sci., classed—TMD] arrangement only brings together [sci., co-ordinates—TMD] the topics which we have decided shall form our primary facet; all the rest are systematically scattered [sci., distributed—TMD]” (Foskett 1982, 218).⁵⁰² Such subject scat-

⁴⁹⁹ For discussions of Cutter’s rationale for limiting upward references, see Miksa 1974, 344–347; 1983a, 151–156.

⁵⁰⁰ By “co-ordination”, Hulme (1950 [1911–1912], 4) meant “the tabulation of [class] headings in an order indicative of some common relationship”, a notion closely related to that of collocating like subjects.

⁵⁰¹ Although Hulme did not formally define the term “distribution”, he was evidently using it in a sense akin to the contemporary dictionary meaning of “[t]he act of spreading abroad or dispersing to or over every part of a space or area” or “the condition or mode of being so dispersed or located all over an area” (Murray et al. 1888–1928, Vol. 3/1, 534, 2 s.v. “Distribution”). In the case of book classifications, the area in question was, of course, the metaphorical intellectual “space” occupied by a classification, which, however, could find a physical analogue in the organization of books on shelves.

⁵⁰² For example, if one were to subdivide the subject of Coins by country and so coordinate the subjects British Coins, French Coins, German Coins, Polish Coins, and Turkish Coins, then one would inevitably scatter, or distribute, subjects such as Gold Coins, Silver Coins, and Copper Coins, since the latter could only appear as subclasses of the former and so be noncontiguous to each other in the order of subjects in the classification. In such a case, the subject British Coins would bring together all documents about British coins; French Coins, all documents about German coins; and so on: however, documents about gold coins would be distributed into the classes British Gold Coins, French Gold Coins, German Gold Coins, and so on, as would all documents about silver coins and copper coins respectively.

ter is an inherent feature of any classification that has a monohierarchical structure—that is to say, one in which any given class can be a member of one, and only one, superordinate class (Chmielewska-Gorczyca 1997, 105; Gilchrist 1971, 13; Riaz 1989, 80; Soergel 1974, 70; 1985, 253; Wellisch 2000, 46, s.v. “Monohierarchy”). Hulme was fully committed to just such a classificatory structure. Although he did not discuss his reasons *expressis verbis*, the underlying rationale is not difficult to discern. First, in his eyes, one of the purposes of a book classification was to secure the physical arrangement of books in a collection in accordance with “the order of their common subject-matter” (Hulme 1950 [1911–1912], 3, 17; cf. 1903, 29–30). Furthermore, he held that the subject classes of a book classification were ideally to be rooted in “an accurate survey and measurement of classes in literature”, a principle of classification design that would come to be enshrined as that of literary warrant (Hulme 1950 [1911–1912], 9; see Glossary, s.v. “Literary Warrant”). Given that the classes of a subject classification were to be empirically derived from a consideration of the subjects of books *qua* documentary units and that, as a concrete, physical object, any given book could occupy only one position on the shelves (See Chapter 6, Section 3.2.2, above), it was convenient that each and every class occupy only a single position within a book classification—a *desideratum* assured by a monohierarchical structure. It was to preserve such a structure that Hulme advised that only one of the broader subjects to which a given specific subject could belong should be chosen as its superordinate class, with a cross-reference thereto from the other one(s).

Although Hulme’s strongly empirical approach to the derivation of classes in a bibliographical classification differed markedly from that of most other contemporary theorists of bibliographical classification (Lee 1976, 107–109), his insistence that a book classification should have a monohierarchical structure reflected an assumption that underpinned all the major classifications of the day: as the creators of the UDC put it, an “essential principle of bibliographical order” was “a place for everything and everything in its place (*Une place pour chaque chose et chaque chose à sa place*)” (La Fontaine & Otlet 1895–1896, 30). The designers of classifications compensated for the scattering of subsidiary subjects attendant upon monohierarchical classificatory structure—what later generations of librarians would come to designate as the problem of “distributed relatives” (Broughton 2004, 299, s.v. “distributed relatives”; Foskett 1982, 218; Savage 1946, 99)—in two ways. First, much as Hulme recommended, they incorporated, albeit to a limited extent, cross-references within their classification schedules: of the major classification schemes,

the DDC, at least from its 2nd edition onwards, made the greatest use of this mechanism. Second, and much more importantly, they provided indexes to the classification schedules in which the names of classes were enumerated in alphabetical order, with references to the class-numbers in the tables. Designed to expedite the look-up of class numbers, these indexes provided a means by which the subsidiary aspects of a given topic could be brought together (Broughton 2004, 137–138; Hunter 2009, 42–43; Mills 1968, 53). The DDC developed the most sophisticated form of such an index, which Dewey named the “Relativ Index”:⁵⁰³ a simple example therefrom may serve to illustrate how collocation was effected.

Within the tables of the 6th edition of the DDC, the subject of bridges was distributed over four different classes representing four different subjects, which fell under two main divisions, 300 (“Sociology”) and 600 (“Useful Arts”). These classes were 624 (“Useful Arts: Engineering: Bridges and Roofs”), 623.6 (“Useful Arts: Engineering: Military Engineering: Military Roads and Bridges”), 351.815 (“Sociology: Administration: Administration of Central Government: Promotion of Public Welfare: Means of Communication: Bridges”), and 352.8 (“Sociology: Administration: Local Government: Streets, Highways, Bridges, Parks”). In the schedules, there was only one cross-reference among these four classes, which directed the user from Class 351.815 to 352.8, though, interestingly enough, there was a cross-reference from 625 (“Useful Arts: Engineering: Railroad and Road Engineering”) to 624. In the Relativ Index, however, all four classes were represented in the following manner (Dewey 1899, 430):⁵⁰⁴

Bridges	administration	351.815
	engineering	624
	local government	352.7
	military engineering	623.6

Whereas, in the tables of the DDC, the departments of human knowledge provided the starting point for locating specific classes within a hierarchical chain and so scattered the classes involving bridges among different sectors of administration (351.815 & 352.7) and

⁵⁰³ It should be noted that the *Index Alphabétique* of the UDC, which followed, in large measure, in the footsteps of the Relativ Index exhibited a similar degree of sophistication; See Institut International de Bibliographie 1907e, “Index alphabétique de toutes les rubriques comprises dans les tables systématiques”, esp. pp. 3, 6–7, §§ I & VII. For a specimen page of the index that nicely illustrates its chief features, see Institut International de Bibliographie 1905b, 34.

⁵⁰⁴ The rendering of name and number in boldface type indicated that the class in question was further subdivided in the schedules.

engineering (623.6 & 624), the index collocated them by inverting, so to speak, the order of presentation, so that bridges, rather than the department of knowledge through the prism of which they were viewed, became the focal point with additional qualifiers (*in casu*, “administration”, “engineering”, “local government”, and “military engineering”, indicating the broader conceptual context of the classes pertaining to them.⁵⁰⁵ Interestingly, this important aspect of the Relativ Index appears to have been of secondary interest to Dewey, for, in his eyes, the chief value of the index lay in the fact that it allowed classifiers to look up subjects by correlating names with class numbers so that they could refer to their place in the schedules expeditiously (pp. 10–12): it was left to later commentators to emphasize the fact that it also coordinated “distributed relatives” (e.g., Foskett 1982, 218; Mills 1968, 53).⁵⁰⁶

The Relativ Index of the DDC and the indexes of the other major bibliographical classifications provided a means of access to the contents of the classification tables that, among other things, served as a *de facto* means of mitigating the dispersive effects of mono-hierarchy. Nevertheless, they remained adjuncts—vitaly important adjuncts, to be sure—to a form of top-down classificatory structure in which the main classes were broad departments of human knowledge within which all subordinate classes were anchored and in which each class could occupy only a single position within the hierarchy of subjects. Within such a scheme, objects such as bridges could not stand as subjects by themselves but only as parts of subject classes such as “Bridges *qua* Objects of Engineering” or “Bridges *qua* Objects of Administration”, in which each and every class belonged to one, and only one,

⁵⁰⁵ In foregrounding a specific object over the broader department of knowledge, or standpoint from which it was viewed, the Relativ Index represented an approach to subject access analogous to that of Cutter’s treatment of subjects in the *RDC*, where, as we have already seen, the choice of entry under which a book with a complex subject (such as “ornithology of New England”) was governed by a significance order in which the concrete object, individual or concrete, always preceded the abstract aspect from which it was viewed (See Section 3.1.1 of the current chapter, esp. pp. 391–393, above).

⁵⁰⁶ Latter-day commentators have argued that the Relativ Index was named (1) because it “collects together relatives” (Frické 2012, 69; cf. Coates 1960, 84; Hunter 2009, 43); (2) because it relates a single concept (in our case, “Bridges”) to some broader context (in our case, “administration”, “engineering”, “local government”, or “military engineering”) (Miksa 2006, 77); and (3) because it shows “the relative hierarchical locations” in which a given term is to be found in the schedules (Svenonius 2000a, 1511 cf. Metcalfe 1957, 148). Dewey, who changed the name of the index from “Subject Index” (1876) to “Relativ Subject Index” (1885) to “Relativ Index” (1888) did not discuss his reason for adopting the term “relative”: however, his discussion of the index in the introductions to the various early editions of the DDC gives credence to the latter two interpretations: Sayers (1907, 442) seems to have intuited as much as well when he gave as one of his early canons of classification that a classification “must be furnished with a relative index; that is to say, an index showing the place of every topic, and every phase or view of a topic”.

hierarchical chain and each hierarchical chain belonged to one, and only one, main class that indicated the aspect or perspective from which its subordinate classes were viewed: it is for this reason that latter-day commentators have come to speak of these classification schemes as “aspect classifications” (Broughton 2004, 18–19) and “perspective hierarchies” (Svenonius 2000a, 151–153) as well as monohierarchies. The potency of the presumption that a bibliographic classification would be an aspect classification was strong: even Brown (1906), who, in designing his SC, sought to eliminate the scattering of subjects in the classification tables themselves by assigning each concrete subject only one “constant place” in the scheme did so within the framework of series of main classes reflecting departments of knowledge (See Section 3.1.1 of the present chapter, esp. pp. 398–399, above).

Polyhierarchy, then, did not fit into the standard template of subject-based bibliographical classifications of Kaiser’s day and it is thus unsurprising that, with the conspicuous exception of Hulme, theoretists of library classification did not explicitly discuss it in their writings. This tendency to downplay polyhierarchy extended to the realm of cataloging, where Cutter’s (1904, 80, Rule 188, Discussion) recognition that it could be a concomitant of cross-references from specific to general terms was tempered by his advice to limit references of that sort. Similarly, most writers on book and periodical indexing, many of whom had roots in librarianship or at least participated in its discourse, did not breathe a word about it in their discussions of cross-references (e.g., Nichols 1892a, 415; Petherbridge 1904, 101–103; Wheatley 1879, 54 & 72, Rule 11; Wheeler 1905, 480–481). The only apparent exception to this general trend came from pen of a British librarian and author of a book on “practical indexing”, who declared that

if a class is indexed, its items must be followed by a cross-reference to the included sub-classes and species and, of course, the converse must take place when a species is indexed, that is, there must be cross-references from the species to the sub-classes and classes in which that species is included (Clarke 1905, 17–18).

Although the use of the plural forms “sub-classes” and “classes” with regard to making cross-references from a specific class (“species”) to broader including classes suggests that he may have had some sort of polyhierarchical structure in mind, it is not altogether certain that this was indeed the case, for other passages in the same work that deal with reciprocal references seem to be based on monohierarchical assumptions (e.g., p. 48). At any rate, the writer did not expatiate further on the possibility of subsuming a single specific class under several broader ones and so the reference to polyhierarchy—if indeed it was one—was, at best, fleeting and inconsequential.

In light of the general tendency to minimize or ignore polyhierarchy, Kaiser's willingness to elevate it to an explicit principle of design for the construction of cross-references marked a noteworthy departure from the contemporary norms of knowledge classification. Yet it is hardly surprising that he should have done so, for an appreciation of polyhierarchy fit well with the general tenor of his thought. For one thing, his firm rejection of the idea of the subject-based classification of documents in favor of one based on documentary kinds (See Chapter 6, Sections 3.1–3.3 above), as well as his eschewal of arranging index units by the meaning of the terms indicating their subjects (See Section 5.1 of the current chapter) freed him from the preconception that a monohierarchical classification was the most suitable form for interrelating subjects with one another and so left him more open to other, less structurally restrictive modes of organizing terms on a semantic basis. Moreover, Kaiser's accordance of primacy to terms for (kinds of) concrete objects as subjects (See Section 3.5 of the present chapter), coupled with a lively sense of epistemological perspectivism (See Section 2.1 of the present chapter, esp. pp. 308–309, above), may well have predisposed him to approve of a kind of classificatory structure that allowed the indexer to subordinate a term denoting a given specific kind of concrete to multiple collective terms referring to broader classes of concretes: after all, in an indexing system that dissolved abstract terms for departments of knowledge through semantic factoring (See Section 3.6 of the current chapter, esp. pp. 492–495, above), broader terms of concretes remained, *de facto*, the sole classificatory indicators of the different aspects of a given specific kind of concrete. As one later theorist of knowledge organization noted, “[p]olyhierarchy is a recognition that concept terms may be ambiguous, it displays their different contexts and shades of meaning” (Vickery 1997, 180): given Kaiser's assumptions regarding the difficulty of defining terms with precision because of their labile semantic boundaries, polyhierarchical relationships gave him a means of indicating the range of semantic nuances that a given term might have within the context of an index. Most important, perhaps, was the fact that polyhierarchy provided a mandate for placing any given term for a concrete “in as many logical classifications [sci., hierarchical structures] as may be called for by our business interests” (Kaiser 1926, 26, § 20): it thus fulfilled the pragmatic function of giving the indexer freedom to make any *useful* connections between a given specific term and any collectives under which it could be subsumed.

Cross-references from collective terms to their various subordinate specific terms formed what later writers would call “downward references”, while those from specific

terms to their superordinate collective term(s) constituted “upward references” (Coates 1960, 11; Horner 1970, 150; Metcalfe 1959, 169–171; 1965, 111). As such, they represented hierarchical relationships, which formed the core of the relational semantics of terms of concretes (Kaiser 1911, § 590; See Section 6.2.2 of the present chapter). The third kind of cross-reference represented a vastly different range of relationships that could obtain between two concretes. Kaiser (1911, § 423) characterized it as signaling “the application of one [concrete—TMD] to the other”. By way of illustration, he invoked the connection between ELECTRICITY and WINE: “*electricity* is used to age *wine*, the two terms *electricity* and *wine* are thus brought into relationship although they cannot possibly be regarded as collective and specific respectively” (§ 424 [emphases his]). This was, in effect, a kind of non-hierarchical relationship analogous to what later generation of theorists of knowledge organization would come to know as “associative relationships” (e.g., Aitchison, Gilchrist, & Bawden 2000, 60–66; ANSI-NISO 2005, 51–56; Broughton 2006b, 129–130). As Kaiser’s example shows, the semantic linkage between the terms so related could be quite complex. Electricity served as a means by which to induce artificial aging of wine, a relationship that was difficult to capture both precisely and compendiously in language. The most economical way of expressing it, as Kaiser did, would be to assert that ELECTRICITY *is applied to* WINE, where the tradeoff for simplicity of expression was a loss of precision in meaning. At any rate, this form of cross-reference was to be used to bring together two otherwise “apparently unconnected terms” (Kaiser 1911, § 423) that did not stand in a hierarchical relationship to one another. Further examples of such relationships can be found on a sample guide card for COTTON that Kaiser reproduced in *Systematic Indexing* (See Figure 39, below). Among the terms listed there are COTTON DYE, COTTON GIN, GINROLLER, COTTON MACHINE, COTTON MILL, and COTTON PRESS. Although most of these terms include the element COTTON and so have at least a verbal connection to that term, they denote substances (COTTON DYE), machines or parts thereof (COTTON GIN, GIN ROLLER, COTTON MACHINE, COTTON PRESS), and manufactories (COTTON MILL) implicated in some way with the industrial processing of cotton: thus, it is evident that they do not stand in a hierarchical relationship to COTTON, but rather represent concretes that are associated with cotton in a manufacturally relevant way.

The final kind of cross-reference that Kaiser identified was that connecting synonymous terms. Now at first blush, the very idea of synonymy may seem not to have fit very comfortably within a view of language that laid stress upon the semantic lability of terms:

after all, if words invariably failed to express in full the ideas or mental pictures of the persons who wrote them and there was no consensus among different individuals on the exact definitional contours of words (See Section 2.2.1 of this chapter, esp. 330–332, above), the probability that, in everyday communication, any two distinct terms could be *exactly* equivalent in meaning would seem to become vanishingly small, if not entirely impossible. Kaiser’s acceptance of synonymy, however, did not involve any inconsistency on his part. Here it is important recall his acknowledgment that most users of a language tended to converge sufficiently in their respective understandings of the words that they used to communicate with one another: we have already noted, in another context, his declaration that, as a rule, “[t]here is a general acceptance as to what is meant by a given name *on the surface*” (Kaiser 1911, § 111 [emphasis his]; see Section 2.2.1 of this chapter, esp. p. 330, above). One must also keep in mind his assumption that different words could overlap in meaning and that, in some cases, the meaning of overlapping terms was sufficiently close that they could be viewed as *de facto* equivalents—one need only think of the virtual equivalence between the collective terms SOFT GOODS, DRY GOODS, and DRAPERS’ GOODS discussed earlier (See Sections 2.2.1 & 5.1 of the present chapter). Furthermore, it may be noted that the notion of synonymy was, itself, open to interpretations varying in their stringency. For example, one of the leading contemporary dictionaries of the English language, the *Century Dictionary*, offered no fewer than four primary definitions of “synonym”, ranging from “[a] word having the same signification as another” and “one of two or more words which have the same meaning” to “by extension, a word having nearly the same meaning as another” and “one of two or more words which in use cover to a considerable extent the same ground” (Whitney & Smith 1911, Vol. 9, 6137, 1 s.v. “synonym”). The former two presented the relation of synonymy as involving complete coincidence of meaning among words, whereas the latter two allowed for subtle differences in meaning so that “words of like significance in the main, but with a certain unlikeness as well” could count as synonyms (Trench 1913 [1851], 179).⁵⁰⁷ The definition of synonymy as close likeness, rather than exact equivalence, in meaning was consonant with Kaiser’s general understanding of the

⁵⁰⁷ In the discourse of modern KO, the distinction between synonyms as words of equivalent meaning (or, in another formulation, as words expressing the same concept) and synonyms as words of closely similar, but slightly different meaning (or, in another formulation, as words expressing closely related concepts) has, *mutatis mutandis*, taken the form of the distinction between “synonyms” and “quasi-synonyms” or “near synonyms”. See, e.g., Aitchison, Gilchrist, & Bawden 2000, 52–53; Austin 1984, 201–203; Broughton 2006b, 71–72, 220–221, s.v. “Quasi-synonym” & 223, s.v. “Synonym”; Soergel 1985, 218–219. See also the comments of Svenonius 1990, 96.

ways of words and so it seems likely that his own view of synonyms aligned with it. This, however, must remain a surmise, for he had little to say about synonyms in *Systematic Indexing*, presumably on the assumption that the notion would be self-evident to his readers: at any rate, he clearly accepted their existence and stipulated that cross-references could be made between them.

Kaiser based his approach to the treatment of synonyms on the tenet that terms of concretes be directly derived from the textual units being indexed (See Sections 2.2.3, 2.2.5, & 4.2 of the current chapter). In practice, this meant that each index item was entered directly under the name of the concrete extracted from it and, if two names serving as terms of concretes were judged to be synonymous, then a cross-reference was to be made between them (Metcalf 1965, 46). Thus, for example, if a given textual unit provided information about what it called “artificial indigo”, then the index item made out for it was entered under the main term ARTIFICIAL INDIGO, whereas a different textual unit treating of what it designated “synthetic indigo” was to be entered under the term SYNTHETIC INDIGO: insofar as the terms ARTIFICIAL INDIGO and SYNTHETIC INDIGO had more or less the same meaning and so could be considered synonymous, they were to be linked by means of reciprocal cross-references.

Now the foregoing method of dealing with synonymous terms differed quite markedly from the prevailing practice of contemporary librarians and indexers. Writers on cataloging (e.g., Cutter 1904, 105–106, Rule 285; Quinn 1899, 73) and indexing (e.g., Clarke 1905, 33; Nichols 1892a, 415; Wheeler 1905, 468, s.v. “Cross reference” & 480) alike distinguished sharply between two kinds of cross-references: “See” references and “See Also” references. The specific difference between the two was that a “See” reference was made from a subject heading under which there were no entries to one under which books (in the case of catalogs), articles (in the case of periodical indexes), or page references (in the case of back-of-the-book indexes) were entered, whereas a “See Also” reference was made from one subject heading under which there were entries to another, with reciprocal references sometimes, though not always, made between the two headings so conjoined (e.g., A Committee of the American Library Association 1895, “Preface”, [ii]; Nichols 1892a, 415, § 47; Wheeler 1905, 480). Whereas “See Also” references were typically used for connecting terms standing in a hierarchical or associative relationship to one another, it was the “See” reference that served as the means of linking up synonyms (Nichols 1892a, 415, § 45; Petherbridge 1904, 101). This entailed selecting one of two (or more) synonymous subject

headings as the preferred heading to represent a given subject so that all entries relating to that subject were to be made under it (Clarke 1905, 30; Cutter 1904, 70–71; Wheeler 1905, 474). Once a heading *A* had been chosen to serve as the preferred heading for a subject, any synonymous heading *B* was provided with a cross-reference of the form “*B*, see *A*”, so as to guide the user of the catalog or index in question from it to the heading *A* under which the entries for the subject in question were to be found; however, no reciprocal reference was made from heading *A* to heading *B* in accordance with the rule that one should “not make a cross-reference *to* a heading under which no entries are made” but only “*from* it” (Nichols 1892a, 415, § 49 [emphases his]).

To appreciate the difference between the conventional mode of establishing cross-references between synonyms and that developed by Kaiser, it is instructive to revert to the example of the terms ARTIFICIAL INDIGO and SYNTHETIC INDIGO. On the former plan, one of these terms—say, ARTIFICIAL INDIGO would be chosen as a preferred heading and all records for textual units dealing with “artificial indigo” or “synthetic indigo” alike would be entered under it, while the heading SYNTHETIC INDIGO would be given a cross reference of the form “See ARTIFICIAL INDIGO”, thus directing the user of the catalog or index to the preferred heading ARTIFICIAL INDIGO: however, no reciprocal reference would be made from ARTIFICIAL INDIGO to SYNTHETIC INDIGO. By contrast, on Kaiser’s plan, each of these terms would have its own set of entries and the guide card for ARTIFICIAL INDIGO would contain a cross-reference to SYNTHETIC INDIGO, while that for SYNTHETIC INDIGO, in turn, would give a cross-reference to ARTIFICIAL INDIGO. More generally, whereas most librarians and indexers distinguished between a preferred heading and its non-preferred equivalents, and stipulated that cross-references follow a unidirectional path from non-preferred headings to the preferred one, Kaiser treated synonymous terms as having equal status as headings and allowed for bidirectional cross-references among them. In other words, Kaiser’s cross-references for synonyms bore a greater formal resemblance to the “See Also” references that catalogers and other indexers used to connect hierarchically and associatively related headings than they did to the “See” references typically used to deal with synonymous ones.

The primary rationale for the use of “See” references with synonyms was to collocate entries for a given subject under a single heading and so to eliminate the “scatter [of] material under several practically identical headings” (Wheeler 1905, 474). The concentration of entries under a single term obviously made for efficiencies in using a catalog

or index, for, once the person searching for a given subject had found the relevant heading, he had all the entries for textual units registered as directly pertaining to that subject at his disposal. Kaiser's method of entering index items under different synonymous terms and linking these up by means of cross-references had precisely the opposite effect, for it scattered index items that could be construed as being about the same subject but used different terms to refer to it under different headings in the index. This meant that a person searching for a given term for a concrete would find under it only those index items in which that very term had been used. If he wanted to be sure that he had found all the information on his subject of interest, he would have to consult the guide card of the term in question to see whether its list of related terms included synonymous terms: if these latter were, indeed, present, then he would have to find them elsewhere in the index. In this respect, Kaiser's mode of treating synonyms as distinct terms of equal status within an index was doubtless less efficient than the method of the catalogers and indexers who employed "See" references to bring together all entries for a given subject, regardless of the terms used to refer to it, under a single preferred heading. Nevertheless, it was consistent both with his general policy of taking terms, rather than concepts, as the elementary units of indexing and with his goal of minimizing the (mis)interpretation of textual units by using, whenever possible, the same terms of concretes that they did to characterize their subject content in an index (See Section 2.2.3 of the current chapter): to deal with synonyms as separate filing terms was to respect the choices that different authors had made in the verbal expression of their ideas and to acknowledge the fine shades in meaning that accompanied the use of different words for what was more-or-less the same subject.⁵⁰⁸ In

⁵⁰⁸ In this, his attitude is comparable to that of his older contemporary, the American librarian and periodical indexer William Isaac Fletcher (1844–1917) who wrote in an article on "some points in indexing" penned over thirty years before *Systematic Indexing* saw the light of day: "But more or less difficulty is apt to arise in connection with the accepted principle that all references to a given subject should be brought together under a common heading, whatever different names the subject may receive in different treatises. Or in other words that of synonymous subject-headings one must be selected for use, and cross-references made from the others to it. This I have called an accepted principle, because I have heard of no dissent from it. But it appears to me that in the application of this rule sufficient attention has not been paid to the limitations of the word *synonymous*. ... May it not be said in all fairness that the choice of different names for their treatises by different writers warrants the inference that the subjects are diverse? If so, the indexer who treats two of these names as synonymous without having assured himself completely that they are so, does the authors a manifest injustice" (Fletcher 1879, 245). Although Kaiser most likely was not aware of Fletcher's article and Fletcher's own preferred system of cross-references did not abandon the "See" reference altogether (p. 247), both men clearly were wary of the interpretative pitfalls of consolidating entries relating to different synonyms under a single preferred term and both were eager to take account of

short, Kaiser's manner of making cross-references between synonyms neatly shows how his general inclination towards linguistic empiricism and his profound sense of the semantic vagaries of language decisively affected an aspect of his methodological protocols for SI, even though this entailed the loss of certain practical efficiencies in use.

Kaiser's system of cross-references for terms of concretes, then, provided for the linkage of (1) collective terms to their various subordinate specific terms, (2) specific terms to their various superordinate collectives, (3) terms standing in non-hierarchical associative relationships to one another, and (4) synonymous terms. As new terms of concretes were introduced into an index over the course of its development, it was necessary to relate them to those already present: "[e]ach new first term", observed Kaiser (1911, § 432), "will have to be carefully considered in order to determine its relations to others in the file before the cards [sci., associated with it—TMD] are filed so that the related terms may be added and the index kept up to date". Given the potentially large number of terms that this might involve and the dauntingly wide range of possible semantic connections between them, the question naturally arose as to what principle should govern an indexer's choices in making cross-references: on what basis was one to decide which terms to relate to which?

For Kaiser, the ultimate criterion for determining what connections to make between terms was to be found in "the individual character of [a] business" (§ 418). His point of departure was the tenet that every business organization had its own specialized domain(s) of interest towards which it oriented its activities and about which it required information (See Chapter 6, Section 2.1, above). In the case of any given index, the particular interests of the organization for which it had been created were to govern both the selection of the textual units to be indexed and the derivation of index terms from those units (See Sections 1 & 4.2 of the current chapter). The same considerations applied to the formation of relationships between the terms in an index, the particular articulation of which was based upon the perceived needs of the intended users. As Kaiser (1911, § 419) explained,

[w]e are not tied to any fixed nomenclature, to deviate from which may have inconvenient consequences; we can choose what we think best, what fits in best with our special work, and we ought to be the best judges as to what terms should be brought into relation for our purpose.

The stipulation that cross-references were to be made in accordance with the specialized interests and needs of a given business also set natural limits to the actual number of

"those fine distinctions between closely related subjects which give rise to the divergences of nomenclature" (p. 246).

recognized relationships among terms in any given index. Regarding this point, Kaiser stated that

we are in no case concerned with *all* related terms but only so far in each individual case as the relationship actually exists from the point of view of the business which the index is to serve, and we have it therefore in our hands to make the number of related terms just as many or few as we like ... (§ 425).

The scope and size of a cross-reference system, as well as its contents and the granularity of its relational structures, were contingent upon factors unique to each individual index, the intelligence department whose personnel oversaw its development, and, ultimately, the character and domain interests of the business organization whose research workers and managers were to be its primary users. Which terms were to be related to which, then, depended entirely upon organization-specific preferences and circumstances.

Such, then, were the theoretical considerations underlying the making of cross-references for terms of concretes. In practice, once a given term had been admitted into an index and its cross-referential relationships, if any, had been determined, the related terms were entered on its first (and, if need be, second) guide card(s) in a manner that followed, by and large, the format for recording them for terms of countries. Much depended upon the length of the term and how many guides were necessary to accommodate it. In the case of one-word terms, Kaiser (1911, § 426) deemed “the work” of preparing a guide to be “very simple”. One wrote all the relevant related terms on the body of the card: these were arrayed in alphabetical order and distributed over “four alphabetical columns” notionally “starting with the letters A G M and S respectively”, with spaces left between words beginning with alphabetically non-contiguous letters to accommodate possible future additions (§ 430; cf. 1908, § 144). One had the option of inscribing a phrase such as “See”, “See Also”, or “Compare” immediately above the left-hand-most of the four columns to indicate that the following list was a list of cross references but Kaiser laid no great store by this: “its omission will be no disadvantage”, he assured his readers, “because the relation between the term on the tab and those in the body of the card is self evident” (1911 § 431). As for the terms enumerated on the guide card, reciprocal references were made on their respective guides as well: by way of example, Kaiser noted that “[t]he guides of the specifics *hoe, hammer* etc refer to the collective *hardware*, and the guide *hardware* enumerates the specifics *hoe, hammer* etc (but not *horse hoe*, whose place is on the guide *hoe* etc)” (§ 426; cf. 1908, § 144).

Multiword terms added a layer of complexity, for, if they were long enough, they might have to be distributed over the first and second guides of a five-position system (See Section 5.2.1 of the current chapter, esp. p. 590, Figure 31, above). For example, a term such as WROUGHT IRON ORNAMENT would require apportioning the phrase WROUGHT IRON to a first guide and the word ORNAMENT to a second guide (Kaiser 1911, § 426). In cases such as this, the noun (phrase) on the first guide (*in casu*, WROUGHT IRON) functioned, in effect, as the filing term and the noun (phrase) on the second guide (*in casu*, ORNAMENT) as a subdivision thereof: nevertheless, both guides could be used for the purpose of cross-references. The term on the first guide typically contracted reciprocal relationships with terms of concretes entered upon other first guides, just as single-word terms did: for instance, WROUGHT IRON might have the collective term IRON among the related terms listed on its guide card, while the guide card for IRON might give WROUGHT IRON in its enumeration of related terms. However, the first guide would also list any terms occurring on the second guides following it as subdivisions: for example, the card for WROUGHT IRON would have a reference to ORNAMENT, since the latter term occurred on a second guide following it. In such cases, a hyphen would be inserted in front of the term designating the subdivision (*in casu*, -ORNAMENT): this hyphen both represented the term written on the tab of the guide card (*in casu*, WROUGHT IRON) and indicated that the term following it was a division thereof (§ 431). In short, the list of related terms on the first guide of a multiword term, the first element of which was a noun (phrase), intermingled related terms directing the user to other first guides in the index (*e.g.*, IRON) with those that guided him to subdivisions of the first guide in question (*e.g.*, -ORNAMENT). On the other hand, the term on the second guide could be brought into relation only with terms appearing on first guides and any reciprocal relations that it formed with those were mediated by the term on the first guide of which it was a subdivision: for instance, the second guide ORNAMENT serving as subdivision of the first guide WROUGHT IRON would include among its related terms a reference to ORNAMENT as “first guide under O”, whereas the first guide ORNAMENT would have a reciprocal reference not directly to the second guide ORNAMENT but to the first guide of which it was a subdivision, namely WROUGHT IRON. Such asymmetry reflected the fact that, from a purely mechanical point of view, one could only locate the second guide ORNAMENT in WROUGHT IRON ORNAMENT by means of the first guide WROUGHT IRON:⁵⁰⁹ at any rate, the effect of the maneuver was to establish a

⁵⁰⁹ Such “indirect” reciprocal references occurred only within the standard five-position guide

hierarchical cross-referential relation between ORNAMENT *simpliciter* and WROUGHT IRON ORNAMENT and *vice versa*.

With multiword terms in which the element on the first guide was not a noun or noun phrase but an adjective, the basic pattern showed slight variation. Consider, for example, terms such as ARTIFICIAL GAS, ARTIFICIAL RUBBER, or ARTIFICIAL WHALEBONE, which might be distributed among the first and second guides in such a way that the adjective ARTIFICIAL was entered upon the first guide and the noun that it modified—in *casu*, GAS, RUBBER, or WHALEBONE—upon a second guide. In such cases, the first guide bearing the adjective on its tab would enumerate all the nouns on the second guides serving as subdivisions to it, so that, for instance, among the related terms listed on the guide for ARTIFICIAL, one would find -GAS, -RUBBER, or -WHALEBONE (cf. Figure 38 below). Kaiser (1911, § 427) noted that such a listing of the subdivisions of an adjectival term on a first guide was analogous to the enumeration of subdivisions on guides for terms of countries and, furthermore, that it would only be necessary when a large number of unit cards had accumulated after the first guide. Otherwise, the listing of related terms on the second guide involved the same kind of indirect reciprocal references as was used for multiword terms in which the element on the first guide was a noun phrase: thus, for example, if one wanted to make a connection between, say, ARTIFICIAL GAS and the collective term FUEL, one would make a reference from the second guide GAS serving as subdivision of the first guide ARTIFICIAL to the first guide FUEL under F, from which, in turn, there would be a reciprocal reference to the first guide ARTIFICIAL (cf. § 426).

Examples of guides for terms of concretes may serve to clarify some of the preceding descriptions as well as give a visual impression of how cross-references were presented and various relationships were treated. Figure 36 is an example of the first guide for the one-word term HARDWARE, taken from an unspecified index. Its four columns contain a fairly full alphabetical list of related terms: the absence of hyphens in front of these indicates that all of them are main terms in their own right and have their own first guides elsewhere in the index file, each of which will include the term HARDWARE in its list of related terms (Kaiser 1911, § 431). The hyphens in BRASS-, BRONZE-, BUILDERS'-, FAMILY-, and SADDLERS'- are substitutes for the term on the tab and indicate that these terms are to be

system: in the alternate system mentioned on p. 589, n. 493, above, in which a three-cut guide was used for the term of concrete and fifth-cut cards for country and process terms, respectively, the three-cut guide would be large enough to accommodate the entire term for concrete so that no distribution between two guides would be necessary and all the related terms would be enumerated on a single card (Kaiser 1911, § 429).

read as BRASS HARDWARE, BRONZE HARDWARE, BUILDERS' HARDWARE, FAMILY HARDWARE, and SADDLERS' HARDWARE, respectively. Now HARDWARE, a term that one standard dictionary of Kaiser's day defined as referring to "[s]mall metal articles, such as

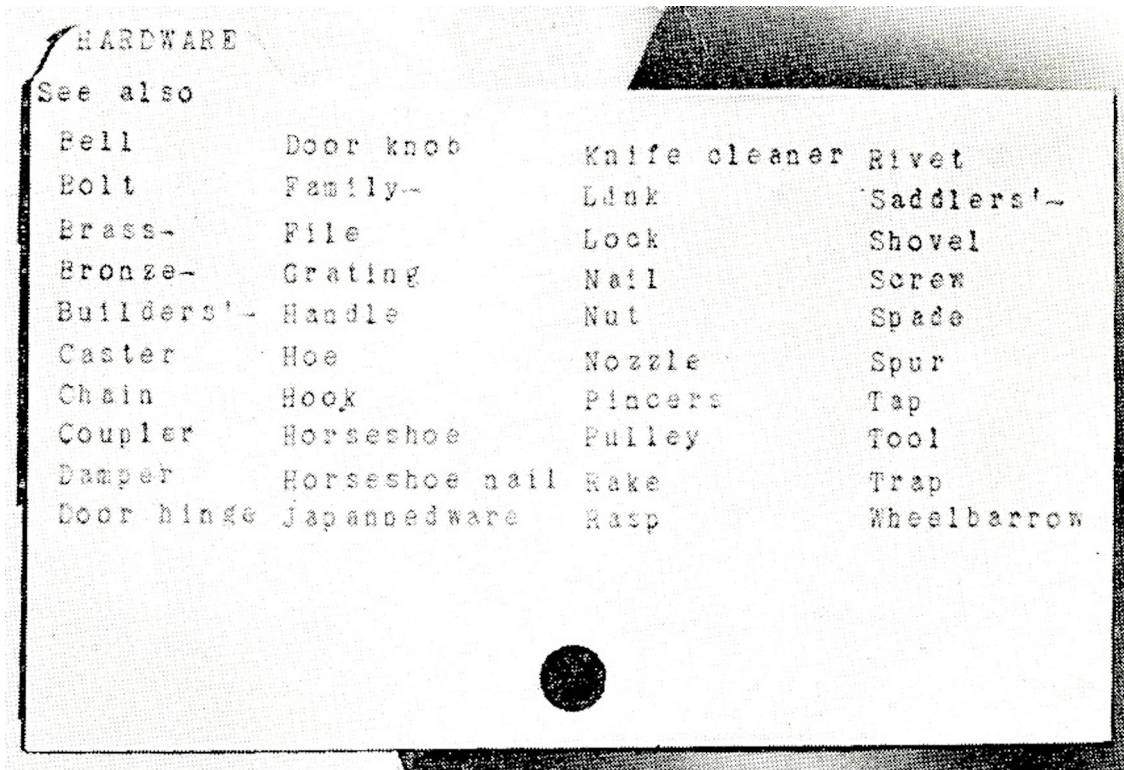


Figure 36: Guide card for the term of concrete HARDWARE (Source: Kaiser 1908, § 117).

house- or carriage-trimmings, fittings, parts of machines, domestic and kitchen utensils and appliances, and small tools" (Whitney 1906, Vol. 4, 2719, 1 s.v. "hardware"), can be characterized as a broad, or collective, term. Even a cursory survey of the enumerated related terms shows that most of them are specific relative to it. The only exceptions are TOOL and JAPANNED WARE (i.e., objects that have been soaked in varnish and baked so as to have a hard, black glossy surface).⁵¹⁰ Both are broad terms, each of which only partially overlaps with HARDWARE in its extension: after all, not every piece of hardware is a tool

⁵¹⁰ Japanning was "[t]he art of coating surfaces of metal, wood, etc. with japan or varnish to produce a high black luster. Japanning liquid [was] made by cooking gum shellac with linseed oil in a varnish kettle. The articles to be coated ... [were] immersed in the liquid and hardened by means of a high temperature in stoves or hot chambers" (Cole 1892 s.v. "Japanning"; cf. Dodd 1876, 191, s.v. "Japanning"; Japanning 1892).

nor are all tools metallic in composition, while japanned ware could include wooden and papier-maché items as well as metallic ones. As for the specific terms that have been set into relationship with HARDWARE, they show notable differences in their level of specificity. Some denote general kinds of hardware defined either by material (e.g., BRASS HARDWARE, BRONZE HARDWARE) or the contexts in which they were used (e.g., BUILDERS' HARDWARE, FAMILY HARDWARE, SADDLERS' HARDWARE). Most, however, are the names of various kinds of metallic objects (e.g., BOLT, DOOR HINGE, HOE, KNIFE CLEANER, LOCK, NAIL, NUT, RAKE, RIVET, SCREW, and WHEELBARROW), some of which can be set into hierarchical relations with the broader terms in the list: for example, BOLT, DOOR HINGE, DOOR KNOB, and LOCK all designate “metallic fittings in common use about a house or other building” for the purpose of “supply[ing] proper and convenient fastenings for doors and windows” and so fall into the category of BUILDERS' HARDWARE (Sturgis, 1901, Vol. 1, 384, s.v. “Builders' Hardware”; Towne 1904, 6; cf. Smythe 1899, 114),⁵¹¹ while FILE, RASP, PINCERS, RAKE, SPADE, and SHOVEL denote different types of TOOL. With its heterogeneous mixture of terms of varying degrees of specificity, as well as overlapping broad terms, this guide led the user either to broad categories of hardware or to specific kinds of objects for which entries were to be found elsewhere in the index.

It is instructive to compare the foregoing guide with another one for a single-word term—IRON—which is reproduced in Figure 37a. Apparently taken from a different index, this guide has to do with a markedly different kind of concrete—IRON denotes a material substance, whereas HARDWARE names a class of artifact(s)—and contains a considerably smaller number of related terms than the guide for HARDWARE. Now certain of its related terms have features similar to those of the terms found on the latter guide. Most notably, a number of them denote different kinds of iron, distinguished by physical composition (e.g., HEMATITE IRON),⁵¹² by the kind of material from which it was made (e.g., SCRAP IRON), by

⁵¹¹ Note that such hierarchical relations can even be formed among some of the terms for specific kinds of objects: for example, HORSESHOE NAIL is evidently a kind, or species, of NAIL. In this, the guide infringes Kaiser's (1911, § 426) own *dictum* that a guide for HARDWARE might include a specific kind of object, such as HOE, but that any term for a variety of a specific kind of object, such as HORSE HOE, should appear under its most proximate collective only.

⁵¹² “Hematite iron” was iron derived from red hematite ores, which were high in natural metallic iron content and low in phosphorus and sulphur. Relatively free of embrittling impurities, hematite iron was frequently used to make steel by the Bessemer process (Baker 1873, 27; Greenwood 1907, 28–29; Sexton & Primrose 1912, 30; Thurston 1909, 64–67).

the fuel used in processing the iron (e.g., CHARCOAL IRON),⁵¹³ by the manufacturing processes employed on it (e.g., CHARCOAL HAMMERED IRON, GALVANISED IRON,⁵¹⁴ PUDDLED

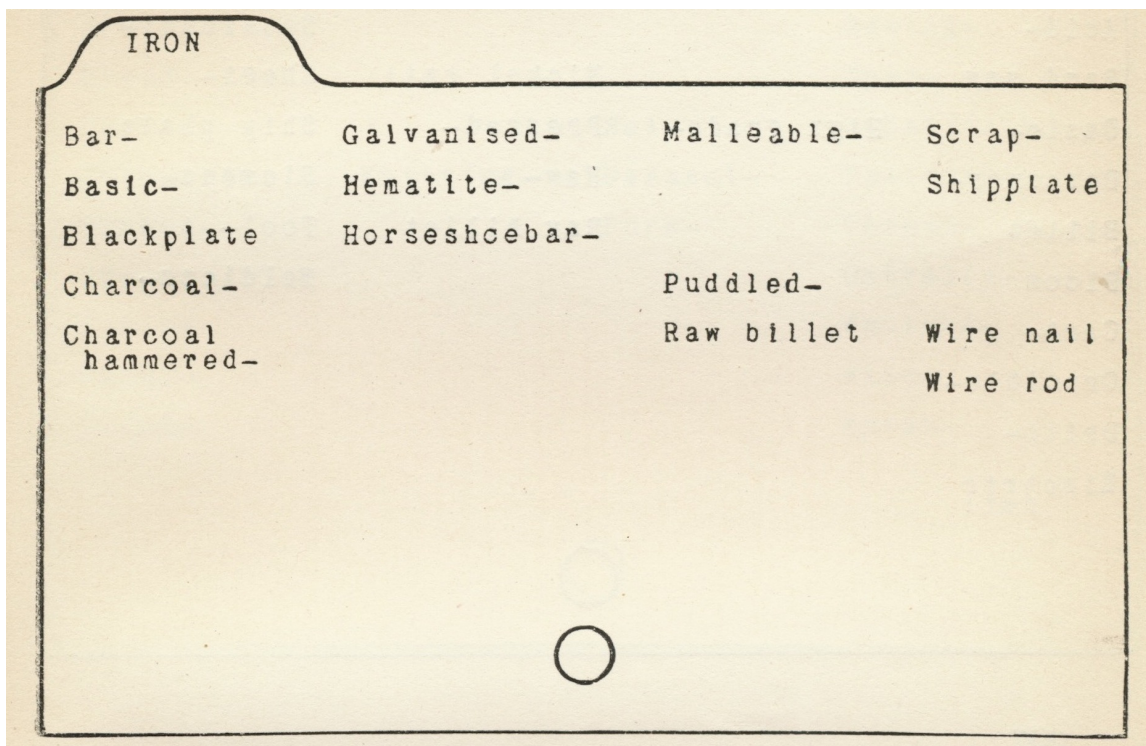


Figure 37a: Guide card for the term for country IRON (Source: Kaiser 1911, § 534).

IRON⁵¹⁵), by the manufacturing processes in which it was to be used (e.g., BASIC IRON),⁵¹⁶ by its properties (e.g., MALLEABLE IRON),⁵¹⁷ by the shape it took (e.g., BAR IRON),⁵¹⁸ and by

⁵¹³ “Charcoal iron” was iron that had been smelted with wood charcoal as fuel: because charcoal was free from sulphur, it was considered an optimal fuel for iron smelting and charcoal iron was deemed to be a superior grade of iron (A Foreman Pattern-Maker 1892, 66).

⁵¹⁴ “Galvanised iron” was “[i]ron, which after having undergone preliminary cleansing, has been dipped in a bath of molten zinc” (A Foreman Pattern-Maker 1892, 157).

⁵¹⁵ Puddling was the process—or rather, family of processes—by which cast-iron or pig-iron, a relatively impure form of iron, was converted to malleable iron (Greenwood 1907, 18) and “puddled iron” was the product of this process (Tiemann 1910, 253): it thus appears to have been a near synonym of “wrought iron” or “malleable iron” (See n. 517, below).

⁵¹⁶ Deriving its name from the fact that it was used to make steel by the basic process, “basic iron” was defined as iron having a phosphorus content greater than 0.01 percent, silicon content less than 1 percent, and sulphur content less than 0.05 percent (Kebler & Hearne 1908, 1183; Sexton & Primrose 1912, 30; United States of America, Department of Commerce 1913, 84).

⁵¹⁷ “Malleable iron” was a synonym for “wrought iron”—i.e., cast iron that had undergone a decarbonization process—and was largely free of such impurities as carbon, silicon, phosphorus, and

the shape it took *and* the kind of material from which (or for which) it was made (e.g., HORSESHOE BAR IRON),⁵¹⁹ These terms, it should be noted, could contract further semantic relationships among themselves: at least two of them—namely, MALLEABLE IRON and BAR IRON—were considered by some authorities to be synonyms (Greenwood 1907, 172), while CHARCOAL HAMMERED IRON designated a variety of CHARCOAL IRON and HORSESHOE BAR IRON referred to a kind of BAR IRON. Alongside these names for different kinds of iron, all of which stand in a hierarchical relationship to IRON, are found terms designating various iron products such as RAW BILLET,⁵²⁰ BLACK PLATE,⁵²¹ SHIP PLATE,⁵²² WIRE NAIL, and WIRE ROD. Viewed from a slightly different perspective, these latter terms represent the different forms that pieces of iron can take. In present-day KO theory, they would be understood to stand in an associative relationship to IRON, interpretable either as one between a given material and the objects manufactured from it or as one between a (notional) whole (*in casu*, the iron *qua* mass substance) and its parts (*in casu*, discrete portions of iron, taking the form of billets, plates, nails, and rods) (Aitchison, Gilchrist, & Bawden 2000, 58 & 66, (k); ANSI-NISO 2005, 49 & 55, Example 128).⁵²³ It is doubtful whether Kaiser would have construed the relationship in quite the same light. The fact that he characterized his version of an associative relationship as one in which one concrete was applied to another suggests that the present case would not have fit within its ambit: after

other elements (A Foreman Pattern-Maker 1892, 219, s.v. “Malleable Iron” & 416, s.v. “Wrought Iron”; Bolland 1894, 249–250, s.v. “Malleable Iron”; Thurston 1909, 155).

⁵¹⁸ “Bar iron” was “wrought iron rolled into long bars” (Hawkins 1908, 31, s.v. “Bar Iron”; cf. Thurston 1909, 193).

⁵¹⁹ One may note that the term “horseshoe iron” could be defined in two different, though not mutually exclusive, ways. According to a British textbook on the metallurgy of iron and steel, “horseshoe iron is a specially soft quality of iron made ... for the use of country smiths, who require iron of a very uniform and easily-worked quality” (Sexton & Primrose 1912, 181); Contemporary American authorities, however, defined it as a superior grade of iron “made of old horseshoes, worked into slabs or balls and rolled and rerolled”, typically into bars (Thurston 1909, 174; Tiemann 1910, 253; cf. The Bar and Horseshoe Iron Industry 1895). It is not certain which definition was intended in the case of our guide, though the association with bar iron might perhaps tip the scales towards the second definition.

⁵²⁰ A raw billet was “a short bar of iron or steel, with a square section” (Whitney & Smith 1911, Vol. 1, 595, 6, s.v. “billet²”) made of “raw”, or unrefined, iron (Horner 1892, 279).

⁵²¹ “Black plate” was the term of art for “a sheet-iron plate before it is tinned” to make tin-plate; see Hunter et al. 1901, Vol. 6, 510, s.v. “black-plate”.

⁵²² “Ship plate” designated “an inferior quality of wrought-iron plate”, so called because it was typically used in ship-building (Whitney & Smith 1911, Vol. 7, 4537, “ship-plate” s.v. “plate”).

⁵²³ In the latter, “partitive” interpretation, raw billets, black plates, ship plates, wire nails, and wire rods would be “portions” of iron *qua* “mass” or “material”. For an elementary discussion of the “portion-mass” relationship, see Winston, Chaffin, & Hermann 1987, 423–425, § 2.3.

all, a raw billet or piece of black plate was not merely applied to iron, it *was* iron in the form of a discrete kind of artifact. Furthermore, we have already seen that Kaiser considered the partitive relationships contracted by terms of countries to be a form of hierarchical relationship between collective and specific terms (See Section 2.2.4 of the current chapter): thus, one cannot discount the possibility that if he understood billets, plates, wires, and rods to form discrete portions, or parts, of iron *qua* material, he would most likely have deemed the relationship between the terms designating them and the term IRON to be a hierarchical one as well. However this may have been, there is a formal distinction between the terms denoting kinds of iron and those denoting kinds of iron objects: a noun or adjective followed by a hyphen signals the former kind of term, whereas terms without a hyphen indicate the latter. To be sure, this pattern is hardly an absolute one, for, in English, certain multiword terms of the form [NOUN/ADJECTIVE] + IRON can designate specific types of iron objects rather than kinds of iron: for instance, SMOOTHING IRON refers to an iron utensil used for smoothing clothes and other textiles (Whitney & Smith 1911, Vol. 9, 5721, s.v. “smoothing-iron”), while SOLDERING IRON denotes a metal tool “with which solder is melted and applied” (Whitney & Smith 1911, Vol. 9, 5753, s.v. “soldering-iron”). Nevertheless, metallurgical vocabulary tended to use phrases of this form *primarily* to designate different kinds of iron *qua* material and so the occurrence of a hyphen at the end of a term provided users with a visual hint that that the term in question was likely to be a term hierarchically subordinate to the term IRON in a generic or, perhaps better, quasi-generic relationship.

When considered in combination with one of its correlates, the guide card for IRON also illustrates how hierarchical cross-references among terms were realized across different guide cards in a card file. Figure 37b on the following page shows the guide for one of its subordinate terms—BAR IRON. This relatively specific term has only a few related terms, which, for the most part, follow the pattern of the terms on the card for IRON: they are divisible into terms designating kinds of bar iron (e.g., CHARCOAL HAMMERED BAR IRON, HORSESHOE BAR IRON⁵²⁴), which, again, are readily discernible by the visual pattern of noun or adjective followed by a hyphen, and those indicating different forms that discrete pieces of such iron can take (ROUND BAR, SHEET BAR). However, the list also includes the term IRON, which obviously represents the genus of which BAR IRON designates a species.

⁵²⁴ It may be noted that HORSESHOE BAR IRON appears as a subordinate term on the guide cards for its proximate superordinate BAR IRON *and* for the superordinate of the latter, IRON: here, again, the example infringes upon Kaiser’s tenet that a specific term should appear as a related term on the guide card of its most proximate superordinate(s) (See p. 630, n. 511, above).

Here, then, we have an example of an upward hierarchical cross-reference from a relatively specific to a relatively collective term—namely, from BAR IRON to IRON—that is the reciprocal correlate of the downward cross-reference from IRON to BAR IRON on the guide card for IRON. Needless to say, the same kind of cross-reference would have been found on the first guides of all the related terms that had been enumerated on the IRON guide.

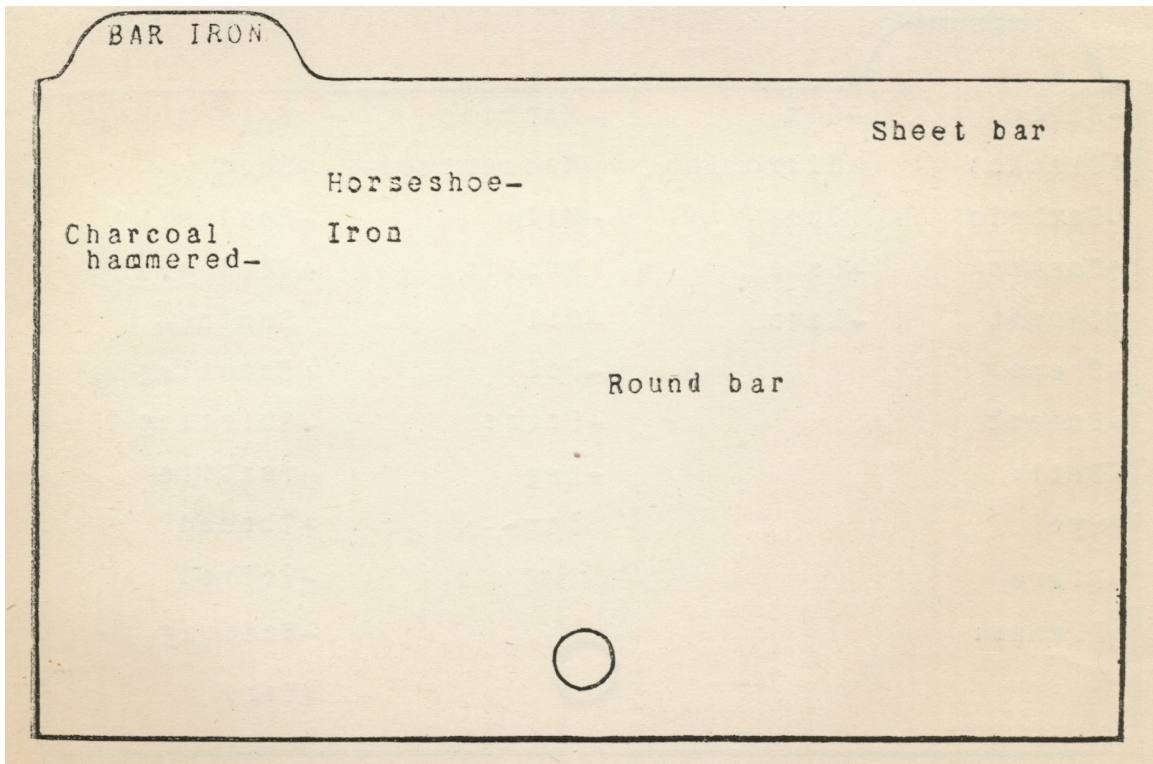


Figure 37b: Guide card for the term for country BAR IRON (Source: Kaiser 1911, § 535).

The preceding three examples have been of guides for first terms consisting of a single noun (i.e., HARDWARE, IRON) or a short noun phrase (BAR IRON) that did not require any subdivisions by a second guide. By contrast, the guide card reproduced in Figure 38 is an illustration of a first guide for a series of multiword terms of which only the first word—the adjective ARTIFICIAL—is inscribed upon its tab. Even a moment's glance at the list of related terms upon the body of the card reveals a striking visual pattern: save for one, all of them consist of a hyphen followed by a noun. The sole term occurring without a hyphen is IMITATION, manifestly a synonym, or perhaps better, a near-synonym, for ARTIFICIAL when used as a noun modifier in such locutions as "imitation leather", "imitation silk", or "imitation diamond". On the other hand, the terms consisting of a noun prefixed by a

hyphen designate various kinds of things of which there can be artificial versions. On a theoretical level, they name divisions of the class of artificial things that the adjective ARTIFICIAL signifies and so stand in a hierarchical relationship to it as subordinate specific terms to a superordinate collective one (See Section 5.1 of the current chapter, esp. pp. 570-

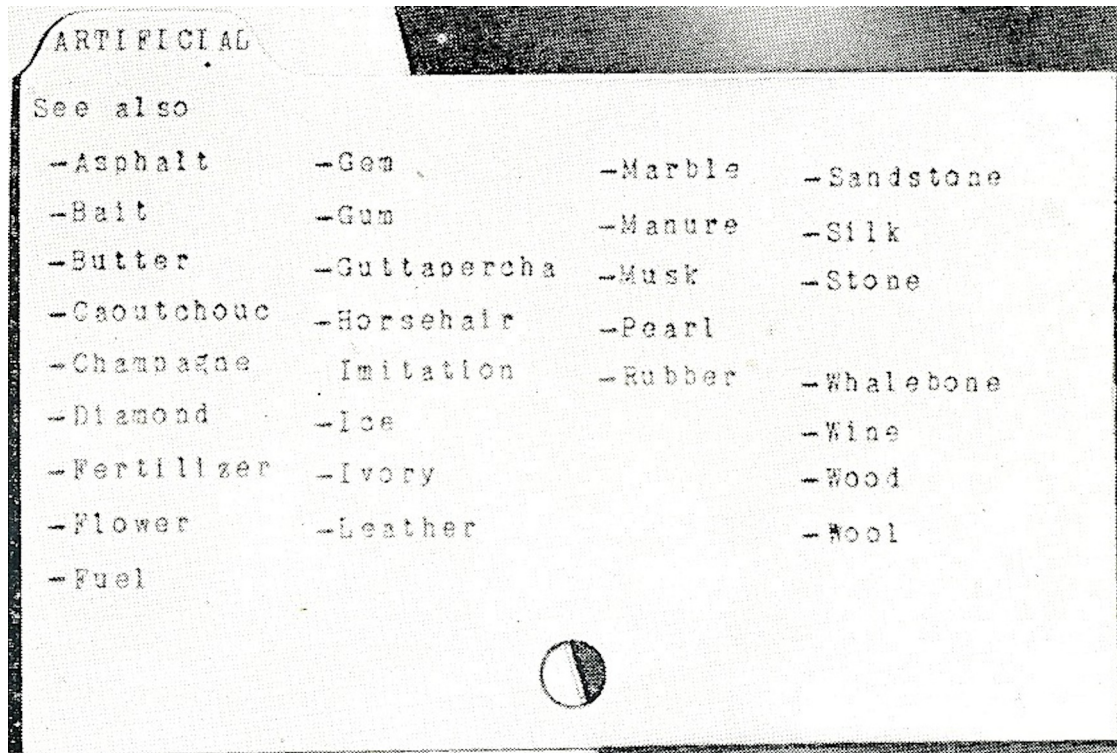


Figure 38: Guide card for the term of concrete ARTIFICIAL (Source: Kaiser 1908, § 117).

571, above). Within the framework of the card index, each of them represents a subdivision of the subset of cards bearing statements of which the first word of the first, or filing, term is ARTIFICIAL. This means that, in the index in which our guide was originally situated, each of the terms following a hyphen on the card, from ASPHALT to WOOL, would have been inscribed upon the tab of a second guide card, which would then have been inserted at the appropriate, alphabetically determined place after the guide for ARTIFICIAL (See Section 5.2.1 of the present chapter). The first guide depicted here thus had to be combined with the second guides that subdivided it to express a full first term: for instance, it and the second guide for ASPHALT stood for the term ARTIFICIAL ASPHALT; it and the second guide for BAIT signified ARTIFICIAL BAIT; and so on. Because the body of the guide for ARTIFICIAL was used primarily to list the subdivisions of that term, an indexer would have to use the body of the second guide if he wanted to make any cross-references between one of the

subdivisions and a first term other than the one that it subdivided. Suppose, for example, that one wanted to indicate a relationship between ARTIFICIAL SILK and SILK. As we have already noted, in such a case, the second guide representing SILK as a subdivision of ARTIFICIAL would list SILK as one of its related terms, while the first guide bearing the term SILK would contain a cross-reference to the term ARTIFICIAL-, as can be seen at the top of the left-hand-most column for the card pictured in Figure 39. The full network of these cross-references is depicted in diagrammatic form in Figure 40: there we see the references from ARTIFICIAL on the first guide to SILK on its second guide, from SILK on the second guide associated with ARTIFICIAL to SILK on the first guide, and from SILK on the first guide to ARTIFICIAL.

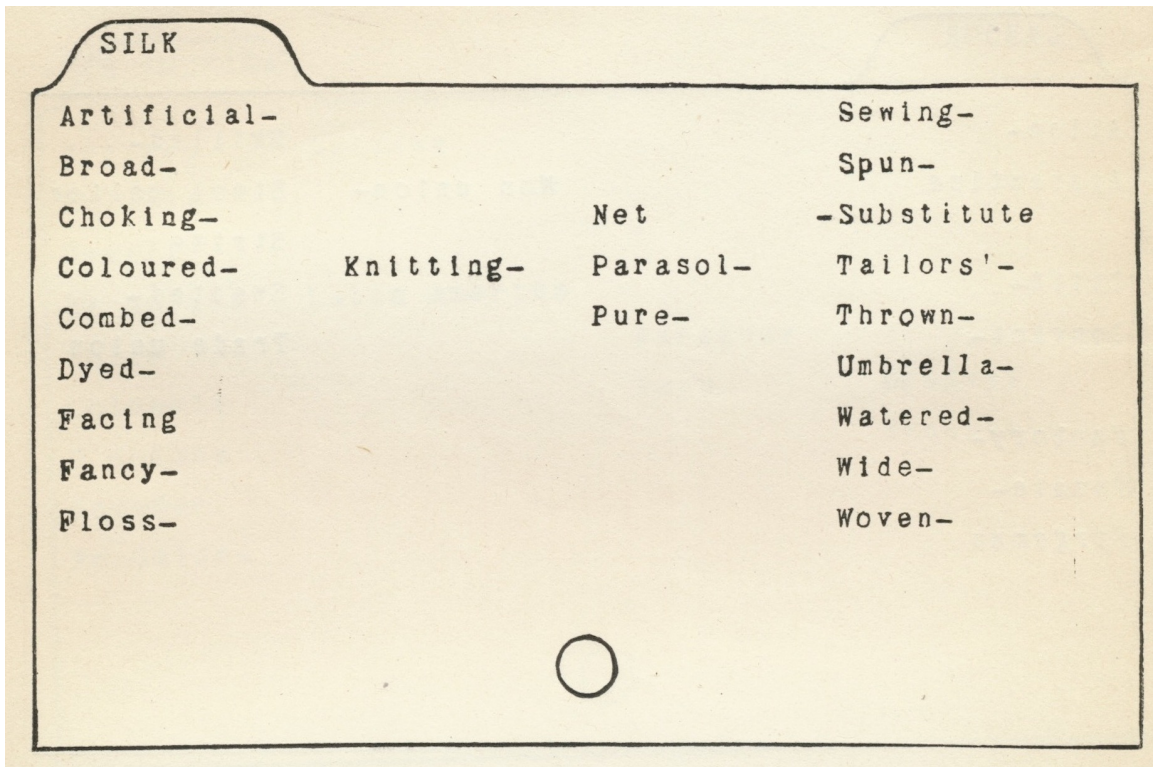


Figure 39: Guide card for the term of concrete SILK (Source: Kaiser 1911, § 538).

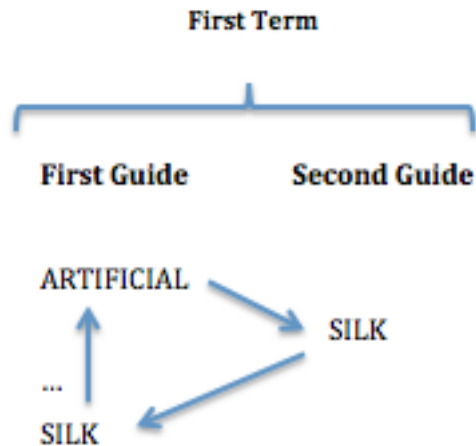


Figure 40: The structure of cross-references between ARTIFICIAL SILK and SILK (Based on: Kaiser 1911, § 426).

This manner of formulating cross-references involved two different relationships. One was that between the class of artificial things designated by the term ARTIFICIAL and the specific kinds of artificial things denoted by terms such as ARTIFICIAL SILK: this was, in effect, a hierarchical generic relationship, for artificial silk was a kind of artificial thing. The other was the relationship between the classes of things designated by first terms other than ARTIFICIAL, such as SILK, and the specific kinds of artificial things named by terms like ARTIFICIAL SILK. The nature of this relationship is less easy to characterize than the preceding one. Artificial silk was not silk in the strict sense of the term, for the latter was defined as threads, or fibers, generated by caterpillars of the silk moth or silkworms (e.g., Pitman’s Commercial Readers [ca. 1907], 187–189; Silk 1913, 217), whereas the former was a cellulose fiber derived from other substances, such as cotton waste or wood pulp, through various chemical-based industrial processes (Artificial Silk, 1907; Harmuth 1915, 10, s.v. “Artificial Silk”; Silk 1913, 219). Nevertheless, as its name implies, artificial silk was intended to imitate natural silk, and the fabrics manufactured from it bore a close resemblance to those woven from the latter. It is unsurprising, then, that, although some manufacturers insisted on maintaining a strict distinction between artificial silk products and those made from “genuine” or “real” silk (e.g., Brainerd & Armstrong Co. 1909), others were willing to count artificial silk as “[a] kind of silk” or at least a substance closely akin to it (e.g., Bible & Bible 1896, 31, s.v. “Artificial Silk”): indeed, in the early years of the 20th century, a number of countries, including Germany, Austria-Hungary, France, Switzerland, Bulgaria, Roumania, Mexico, and Japan classed it among silk goods in their customs

classifications (Great Britain, Board of Trade 1905b, 24–28, 104, 128, 134–138, 142). The nature of the relationship between the terms ARTIFICIAL SILK and SILK obviously depended upon which of these competing interpretations an indexer adopted. If one viewed artificial silk as a kind of silk (at least in the commercial sense), then the relationship was a hierarchical generic one between a collective, or superordinate, term (i.e., SILK) and a specific, or subordinate, one (i.e., ARTIFICIAL SILK). If, on the other hand, one viewed artificial silk as a substance fundamentally distinct from naturally generated silk, then the relationship became, in effect, what modern theorists of KO would consider to be an associative relationship between a natural product and a synthetic substitute for it.⁵²⁵ Although Kaiser (1911, §§ 417, 424) did not explicitly discuss his understanding of the relationship of the two terms, it is notable that, in the analogous case of the dyestuff indigo, he subsumed the terms NATURAL INDIGO and ARTIFICIAL INDIGO under the head of INDIGO, apparently taking the former terms as subordinate to the latter: this suggests that

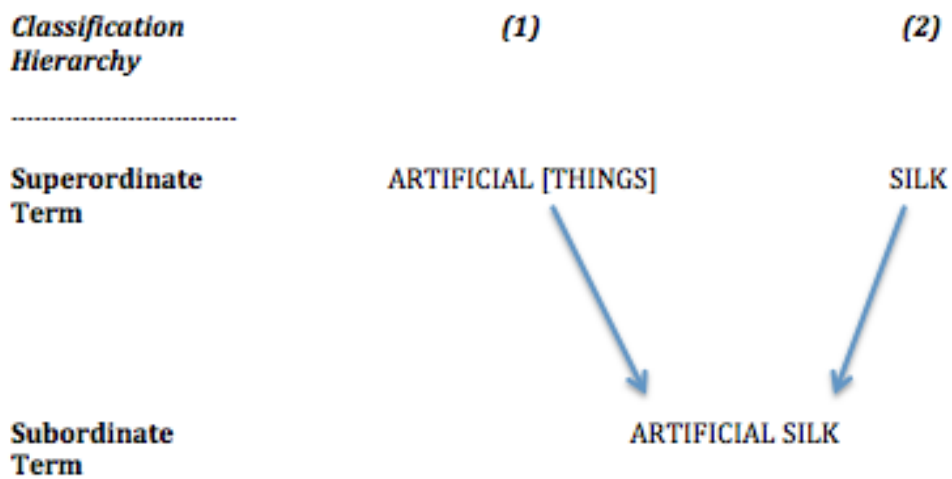


Figure 41: Two orthogonal generic hierarchical relationships involving the term of concrete ARTIFICIAL SILK

⁵²⁵ Such, at any rate, was the interpretation of the editors of a *Thesaurus of Textile Terms* prepared at the Massachusetts Institute of Technology in the late 1960s, who assigned ARTIFICIAL SILK—which they characterized as an archaic term—the role of a related term (RT) to SILK; see Backer & Valko 1969, 12, s.v. “ARTIFICIAL SILK (ARCHAIC)”, & 199, s.v. “SILK”.

he most likely considered ARTIFICIAL SILK to stand in a hierarchical relationship to SILK.⁵²⁶ If this interpretation is correct, then the term ARTIFICIAL SILK was a subordinate term in a generic, or at least quasi-generic, relationship to two orthogonally superordinate terms ARTIFICIAL (things) and SILK alike: that is to say, it participated in a kind of poly-hierarchical relationship, as depicted in Figure 41 below, of which we shall presently see further, less equivocal examples.

Interestingly, the expression of the relationship between ARTIFICIAL (things) and ARTIFICIAL SILK as a cross-reference was due, in large measure, to physical constraints imposed by the size of the tabs of the fifth-cut guide cards that Kaiser took as the standard kind of guide to be used in an index (See Section 5.2.1 of this chapter, esp. p. 589 with n. 492, above). In the case of multiword terms such as ARTIFICIAL SILK, it was necessary to divide the term into two components—namely, ARTIFICIAL and SILK—because, barring the use of abbreviations, both words, typewritten in all capital letters on a single line would not fit upon the inch-long tab of a first guide: indeed, this space just sufficed to accommodate a long adjective such as ARTIFICIAL (cf. Figure 38 at p. 635, above). It was the distribution of the words of the term across two cards that led to the explicit formulation of a class of artificial things signified by the first guide bearing the adjective ARTIFICIAL. This first guide could then be subdivided by second guides that specified the kinds of artificial things about which information was to be found in the index: cross-references were made between the first guide ARTIFICIAL and its second guides in order to give a compendious overview of the subdivisions of the class of artificial things signified by the first guide (cf. Kaiser 1911, § 427).

There was, however, another way of correlating multiword terms with guide cards in a card index. Kaiser (1911, § 410) allowed for the construction of indexes—in particular, technical indexes supporting “technical or very specialized work” (§ 429) and so featuring heavy use of long multiword terms of concretes—in which the first and second guides of a five-position guide system were to be replaced by a single third-cut guide (See p. 589, n. 493, above). In indexes of this sort, terms such as ARTIFICIAL SILK could be readily

⁵²⁶ It is perhaps no accident that Kaiser (1911, §§ 200–202) appears to have had some familiarity with the tariff schedules of a number of different nations, including ones, such as Germany and Austria-Hungary, in which artificial silk was classified as a kind of silk good: such classifications may well have helped to shape his views on the matter. Moreover, taking ARTIFICIAL SILK as a subordinate term for SILK would have been congruent with Kaiser’s tendency to treat terms primarily as verbal, rather than conceptual, units (cf. Section 2.2.3 of the current chapter), much as did those the contemporary lexicographers who entered the term “artificial silk” under the lemma “silk” (e.g., Smith 1910, 1219, I.a s.v. “silk”),

typewritten upon the three-inch-long tab of a single guide card. Needless to say, this change in the dimensions of the physical medium upon which multiword terms for concretes were inscribed had a profound effect upon the cross-reference structure of such terms. First, and most important, by obviating any need for guide cards bearing only the adjectival elements of first terms, such as, for example, ARTIFICIAL, it eliminated the *explicit* expression of the general classes that these guide cards represented. Instead of a single first guide for ARTIFICIAL signifying the notion of artificial things in general followed by second guides for terms referring to the specific kinds of things of which there were artificial varieties, as depicted in the left-hand column of Figure 42, there were only guides for the full terms of which ARTIFICIAL was the first element, as the right-hand column of the figure shows. This meant that, at least as represented on the guide cards, the notion conveyed by the adjective ARTIFICIAL became, so to speak, fused with the specific kinds of artificial things denoted by

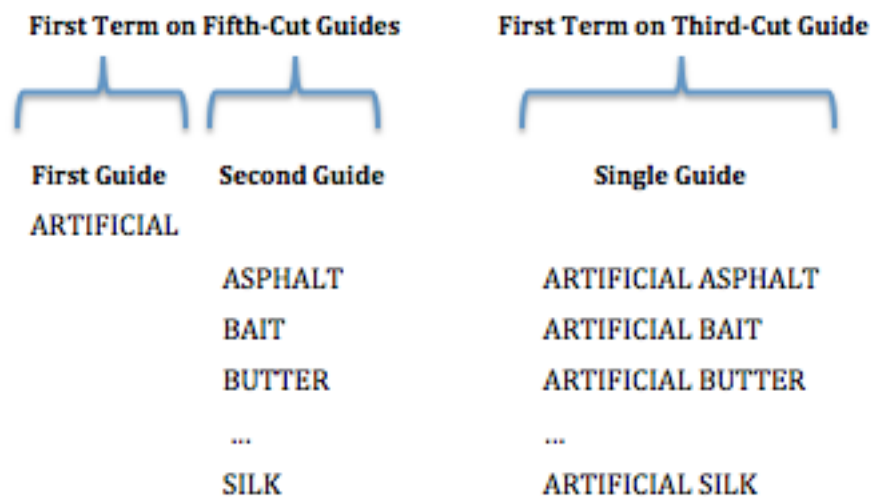


Figure 42: Two forms of entering multiword terms upon guide cards, after Kaiser 1911, §§ 410 & 429.

the nouns modified by the adjective, there no longer being any guide card standing for artificial things in general. An obvious consequence of this was that there no longer was any need to make cross-references between the element ARTIFICIAL and the various terms with which it combined to form full first terms: instead, all the related terms that would have normally been listed on a second fifth-cut guide found their place on the single third-cut guide (cf. Kaiser 1911, § 429). Thus, the cross-reference structure was simplified from the three-way one illustrated in Figure 40 to the bidirectional one between ARTIFICIAL SILK and SILK depicted in Figure 43. Here we have a vivid example of how the physical configu-

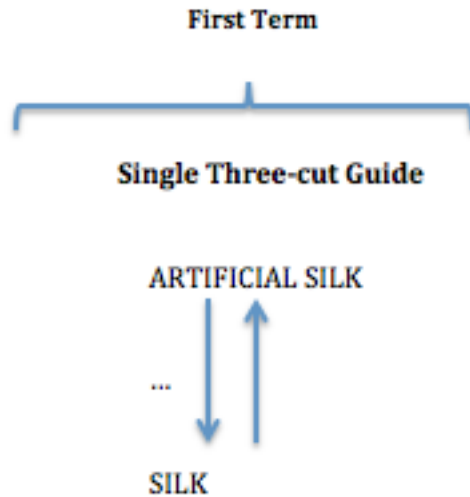


Figure 43: The structure of cross-references between ARTIFICIAL SILK and SILK in a specialized index (Based on: Kaiser 1911, § 426).

rations of guide cards could affect the particular cross-reference structure of a card file.

Having digressed to note the effects that the use of different types of guide cards could have upon the making of cross-references, let us return to the standard system of five-position guides. As the previous examples demonstrate, the first guides of longer multiword terms of the form [[ADJECTIVE] + [NOUN]] tended to differ quite markedly in their lists of related terms from the first guides for single-word (or short two-word) terms. Whereas the latter (e.g., HARDWARE, IRON) represented complete first terms and so gave cross-references to other first terms in the index files, the former represented only the initial word(s) of first terms (e.g., ARTIFICIAL) and so tended to focus on references to the nouns that completed the first terms in question and that were entered on associated second guides. Matters became more involved with multiword terms of the form [[NOUN₁] + [NOUN₂]]—such as, say, SILK SHIRT—in which [NOUN₁] (*in casu*, SILK) served as a modifier of [NOUN₂] (*in casu*, SHIRT). In such cases, the initial noun could be treated both as if it were a complete single-word term occurring on the first guide (i.e., SILK *simpliciter*) and as the first element in a multiword term distributed between a first and a second guide (i.e., SILK + [NOUN₂]); thus, the list of related terms on the first guide could include both references to other first terms and references to terms inscribed on the tabs of the second guides that were its subdivisions. Our final example, reproduced in Figure 44 on the next page, represents a particularly interesting and complex instance of a first guide for a term that performed such double duty: COTTON.

Before we consider the cross-references on the guide, a brief comment regarding semantics is in order. Although its general signification as the name of a well-known staple agricultural product is clear, COTTON can take on different nuances of meaning in different contexts. In its strictest sense, the term designates “the white fibrous substance, soft and downy like wool, which clothes the seeds of the cotton-plant (*Gossypium*)” (Murray et al., 1888–1928, Vol. 2/2, 1043, I.1 s.v. “Cotton”; cf. Downey 1914, 105; Harmuth 1915, 45, 1 s.v. “Cotton”; Whitney & Smith 1911, Vol. 2, 1294, 1 s.v. “cotton¹”). Once this fibrous substance has been extracted from the boll, or seed-pod, in which it grows and separated from the seeds that it covers, it has a wide range of commercial uses: let us call it cotton *qua* fibrous substance. COTTON can also refer to the plant from which cotton *qua* fibrous substance is derived, other parts of which have commercial uses as well (Murray et al., 1888–1928, Vol. 2/2, 1043, I.2 s.v. “Cotton”; Whitney & Smith 1911, Vol. 2, 1295, 5 s.v. “cotton¹”), and so we can also speak of cotton *qua* plant. Furthermore, historically, the prin-

COTTON			
-Bale	-Gin	-Machine	Sateen
+Blanket	Ginroller	Mercerized-	-Seed
-Cambric	Gun-	-Mill	-Seed oil
+Canvas	+Lace	Muslin	-Seed meal
+Carpet	-Lawn	-Oil	Sewing-
-Crepe		-Pod	+Sheeting
-Damask		-Press	+Shirting
-Drill		-Rag	Textile
+Dye		Raw-	+Thread
-Fibre			-Velvet
+Flanne			-Wadding
			+Yarn

Figure 44: Guide card for the term of concrete COTTON (Source: Kaiser 1911, § 537).

incipal commercial use of cotton *qua* fibrous substance has been as a material for the manufacture of textiles and clothing: thus, COTTON also can denote thread spun from

cotton or cloth made therefrom (Murray et al., 1888–1928, Vol. 2/2, 1043, 3–4, s. v. “Cotton”; Whitney & Smith 1911, Vol. 2, 1294–1295, 2–3 s.v. “cotton¹”): we shall term this cotton *qua* fabric.

A perusal of the list of related terms on our guide card—the majority of which are multiword terms in which COTTON features as an element—shows that all three meanings come into play. As one might expect, a number of the terms pertain, in one way or another, to cotton *qua* fibrous substance: for example, RAW COTTON refers to cotton fiber that has been mechanically separated from cotton seeds but otherwise unprocessed (Harmuth 1915, 130, 1 s.v. “Raw”); COTTON GIN designates the machine used to separate cotton fiber from cotton seeds (Dooley 1914, 114–116; Whitney & Smith 1911, Vol. 2, 1295, s.v. “cotton-gin”); COTTON BALE signifies “[a] large bundle or package” of raw cotton “prepared for transportation, either in a cloth cover, corded or banded, or without cover, but compressed and secured by transverse bands, wires, or withes and longitudinal slats” (Whitney 1906, Vol.1, 428, 1 s.v. “bale³”; cf. Dooley 1914, 117); COTTON WADDING denotes a thin band of beaten and carded cotton fiber sized with a gelatinous covering for use as padding or filler in certain kinds of textiles, such as quilts (Cole 1892, 369, s.v. “Wadding”; Murray et al., 1888–1928, Vol. 10/2, Section “W”, 3, 3 s.v. “Wadding”); and GUN COTTON refers to cotton fibers steeped in nitric and sulphuric acids to form a powerful explosive (Murray et al., 1888–1928, Vol. 4/2, 511, s.v. “Gun-cotton”). A few terms have to do with cotton *qua* plant rather than fibrous substance: such is the case with COTTON POD and COTTON SEED, both of which designate parts of the cotton plant, while COTTON SEED OIL, its synonym COTTON OIL, and COTTON SEED MEAL represent commercial products obtained from cotton seeds. Others, such as TEXTILE; MUSLIN, which designates “a light, commonly plain-woven cotton cloth” (Baker 1908, 167, s.v. “Muslin”; cf. Dooley 1914, 186; Harmuth 1915, 109, s.v. “Muslin”); and SATEEN, the name for a kind of “fine-thread, coarse twilled cotton cloth, of soft texture and glossy finish” (Baker 1908, 213, s.v. “Sateen”; cf. Dooley 1914, 190; Harmuth 1915, 137, s.v. “Sateen”), obviously have to do with cotton *qua* fabric. Many other terms refer to kinds of fabric (i.e., COTTON CAMBRIC, COTTON CANVAS, COTTON CREPE, COTTON DAMASK, COTTON DRILL, COTTON FLANNEL, COTTON LACE, COTTON LAWN, and COTTON VELVET), spun materials for the production of fabric (i.e., COTTON THREAD; SEWING COTTON; and COTTON YARN), fabrics destined for the production of certain kinds

of finished products (i.e., COTTON SHEETINGS, COTTON SHIRTINGS),⁵²⁷ and finished products (i.e., COTTON BLANKET, COTTON CARPET, and COTTON RAG). These occupy a middle ground between the notion of cotton *qua* fibrous substance and that of cotton *qua* fabric. On one hand, almost all of them consist of noun phrases of the form [COTTON + [KIND OF FABRIC (PRODUCT)]] in which the first element COTTON, acting as a modifier of the following noun, evidently signifies the material from which the fabric is made—that is to say, cotton *qua* fibrous substance. On the other, the noun phrases taken as a whole—e.g., COTTON CAMBRIC or COTTON FLANNEL—refer to kinds of fabric in a manner directly analogous to that of such terms as MUSLIN and SATEEN and, in this sense at least, they clearly place cotton *qua* fibrous substance firmly within the ambit of cotton *qua* fabric product.⁵²⁸ In much the same way, the term COTTON FIBRE combines elements of the meanings of cotton *qua* fibrous substance and cotton *qua* plant: the fact that COTTON qualifies FIBRE in the phrase COTTON FIBRE is an indication that it designates the plant from which the fiber has been extracted and yet the term as a whole clearly has to do with cotton *qua* fibrous substance. It is evident, then, that COTTON, as reflected by the various terms that have been brought into relation to it on the card, is polysemous, gliding easily among the closely linked senses of cotton as a fibrous substance, cotton as the plant from which the substance is derived, and cotton as a textile product made from the substance. The fact that Kaiser allowed for all of these nuances of the word may serve as a reminder that, for him, the term *qua* verbal unit was the elementary building block of SI (See Section 2.2.3 of the current chapter) and that he expected terms to manifest a certain degree of

⁵²⁷ A sheeting was a “stout ... cloth made wide for bed sheets” (Whitney 1906, Vol. 7, 5563, 2 s.v. “sheeting”), while a shirting was “[a]ny fabric designed for making shirts” (Cole 1892, 315, s.v. “Shirting”; Whitney 1906, Vol. 7, 5579, 1 s.v. “shirting”).

⁵²⁸ Many of these terms contain COTTON as a modifier because the noun that it qualifies either denotes a make of fabric that could be woven from different kinds of material or because the noun refers to a kind of fabric originally associated with a material other than cotton. An example of the first situation is the term CAMBRIC in COTTON CAMBRIC, which denotes “a light, plain woven, sized and well glazed fabric of inferior grade” made from either cotton or linen yarn (Harmuth 1915, 31). An example of the second case is FLANNEL in COTTON FLANNEL, which originally denoted “a warm loosely woven woolen stuff used especially for undergarments, bed-covering, etc., but also to some extent for outer garments, in styles adapted for that purpose” (Whitney 1906, Vol. 3, 2253, 1.1 s.v. “flannel”): in this latter case, COTTON FLANNEL—also known in Kaiser’s time as “Canton flannel” after the Chinese port whence it was originally imported—referred to “a strong cotton cloth with a long soft nap” that resembled true woolen flannel in its form (Whitney 1906, 3, 2253, “Canton flannel” s.v. “flannel”; cf. Cole 1892, 55, s.v. “Canton Flannel” & 98, s.v. “Cotton Flannel”). In both kinds of cases, the modifier COTTON was necessary to specify the kind of material from which the fabric was made. By contrast, MUSLIN and SATEEN were, by definition, only made of cotton and so did not require the modifier COTTON to indicate from what kind of material they were woven.

semantic indefiniteness, even if their core meaning was reasonably clear (See Section 2.2.1 of the present chapter, esp. p. 330, above).

Having roughly staked out the basic contours of the meaning(s) that COTTON took on in connection to its related terms, we are now in a position to consider the cross-references reproduced in Figure 44. From a formal point of view, the terms enumerated on the body of the card can be divided into three visually distinct groups: one-word terms; terms in which a noun or adjective is followed by a hyphen indicating the structure [[ADJECTIVE/NOUN] + COTTON]; and terms in which a hyphen or a small cross precedes a noun or noun phrase, signaling the form [COTTON + [NOUN (PHRASE)]]. The one-word terms are very few, numbering only four in all: TEXTILE, MUSLIN, SATEEN, and GINROLLER. The nature of the relationships between the first three of these and COTTON can be interpreted in two ways, depending on the meaning that one assigns to the latter term. If COTTON is taken to mean cotton *qua* fabric, then the relationships are straightforwardly hierarchical ones between collective and specific terms: since cotton cloth is a kind of textile, TEXTILE can be viewed as superordinate to COTTON and, inasmuch as MUSLIN and SATEEN are kinds of cotton cloth, they can be taken to be subordinate to it. If, however, COTTON is interpreted primarily in the sense of cotton *qua* fibrous substance, then the relationships could be understood as associative ones between a raw material and products manufactured from it (Aitchison, Gilchrist, & Bawden 2000, 66, (k); ANSI-NISO 2005, 55, Example 128): after all, cotton is a material from which many, though by no means all, textiles are made and it is the constituent material of muslin and sateen. Of these two interpretative possibilities, the former seems to accord better with Kaiser's (1911, §§ 417, 424) general inclination to emphasize hierarchical relationships between collective and specific terms, though the latter cannot be discounted. The case of GINROLLER is much more clear-cut. This term denotes "one of the rollers between which cotton is drawn when it is ginned [sci., processed in a gin roller to remove seeds—TMD]" (Smith 1910, 525, s.v. "gin-roller"): it thus stands in an associative relationship to COTTON in its sense of cotton *qua* fibrous substance.

Also restricted in number are those multiword terms taking the grammatical form [[ADJECTIVE/NOUN] + COTTON], of which there are likewise four: RAW COTTON, MERCERIZED COTTON, GUN COTTON, and SEWING COTTON. The first three terms refer to different kinds of cotton *qua* fibrous substance differentiated by the kind of processing it has undergone. As we have already seen, RAW COTTON designates cotton fiber that has been separated, by means of a cotton gin, from the seeds with which it was connected in the

seed pod of the cotton plant but is otherwise unprocessed, while GUN COTTON denotes cotton fiber treated with nitrates and sulphur for use as an explosive: MERCERIZED COTTON, on the other hand, refers to cotton fiber or fabric “made lustrous by treating it with caustic soda at normal temperature and under tension to prevent shrinking” (Harmuth 1915, 104, s.v. “Mercerized Cotton”; cf. Baker 1908, 158–159, s.v. “Mercerized” & “Mercerization”; Dooley 1914, 150–151). All three of these terms, then, stand in a loosely quasi-generic relationship as specific kinds of COTTON. The fourth term, SEWING COTTON, bears quite a different relation to COTTON. Signifying a “hard spun cotton thread” (Harmuth 1915, 141), it serves as a synonym, or near synonym, for COTTON THREAD (Murray et al. 1888–1928, Vol. 2/2, 1043, I.3 s.v. “Cotton”; Whitney & Smith 1911, Vol. 8, 5534, s.v. “sewing-cotton”): that is to say, it refers to cotton fiber formed into a particular shape—namely, that of a lengthy, twisted filament (Dooley 1914, 138; Whitney & Smith 1911, Vol. 9, 6305–6306, 1 s.v. “thread”)—that renders it suitable for weaving into cloth or fabric. In this respect, the relationship of SEWING COTTON to COTTON appears to be one of a term for a kind of object to a term naming the material from which that object is made. Such a relationship is analogous to those between IRON and WIRE NAIL or BAR IRON and SHEET BAR considered earlier and so can be viewed as a relationship between a kind of stuff—*in casu*, COTTON *qua* fibrous substance—and a kind of product formed therefrom—*in casu*, SEWING COTTON *qua* cotton thread (Winston, Chaffin, & Herrmann 1987, 425, § 2.4): that is to say, it is best understood as a partitive relationship in which the component substance forms part of the object. We have already noted that, in modern KO theory, such a relationship is treated as an associative relationship. Whether Kaiser viewed it in this way or, conversely, preferred to see the relationship as a hierarchical one between a collective term denoting a kind of substance viewed as a mass substance (i.e., COTTON) and a specific term for a kind of discrete object made from this kind of substance (i.e., SEWING COTTON) is uncertain, although the latter interpretation fits better with the general tenor of his thought.

The terms considered thus far, whether single-word or multiword, served in their original context as cross-references from COTTON to other first terms recorded on first guides. In this they differ fundamentally from the last and by far most numerous class of related terms on the guide card. These are multiword terms which, as their grammatical form—[COTTON + [NOUN (PHRASE)]]—indicates, directed the user of the index to subdivisions of the term COTTON—that is to say, to the terms recorded on the second guides

following the first guide for that term. Although formally similar to one another, these “subdivisional” related terms, taken in the aggregate, reflect a wide range of relationships with the term COTTON. The differences in relationship depend, in large measure, upon the kinds of object to which the nouns or noun phrases modified by COTTON refer. As we noted earlier, a number of the terms in question are names of fabrics, spun materials for the production of fabrics, or finished fabric products made of cotton: let us take, as representative examples, COTTON FLANNEL, COTTON YARN, and COTTON BLANKET, respectively. The interpretation of the relationships that these terms have to COTTON is contingent, to a large degree upon whether one understands the latter term primarily to mean cotton *qua* fibrous substance or cotton *qua* fabric. If one understands COTTON to refer to cotton *qua* fibrous substance, then the relationship between COTTON and COTTON FLANNEL, COTTON YARN, and COTTON BLANKET is identical to that between COTTON and SEWING COTTON: that is to say, it is partitive, with COTTON representing the material substance from which the objects designated by COTTON YARN, COTTON FLANNEL, and COTTON BLANKET are made. If, on the other hand, one takes COTTON to designate cotton *qua* fabric—that is to say, spun material or cloth woven therefrom—the relationships become more differentiated: COTTON FLANNEL designates a specific kind of cotton cloth and so stands as a subordinate term to COTTON in a generic relationship, as does COTTON BLANKET, which represents a particular kind of cotton cloth product, while COTTON YARN names a kind of spun material from which certain kinds of cotton cloth are made and so takes on a partitive relationship with COTTON. Which of these interpretations corresponds to that of Kaiser is quite unclear, though the presence of TEXTILE among the related terms lends some support to the supposition that he may have had the latter in mind—if, indeed, he drew a sharp distinction between cotton *qua* fibrous substance and *qua* fabric.

One feature that unites COTTON FLANNEL, COTTON YARN, and COTTON BLANKET in Figure 44 is that the element COTTON is replaced by a small cross instead of the hyphen that generally serves as a substitute for the term on the tab of a guide if it also appears as a component of one of its related terms. The function of the cross is to create a double cross-reference. As we have already seen, a hyphen followed by a noun or noun phrase typically means that the related term in question is a subdivision of the term appearing on the tab of the first guide, a kind of reference that we have already discussed in conjunction with the card for ARTIFICIAL in Figure 38. The cross indicates that the user of the index should consult not only the second guide on which the word forming the second element of the

term as a whole (*in casu*, FLANNEL, YARN, or BLANKET) appears as a subdivision of the first term, but also the first guide on which it appears itself as a first term: for example, “if on the same guide [sci., the first guide for COTTON—TMD] we wish to indicate both *blanket* and *cotton blanket*, we may write *+blanket*, signifying that there is information both under *cotton blanket* and *blanket*” (Kaiser 1911, § 431 [emphasis his]).⁵²⁹ This creates the kind of cross-reference structure diagrammatically represented in Figure 45. Two features of this mode of cross-referencing should be noted. First, it involves multiple hierarchical structures converging upon a specific term. If one interprets COTTON in the sense of cotton *qua* fabric, then its subdivision COTTON BLANKET refers to a particular kind of cotton fabric product and so stands in a hierarchical generic relation to it as a subordinate term. At the same time,

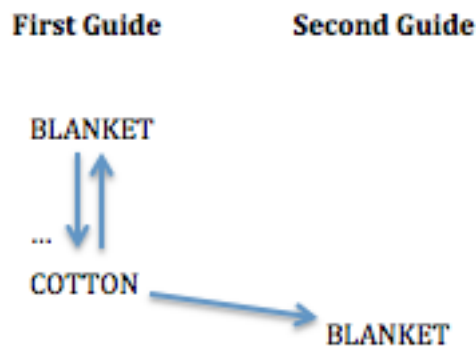


Figure 45: The structure of cross-references between COTTON BLANKET and BLANKET (Based on: Kaiser 1911, § 431).

COTTON BLANKET also stands in a hierarchical generic relation to BLANKET, for it designates a subclass of blankets defined by its constituent material. In short, the cross-reference

⁵²⁹ One may well wonder why it would be necessary to make a cross-reference from COTTON BLANKET to BLANKET in the first place if the proper index term for entering pieces of information about cotton blankets was COTTON BLANKET. The rationale for doing so was twofold. First, as already noted in Section 4.2 of the current chapter (esp. pp. 514–515, above), Kaiser (1911, § 328) allowed for the possibility that “[i]f numbers of concretes are given with the same country and process”, they could be “collected into a few class terms, which are then treated as concretes, the specific terms being transferred to the amplification” of the indexing unit: thus, information about a specific kind of concrete, such as cotton blankets, might come to be entered under index terms for more general concretes, such as blankets, so necessitating a cross-reference from the more specific term from concrete to the more general one if users of the index were to find all the information available in the index on the specific concrete. Second, Kaiser noted that, in the case of some terms of concretes, a guide card for a general term might include in its list of cross-references terms that were closely related to a given multiword specific term entered as a subdivision of a different term but not entered on the first guide of the latter: a cross-reference from the more specific term to the more general one would thus direct the users of the index to a wider set of cross-references that had the potential to lead them to other entries in the index that might prove useful to them (§ 436).

structure establishes a polyhierarchical set of relationships between COTTON BLANKET as a specific term and COTTON and BLANKET as its collective terms in a manner akin to the relationships obtaining between ARTIFICIAL SILK and the terms ARTIFICIAL [THINGS] and SILK represented in Figure 41 above. Second, the use of the small cross in front of terms like BLANKET concentrates cross-references that would otherwise be distributed across two guide cards—that from COTTON to the second guide for BLANKET and that from BLANKET as a subdivision of COTTON to BLANKET as a first term—on the guide for COTTON alone. In its original context, it served to distinguish subdivisions of COTTON for which information was found elsewhere in the index (i.e., those marked with the preceding cross) from those for which information was limited to the index items filed under the second guide representing the subdivision itself (i.e., those with the preceding hyphen alone).⁵³⁰ The distinction between crosses and hyphens, which seems to have been used primarily in indexes in which the first guide of a multiword term contained cross-references both to the terms on the second guides associated with it and to the first guides on which those same terms occurred (cf. § 428), thus functioned as a means of indicating as precisely and economically as possible all the place(s) in the index where information pertaining to one of its subdivisions might be found.

As we have just seen, many of the subdivisions of the term COTTON were multiword terms standing in a hierarchical generic, or quasi-generic, relationship to it. Others, however, formed different kinds of relationship to this central term. On one hand, as we have already seen, certain of the terms—COTTON SEED, COTTON POD, and COTTON FIBRE—presupposed an interpretation of COTTON as a term for cotton *qua* plant and, insofar as they named parts of the cotton plant, they contracted a partitive relationship with it. Closely related to these were the terms COTTON SEED OIL, its synonym COTTON OIL, and COTTON SEED MEAL, which designated products derived from the pressing of cotton seeds

⁵³⁰ In some indexes, such a distinction was necessary because Kaiser allowed for the making of “dummy” guide cards for general terms of concretes, even if no index terms were filed under them: as he put it, “[i]f there is information on a specific term and it is desired to note it under its collective, under which however there is no information, and therefore no first guide, a first guide may be made and inserted for this purpose. But this does not apply vice versa” (Kaiser 1911, § 430). The rationale for this policy was as follows. Because terms were, as a rule, to be directly derived, or extracted, from the textual unit being indeed (See Section 2.2.3 of the present chapter), situations might arise in which an index contained index items under a term for a specific kind of concrete—e.g., COTTON CAMBRIC—but no index items under the more general kind of concrete of which that specific kind was a species—e.g., CAMBRIC. On the supposition that some users of the index might be inclined to search under the general term CAMBRIC despite the fact that no information was to be found under it, it was expedient to make a guide card to direct the user to look under those more specific terms, such as COTTON CAMBRIC, under which index items were actually to be found.

(Dooley 1914, 116): as such, they stood in what would today be considered an associative relationship to COTTON in its sense of cotton *qua* plant, though Kaiser may well have thought of them simply as specific terms. Another series of terms, however, unequivocally belonged to the realm of associative relationships by Kaiser's own standards. These included COTTON DYE, a term for designating dyes used to color cotton fabrics; COTTON GIN, which, as we have already seen, referred to the machine used to separate cotton fiber from cotton seeds; COTTON MACHINE, the general name for "a machine for carding or spinning wool" (Whitney & Smith 1911, Vol. 2, 1295, s.v. "cotton-machine"), COTTON MILL, a designation for "[a] building provided with machinery for carding, roving, spinning, and weaving cotton" (p. 1295, s.v. "cotton-manufactory, cotton-mill"), and COTTON PRESS, a term that denoted the various kinds of presses "used for compressing cotton into bales" (p. 1295, s.v. "cotton-press"). Each of these terms named a kind of object that was not composed of cotton itself and so could not form a hierarchical relationship, either generic or partitive, to COTTON: rather, they designated concretes that, in one way or another were involved in the process of transforming cotton fiber into cotton fabric, whether as the locus where the process took place (i.e., COTTON MILL), as a mechanism for obtaining raw cotton (i.e., COTTON GIN) or preparing it for transportation (i.e., COTTON PRESS), or as a means of altering the physical form or appearance of the fiber (i.e., COTTON MACHINE and COTTON DYE). As such, their various relationships to COTTON were ones that, *mutatis mutandis*, fell within Kaiser's category of relationships in which one concrete was applied to another—that is to say, within his analogue to modern-day notions of associative relationships.

The list of cross-references on the guide for COTTON that we have just considered neatly encapsulates the spectrum of relationships that could obtain between terms of concretes, ranging from the hierarchical generic relationships between collective and specific terms that lay at the heart of the relational semantics of such terms (See Section 2.2.4 of the current chapter), through what would today be recognized as partitive relationships interpretable either as hierarchical (as Kaiser seems to have done) or associative (as is frequently done in present-day thesauri and other controlled vocabularies) in nature, to unequivocally associative relationships, as well as relationships between synonyms. The fairly involved structure of the cross-references reflected, in part, the fact that COTTON was treated *de facto* not as a semantically unitary term, but as a one that could carry at least three meanings—namely, cotton *qua* fibrous substance, cotton *qua* plant, and cotton *qua* fabric: this inner semantic heterogeneity attracted different kinds of related term to it. No

less important, as a noun, COTTON could stand independently as a single-word term or serve as an element in a multiword term: in the latter case, it functioned either as a modifier or as modified head noun of the term in question. Whereas all three syntactic possibilities made an appearance on the guide card, especially well represented was the one in which COTTON appeared as a modifier in a multiword term—a form whose grammatical structure afforded ample opportunity for making *verbal* connections between COTTON *simpliciter* and terms that stood in a variety of relations to it: as we have seen, it accounted for most of the terms with which COTTON formed associative relationships. Finally, one may note that the guide appears to have come from a fairly well developed index, within the framework of which the decision had been made to cover not only terms for cotton fiber and the fabrics made therefrom, but also terms designating the apparatus used in the industrial processing of fibers into fabrics, as well as terms naming the products of other, non-fibrous parts of the cotton plant. In short, the case of COTTON illustrates how semantic, syntactic, and pragmatic factors all played a part in shaping the lists of related terms that provided the semantic links among terms of concretes in an index file.

7.5.3. Guide Cards and Cross-References: Concluding Comments

Viewed as a whole, Kaiser's protocols for the formulation of cross-references among first, or main, terms in an index can be characterized as fairly latitudinarian and pragmatic, setting forth a minimal set of structural rules while giving the indexer considerable discretion in the choice of terms. As regarded structure, the most stringent rule was that the two categories of terms that could serve as first terms in an index—terms of concretes and terms of countries—were to be strictly differentiated with regards to cross-references, so that concretes were brought into relation only with other concretes and countries only to other countries (See Section 5.2.2 of the current chapter). This limitation naturally flowed from the inner logic of SI's category system: inasmuch as relationships between terms of concretes and terms of countries were already expressed at the level of the statement (See Sections 3 & 3.5 of the present chapter), there was no need to replicate them in the cross-references. Otherwise, Kaiser envisioned that hierarchical relationships between collective and specific terms would be the primary forms of cross-reference for terms of concretes and terms of countries alike and that, for the most part, such cross-references would be reciprocal: ideally, he wrote, "[e]very specific refers to its nearest collectives, every collective gives all its specifics" (Kaiser 1911, § 417).

Kaiser's emphasis on relationships between collective and specific terms *tout court* should not obscure the fact that the range of relationships expressible within the network of cross-references that he outlined was quite wide and differently articulated across the two categories of terms that participated in them. For terms of concretes, the prototypical form of relationship was the hierarchical generic, or quasi-generic, relationship between a collective term referring to a class of objects and specific terms denoting the different kinds, or varieties, of objects composing that class (See Section 2.2.4 of the present chapter): a single specific term could form such relationships with multiple collective terms giving rise to polyhierarchical structures (See Section 5.2.2.2 of the current chapter). Also falling under the penumbra of hierarchical relationships were partitive relationships. While Kaiser did not formally acknowledge the existence of these among terms of concretes, he did make limited use of them *de facto* (See Sections 2.2.4 & 5.2.2.2 of the present chapter). He quite explicitly allowed for non-hierarchical associative relationships involving the application of one concrete to another, though he did not set any firm limits on how the notion of application was to be construed. He also made provisions for cross-references among synonyms or near synonyms, a measure that was necessary because of his stipulation that, whenever possible, terms of concretes were to be taken directly from the textual unit being indexed and his concomitant eschewal of any distinction between preferred and non-preferred terms belonging to this category (See Section 5.2.2.2 of the present chapter). As for terms of countries, the primary kinds of relationships were hierarchical partitive relationships between the names of countries and those of the larger geographical regions to which they belonged as well or between the names of countries and those of the smaller geographical units—states, regions, or cities—located within their boundaries (See Sections 2.2.4 & 5.2.2.1 of the current chapter). Terms of countries could also form associative relationships, although these were entirely limited to representing the two-country dyads found in certain tripartite statements pertaining to movement of concretes from one country to another (See Sections 3.6 & 5.2.2.1 of the present chapter). Kaiser did not make provisions for relationships of synonymy between terms of countries, since, in his view, it was best to use standardized preferred terms for the names of geographical units (See Section 4.2 of the current chapter).

Terms of concretes, then, tended to exhibit more complex and variegated sets of relationships than did those of countries. This tendency was partially due to the fact that the former were names of general kinds of objects, while the latter were limited to designations

of particular geographical entities (See Section 2.2.4 of the present chapter). Both the general nature of terms of concretes and the comparatively broad domain of objects to which they referred allowed the indexer to bring them into a wider spectrum of relationships among themselves than he could do with terms of countries. Another contributing factor, upon which Kaiser (1911, §§ 420, 423) laid considerable stress, was that terms for concretes were semantically less determinate than those for countries. This indeterminacy likewise served to render them more apt to be placed into a greater number of (poly)hierarchical relationships than could be done with terms for countries. On the other hand, the kinds of relationships between terms for countries were much more clear-cut than those obtaining between terms for concretes: the hierarchical relationships between collective and specific terms for the former were invariably partitive and there was little doubt about the difference between them and associative relationships. By contrast, the various forms of semantic relationships among terms of concretes tended to shade off into one another. While Kaiser (1911, §§ 423–424) did differentiate between hierarchical, non-hierarchical, and synonymous terms (cf. Mills 1968, 184), he seems not to have distinguished hierarchical generic and partitive relationships with regard to concretes. It is not always easy for the latter-day student of SI to reconstruct Kaiser's understanding of certain of the relationships that appeared in his examples of related terms of concretes: for example, it is uncertain whether he interpreted the relationships between terms denoting substances, or mass materials, such as IRON and COTTON, and the products made therefrom, such as RAW BILLETS or COTTON BLANKETS, as hierarchical or associative relationships, though, as we have noted, there is some slight indication that the former was most probably the case (See Section 5.2.2.2 of the present chapter).

Formulated in a general manner that left many matters of detail open to interpretation, Kaiser's distinctions between different kinds of relationships found only limited expression in the displays of cross-references upon guide cards. Related terms were enumerated in a single alphabetical series, without any regard as to whether they stood in a hierarchical, associative, or, in the case of concretes, synonymous relationship to the term upon whose guide they appeared (See Sections 5.2.2.1–5.2.2.2 of the current chapter). This is not to say that they were presented as a homogeneous, undifferentiated mass, for Kaiser did introduce certain typographical conventions to distinguish some related terms from others. In the case of terms for countries, the lists of related terms on the first guide for a given country differentiated between names of geographical entities preceded by a hyphen and those

without a hyphen: the former represented the names of countries or parts of countries inscribed on the tabs of second guides serving as subdivisions for the guide in question, while the latter represented first terms that had their own first guides and were to be sought under those elsewhere in the index (See Section 5.2.2.1 of the present chapter). As for terms of concretes, hyphens, which occurred only in multiword terms, served as substitutes for the term inscribed on the tab of the guide card in question and could either precede another word (as in -SILK on the guide card for ARTIFICIAL reproduced at p. 635, Figure 38, above) or follow it (as in HEMATITE- on the guide card for IRON reproduced at p. 631, Figure 37a, above): in the former pattern, they served the same function as they did with terms of countries—that is to say, they indicated terms the second element of which was typewritten on the second guides that served as subdivisions for the term upon the first guide of which they were listed. Terms with no hyphen, again, directed the user of an index to first terms with their own first guides elsewhere in the index, while those preceded by a cross (as +BLANKET in the guide card for COTTON reproduced at p. 648, Figure 44, above) indicated that that the term in question served both as a second-guide subdivision of the term upon whose first guide it appeared *and* also appeared upon its own first guide elsewhere in the index (See Section 5.2.2.2, above).

For both terms of concretes and terms of countries, then, the conventions that Kaiser (1911, § 431) employed to visually discriminate among different kinds of terms served primarily to signal the distinction between terms occurring on first guide cards as main entry terms and those appearing on second guides as subdivisions of terms on first guide cards. That is to say, the distinction had to do, first and foremost, with what can loosely be termed the material syntax of terms with respect to the first two positions of the five-position system of guide cards: the presence of a hyphen (and, in the case of terms of concretes, a cross) at the beginning of a term indicated that it was a subdivision of the first guide that the user of an index happened to be consulting, whereas its absence or its position at the end of a term signaled that the term in question (or, in the case of multiword terms, its first element) had its own first term and so was to be sought elsewhere in the card files. To be sure, the position of the hyphen could be taken as indicating, to some extent, the kind of relationship that a given multiword related term was likely to have with the term on the guide of which it was listed. As we saw earlier, related terms in which the hyphen followed a qualifying noun or adjective such as MERCERIZED- and RAW- on the guide card for COTTON (See Figure 44, above) or BRASS- and BUILDERS'- on the guide card for HARD-

WARE (See Figure 36, above) tended to stand in generic, or quasi-generic, relationships to their tab terms, although this did not hold in all cases, as the example of SEWING- on the guide card for COTTON shows (See Section 5.2.2.2 of the present chapter, esp. p. 646, above). However, the converse case in which the hyphen preceded a noun or noun phrase was much less predictable on this score: such multiword terms could have generic, or quasi-generic, relationships to their tab terms, as -ASPHALT did in relation to ARTIFICIAL (See Figure 38, above); partitive relationships, as -SEED did in relation to COTTON (See Figure 44, above); or associative ones, as in the case of -MACHINE in relation to COTTON (See Figure 44, above). By the same token, lack of any hyphen could apply to generic, or quasi-generic, relationships, as it did in the case of HAMMER with respect to HARDWARE (See Figure 36 above), relations of synonymy, as with IMITATION in relation to ARTIFICIAL (See Figure 38, above), or associative ones, as GINROLLER did with respect to COTTON (See Figure 44, above). In short, Kaiser's devices for differentiating the material syntactic relationships between terms on guide cards corresponded only very imperfectly—indeed, one might say, accidentally—to the semantic relationships expressed by means of cross-references.

Kaiser's use of hyphens and crosses as a means to distinguish between cross-references directing a user to main terms and those leading to subdivisions of a given term differed sharply from the norms of present-day KO, according to which the terms serving as cross-references in alphabetical displays of controlled vocabularies such as retrieval thesauri are to be differentiated by the semantic relationships obtaining between them and the term under the entry for which they are listed. According to the conventions for designing thesauri, superordinate and subordinate terms in hierarchical relationships are typically represented by the sigla BT (= Broader Term) and NT (= Narrower Term), respectively,⁵³¹ while associative relationships are indicated by the symbol RT, an abbreviation for "related term", and equivalence relationships—i.e., the relationships between a preferred term and its non-preferred synonyms or near-synonyms—with the sign UF, the acronym for USE FOR (Aitchison, Gilchrist, & Bawden 2000, 97, 99; ANSI-NISO 2005, 18, § 5.4.4 & 60, § 9.2.2.1;

⁵³¹ The designers of thesauri have the option of indicating between the different kinds of hierarchical relationships in which such terms participating; for example, a broader term in a generic relationship can be designated as BTG; a narrower term in the same relationship as a NTG; a broader term in a partitive relationships as BTP; a narrower term in such a relationship as NTP; etc. See, e.g., Aitchison, Gilchrist, & Bawden 2000, 58–59; ANSI-NISO 2005, 48–49, §§ 8.3.1.1 & 8.3.3.1; Broughton 2006b, 125–126.

Broughton 2006b, 117). The application of these conventions to the terms pertaining to cotton *qua* fabric in Figure 44 would have led to a display structured as follows:

COTTON (FABRIC)
BT TEXTILE
NT COTTON BLANKET
COTTON CAMBRIC
...
COTTON VELVET
RT COTTON DYE
COTTON MACHINE
...

To modern-day students of KO for whom indicating the semantic relationships of cross-references constitutes a best practice, Kaiser's use of marks such as hyphens to distinguish between related terms that were main terms and those that formed subdivisions of a given term may well seem to have placed undue emphasis on what was primarily a formal, syntactic feature of index terms. However, there was good reason for foregrounding this distinction, for it gave the user of a card index a compendious overview of the physical distribution within a file of the guide cards upon which the related terms enumerated under a given entry term were located: in other words, Kaiser sought to signpost the position of related terms within the landscape of the particular form of technological apparatus that he used for the implementation of his indexing system—the card index using five-position guide cards. Here, then, we have another example of how the technological context of SI shaped its formal features.

Although Kaiser's conventions for displaying related terms on a guide card did not signal explicitly the nature of the semantic relationships between them and the main entry term with which they were brought into association, he believed that the linkages formed by enumerating cross-references on guide cards were a valuable aid in navigating the card files of an index to find collateral information on a given subject of interest. In particular, lists of related terms brought to the attention of the user index terms that he might otherwise overlook in the course of search, a scenario that Kaiser illustrated in the following manner:

To give a simple example, our index contains information under *natural indigo*, *artificial indigo*, *synthetic indigo* and *indigo*. These terms have been drawn from various sources and for obvious reasons the indexer is not at liberty to change names By the plan proposed the collective term *indigo* will refer to all other

terms of indigo and each specific will refer to *indigo*. Now if we require information on *synthetic indigo*, the cards will be found under *S*, but we may not be aware of the fact that there is also *artificial indigo*, or if we know, we may not always remember. But since the guide *indigo* gives all its related terms which must of course include all varieties of indigo, simple reference to this guide will assure us that no information has been missed. Further the related terms on the guide *indigo* will in many cases give us most useful hints as to the distribution of the information in our index under the various kinds of *indigo*, for we are made aware of the fact that *indigo* is also related to *dyestuffs*, *colours*, *chemicals*, *plants* etc which may possibly help us to extend our field of investigation (Kaiser 1911, § 417).

On this view, cross-references functioned as a sort of *aide-mémoire* that brought to the attention of users of an index additional terms of concretes or countries under which they might want to search for information or, to put things in the words of a recent commentator on the use of associative cross-references (i.e., RTs) in controlled vocabularies, they served as “a stimulant to verbal imagination” by means of which users could be guided to formulate “effectively articulated search requests” (Svenonius 2000a, 160). Noteworthy, in this regard, is Kaiser’s invocation of the polyhierarchical links between INDIGO and its collective terms DYESTUFFS, COLOURS, CHEMICALS, and PLANTS as an example of how related terms could prompt users to consider the various aspects of a given subject under which they might want to search: even if the guide card for INDIGO didn’t explicitly indicate the nature of the relationship between this term and its superordinates, it nevertheless signaled that the former was related to the latter in a meaningful way and so marked a notional trail that a person consulting an index could pursue if he so chose.

Insofar as cross-references brought together terms that were semantically related but the entries for which might be scattered at different locations of an alphabetically arranged index or buried within long series of subdivisions, Kaiser considered them to be indispensable mechanisms for establishing proper systematic control over information in an index. As he saw it,

[i]t is a matter for serious reflection that without proper control a large index may contain most valuable information, but so hidden away that it may be completely lost sight of sometimes until discovered by accident. To be in possession of information is one thing, to produce it when required is quite another matter, it is the real test in our case. By connecting related terms we in fact tie strings to the cards, which makes it impossible to miss any (Kaiser 1911, § 647).

That is to say, cross-references enabled users to conduct searches that would lead them, if need be, to all the potentially relevant information available in an index regarding a given concrete or country in all its ramifications, not only that which was entered under the

particular term denoting the concrete or country. At the same time, Kaiser conceptualized related terms as providing a mode of access to the contents of a card index complementary to that embodied in the alphabetical ordering of index items: whereas the alphabetical arrangement of main terms (and their subdivisions) inscribed on the tabs of guide cards gave persons consulting an index “direct access” to index items for particular terms of concretes and terms of countries, the lists of related terms on the bodies of these cards offered “indirect access” (§ 644) by adverting users’ attention to other parts of the index where related information—as defined by the particular field of interest of the business organization for which they worked—likely to be pertinent to the particular subject for which they were searching was to be found. It is for this reason that he considered networks of related terms to be a necessary feature of SI, one that, engrafted upon the alphabetical organization of a card file, served to “complete the structure of the card index” (§ 414).

7.6. Concluding Remarks on Systematic indexing: System and Individuality

According to Kaiser (1911, § 447, Steps 8–9), making guide cards and entering related terms upon them constituted the final stages in the making of a card index. In completing our discussion of them, we have reached the end of our account of the method of SI set forth in *The Card System* and *Systematic Indexing*. At this point, it is appropriate that we take stock of the territory that we have traversed. Over the course of this chapter and the previous one, we have considered the general context of knowledge organization in which Kaiser envisioned that his indexing method would be used, to outline his protocols for indexing, and to examine the rationale, both theoretical and practical, that underlay them. We have shown that Kaiser held that SI was to be employed within a specific kind of milieu—what he called the intelligence department of a business organization—and that it was to be used in conjunction with two other forms of KOS: (1) a method for classifying and physically organizing documents by documentary type and (2) a central register, or series of registers, that identified the various documents as documentary, or filing, units and so facilitated their retrieval (See Chapter 6, Sections 2.2, 3, 3.1, & 3.4, above). We have noted that both the mode of document classification that Kaiser advocated and the system of card registers that he outlined were either entirely (in the case of the former) or largely (in the case of the latter) dissociated from the indication of the informational contents of the documents belonging to the collection of an intelligence department (See Chapter 6,

Sections 3.2–3.4, above). We have observed that Kaiser reserved the function of indicating the informational contents—or, if one will, the subjects—of documents for the card index (See Chapter 6, Section 3.4; Section 1 of the present chapter, above). However, unlike the library catalog or the periodical index, a card index constructed in accordance with SI did not have bibliographical units, such as books or periodical articles, as its unit of analysis: rather, it was the product of a highly analytical form of indexing in which items of information *within* documents pertaining to certain selected subjects of interest were identified and recorded upon index cards (See Section 1 of the current chapter).

The primary purpose of an index, then, was not to characterize the contents of documents *qua* bibliographic units but to provide “ready access” (Kaiser 1911, § 643) to certain pieces of information within them (See Chapter 6, Sections 2.2–2.3, 3.4; Section 1 of the present chapter, above). We have described and analyzed at some depth the method of indexing that Kaiser developed to achieve this aim. We have seen that, in his view, indexing was the process of analyzing the “information ... conveyed by written language” (Kaiser 1911, § 297; cf. Sections 2–2.1 of the current chapter): one could only index the informational contents of a given text by reading it and deciding which elements thereof should be included in one’s index files. Yet Kaiser also believed that there was a fundamental cleavage between any writer’s thought and the language that he used in his textual communications: as a consequence, written texts provided, at best, only a partial and approximate representation of the “conceptions” or “mental pictures” that gave rise to them (See Sections 2.2–2.2.1 of the present chapter). Furthermore, he held that the reception of texts on the part of readers—including indexers—inevitably involved a process of interpretation fraught with the danger of misconstruing the messages that writers wished to convey (See Section 2.2.2 of the current chapter). His strong sense of the semantic lability of language induced him to adopt a mode of indexing in which the possibility of misinterpretation was minimized by deriving the terms—i.e., the names of (kinds of) things and actions—used to characterize the subject content of a piece of textual information directly from the text being indexed (See Sections 2.2.3 & 4.2 of the present chapter): in this way, terms *qua* verbal units became the primary building blocks from which an index was to be constructed (See Section 2.2.3 of the current chapter).

We have seen that Kaiser articulated terms into two orthogonal, but interacting, semantic classifications that, each in its own way, contributed to the structuring of a card index. On one hand, each term forming part of the vocabulary of an index was to be assigned

to one of three categories—namely, terms of concretes, terms of countries, and terms of processes (See Section 2.2.4 of the current chapter). Developing this system of categories in part from those used in the knowledge organization régime of the PCM, an institution devoted to the collection, indexing, and diffusion of commercial information (See Chapter 3, Sections 3.3–3.3.2; Sections 3.1.2 & 3.4 of the present chapter, above), Kaiser sought to justify it with a series of epistemological-ontological and logico-linguistic arguments: as we have shown, these theoretical arguments did not quite match the categorial scheme as it was used in practice, for they posited concretes and processes as the two primary categories and countries as a secondary category derivative of concretes, whereas the protocols of SI actually treated countries as a category on a par with those of concretes and processes (See Sections 2.1, 3.2, & 3.4 of the current chapter). Kaiser established rules for combining terms from the three categories into complex index terms, or statements, on the basis of their category membership (See Section 3.1 of the current chapter). The rules of combination for forming statements were such that terms of concretes or terms of countries—the two categories that, in Kaiser’s estimation, represented the kinds of subjects about which businessmen had the greatest need of information—always preceded those for terms for processes (See Section 3.5 of the current chapter). Here, too, pragmatic considerations were intermingled with theoretical ones, for, in addition to arguing that concretes and countries were of greater interest to businessmen, Kaiser set forth the argument that processes were ontologically dependent upon concretes, whereas human knowledge of concretes came about through observation of the processes in which they participated (See Section 2.1 of the present chapter).

The statement defined what parts of a given textual unit were to count as an item of indexable information, or index item, by delimiting its subject (See Sections 3.1 & 4.1 of the present chapter). Each such item comprised a statement outlining the subject together with an amplification consisting of an annotation about, or a brief condense of, the information pertaining to subject in question, the date of the information, and data about the bibliographical source of the information (See Sections 3 & 4.2–4.3 of the current chapter). Kaiser formulated protocols for recording such items upon unit cards, which, in turn, formed the elementary units of a card index file (See Section 4.4 of the present chapter). Within an index file, unit cards were arranged in accordance with the alphabetical order of the terms forming statements, beginning with the terms for concretes or countries serving as the main, or filing, terms and then progressing to their subdivisions: as we have

documented, Kaiser developed an intricate scheme for deploying guide cards to indicate where within a card index file the set of cards entered under a main filing term and certain of its subdivisions were to be located (See Sections 5.1 & 5.2.1 of the present chapter).

The second semantic classification of terms involved only those for concretes and for countries. Within each of these categories, terms could be set into relation to one another on the basis of their relative specificity or generality *vis-à-vis* other terms belonging to their categories (See Section 2.2.4 of the present chapter). This distinction between general and specific terms played a double rôle within SI. First, Kaiser (1911, § 74) strongly valorized specific over general information on epistemological grounds. To his mind, the more specific a piece of information was, the less likely that it represented a generalization on the part of its originator, the more likely that it represented fact rather than opinion, and so the greater the scope it gave the person using it to form his own generalizations therefrom (§§ 74, 79; see Section 2.2.5 of the current chapter). We have seen that Kaiser associated specific information with information characterized by relatively specific terms and general information with information characterized by relatively general, or, in his parlance, collective, terms: unsurprisingly, then, he maintained that, for the purposes of indexing it was preferable, *ceteris paribus*, to make use of terms denoting specific kinds of concretes rather than those denoting general kinds (See Section 2.2.5 of the present chapter). In this way, the distinction between specific and general terms provided one criterion for the selection of terms of concretes, which, as noted earlier, were to be derived directly from the textual unit being indexed.

The second major function of the distinction between general and specific terms in SI was to serve as the primary point of reference for the relational semantics of cross-references (See Sections 2.2.4 & 5.2.2.1–5.2.2.2 of the current chapter). We have seen that Kaiser considered what would today be characterized as the hierarchical generic, or quasi-generic, relation between collective and specific terms to be the archetypal form of semantic relationship between terms of concretes, alongside which he ranged associative and synonymic, or quasi-synonymic, relationships (See Sections 5.2.2.2 & 5.3 of the present chapter). He likewise held relationships between collective and specific terms to be a characteristic feature of the relationship between terms of countries. Although hierarchical in nature, these relationships typically took the form of what current students of KO would term partitive relationships between countries and their subdivisions or between broad geographical regions and their component countries: in addition to these, he allowed for the

use of a rather limited form of associative relationships among countries (See Sections 5.2.2.1 & 5.3 of the current chapter). Entered upon the guide cards for main entry terms, lists of cross-references, or related terms, as Kaiser preferred to call them, provided a means of alerting users of an index to the presence, elsewhere in the index, of guide cards for terms denoting subjects related to the one under which they were currently searching that might have entered under them index items containing information pertinent to their particular needs or interests (See Section 5.3 of the present chapter). The division of terms into (relatively) general and (relatively) specific ones, then, provided the cornerstone for a system of connecting semantically related terms to one another that complemented the arrangement of unit cards based on the alphabetical order of the component terms of their statements.

Such, then, were the main lines of Kaiser's method of indexing, the various theoretical and practical ramifications of which we have discussed in detail in the foregoing pages. Yet no account of SI would be complete without singling out for special consideration two qualities that characterized it as a whole: systematicity and the expression of individuality. Both of these qualities reflected core values underlying the design of Kaiser's KOS: systematicity betokened a striving after structural coherence, consistency, and efficiency in the constitution and maintenance of an index, whereas the expression of individuality was realized in the customization of the content and, within limits, the structure of statements, index items, guide card systems, and cross-references, in accordance with the particular context in which a given index was to be used. Inasmuch as the imperatives of systematicity encouraged the setting of constraints upon the work of the indexer in constructing an index, while the expression of individuality through customization conversely required that he have a degree of freedom in calibrating the content and structure of an index to particular circumstances, it may be tempting to view these two features of SI as representing mutually countervailing impulses within its design. As we shall see, their co-occurrence did generate a degree of tension within Kaiser's conceptualization of his system of indexing, for he considered individuality to be an attribute not only of a business *qua* organization but also of each person employed by such an organization, including those members of its intelligence department responsible for compiling its index. Inasmuch as work on an index required following certain rules and standards, it was necessary to manage it in such a way that the individuality of indexers, filers, and their clerical assistants was aligned with these. Yet if Kaiser held that there was considerable scope for friction between the demands of

systematicity and those of individuality in the practical implementation and day-to-day maintenance of a card index, he based his method of indexing on the assumption that these two seemingly opposed qualities could be combined in a manner that allied adherence to certain fundamental structural principles with considerable freedom in the application thereof. Kaiser's conception of these two characteristics of SI and their interaction with one another imparted to his indexing system a distinctive ethos closely bound up with the informational culture of the business world for which it was designed.

7.6.1. The Systematicity of Systematic Indexing

In designating his indexing method as "systematic indexing", Kaiser indicated that he considered systematicity to be its cardinal and, indeed, defining feature. Although he did not explicitly discuss this choice of name in his writings, various passages in *The Card Index* and *Systematic Indexing* suggest that there were at least three different, but related, senses in which SI reflected the ideal of systematicity: its use, and coordination, of multiple classificatory structures; its correlation of the different component systems of a card index into a single organization by means of a set of shared structural elements; and the methodical nature of the procedures that Kaiser outlined for constructing a card index.

To Kaiser's mind, the notions of system and organization were indissolubly linked with that of classification. Perhaps the clearest indication of this can be found in a passage of *Systematic Indexing* in which he sought to specify "the meaning of the term classification" by situating it within a series of words referring to the ways in which one might "put into a sequence a number of given things or conditions" (Kaiser 1911, § 98). As we have already seen, in this context, Kaiser assigned the following meaning to the term "to classify": "to make classes, i.e., to work out the order of sequence of what is given so as to satisfy a given purpose, to make up a scheme by which to class" (§ 99; cf. § 104, Point 1; see Chapter 6, Section 3.1; Sections 1 & 5 of the current chapter, above). Having defined the act of classifying as the process of drawing up "a scheme of ordered sequence or classification", he went on to relate it to that of systematizing. "[T]o systematise", he stated, was to bring together and coordinate multiple classifications: in his words, "it implies⁵³² a number of classifications running side by side so to say, both independently and interdependently i.e. coordinated classifications" (§ 99). On this definition, a system could be construed as consisting of a series of distinct, but interrelated and interacting, classifications.

⁵³²On the meaning of "implies" in this context, see p. 430, n. 375, above.

Viewed from this perspective, SI can readily be seen as an exercise in systematization, for it brought into relation no fewer than four different classificatory structures. Three of these had to do with index terms. First and foremost, there was the classification of terms in accordance with the categorial system that divided the vocabulary of an index into terms of concretes, terms of countries, or terms of processes. This semantic classification, as we have had ample opportunity to observe, formed the basis for the construction of statements by means of which individual index items were defined (See Sections 2.2.4, 3, 3.5, 4.1, & 6 of the current chapter). Second, the sequence of index items within a card file was determined primarily by the alphabetical order of the terms of which their respective statements were composed: we have seen that, in Kaiser's eyes, alphabetization was a mode of classifying words on the basis of the letters of which they were composed (See Chapter 6, Section 3.2.2; Section 5.1 of the present chapter, above): as such, it can perhaps be characterized as a purely syntactic classification. Engrafted onto the alphabetical classification of index terms was the network of cross-references, or related terms, that bound together the first, or main, terms of statements—invariably terms of concretes or terms of countries—in accordance with various kinds of semantically-based relationships, among which hierarchical generic ones between collective and specific terms for concretes and hierarchical partitive ones between collective and specific terms for countries were especially prominent (See Sections 6.2.2.4, 5.2.2.1–5.2.2.2 of the current chapter). As we have had occasion to note, Kaiser (1911, §§ 414, 416; see Sections 5 & 5.2.2 of the present chapter) considered related terms to perform a function similar to that of a "logical classification": in other words, they added a third layer of classificatory structures over the categorial one expressed in statements and the alphabetical one determining the sequence of unit cards bearing index items in the card file. A fourth and final classification did not deal with terms as such but served to correlate individual pieces of information to their documentary sources. Each index item included a call number that both designated the documentary unit from which it had been derived and indicated the location thereof in the files or on the shelves of the intelligence department maintaining the index (See Chapter 6, Section 3.1; Section 4.3 of the current chapter, above). Insofar as the protocols for SI brought these four different classifications into relationship with one another and provided for their interaction in the constitution of index items, the formation of card index files from these items, and the establishment of relationships between individual index items in the files and documentary materials from the collection with which the index file was associated, they resulted in an

index involving a series of “coordinated classifications”—that is to say, a systematized, or systematic, index.

In Kaiser’s view, the coordination of several classifications brought about through systematizing resulted in a system. Multiple systems, in turn, could be aligned with one another through the process of organizing. “To organise” was to combine several systems into a single framework: “it implies”, he wrote, “a number of systems running side by side both independently and interdependently i.e. coordinated systems” (Kaiser 1911, § 99). The result of organizing was the kind of higher-level unity that Kaiser called an organization and which he defined as “a set of specialized systems coordinated to work collectively with the same end in view” (§ 26). We have already seen that this general definition of organization informed his understanding of such collective business entities as firms and companies (See Chapter 6, Section 2.2, above). It conditioned his understanding of the nature of card indexes as well.

“An index is an organization, a combination of systems”, declared Kaiser (1911, § 629). To his mind, it was possible to “distinguish four departments or systems in the card index” (§ 644), namely:

1. analysis and reconstitution of literature
2. ordering and filing the information resulting
3. providing direct access to what is filed
4. providing indirect access to what is related.

At first glance, the manner in which he characterized these four “departments or systems” may seem unusual, for he described them in terms of the kinds of activities performed *vis-à-vis* an index (i.e., nos. 1 & 2) or of the functions that it subserved (i.e., nos. 3 & 4) rather than listing its component elements as such. However, any impression of oddity that may enter into the mind of a reader quickly dissipates, for Kaiser went on to associate each of these processual or functional aspects of an index with particular elements thereof. The concrete result of the “analysis and reconstitution of literature” was “the formulation of the statement”, whereas “ordering and filing the information” involved “the disposition of the materials on the cards and ... the order in which the cards are arranged”; similarly, “providing direct access to what is filed” was the office of “the guides”; while “providing indirect access to what is related” was the function of the cross-reference structure that recorded “the cross classing of terms” (§ 645). In short, (1) statements, (2) the index items recorded on unit cards and arrayed in card files, (3) the sets of guide cards that signaled the

location of main terms and their subdivisions in the files (§§ 314, Point 3, 408, 410–411), and (4) the sets of related terms inscribed upon the bodies of the guides (§ 230) constituted the four systems that conjointly made up a card index *qua* organization.

Kaiser's analysis of the card index into these four systems, the boundaries of which did not coincide in all respects with those of the four classifications noted earlier,⁵³³ appears to have been governed by both conceptual and material considerations. Statements provided the semantic grid by means of which to isolate and define pieces of information and so served as the basis for the construction of index items. Index items recorded on unit cards and arranged according to the alphabetical order of the terms in their statements were the primary material elements of a card file. Guide cards indicating the place within an index of index items entered under particular terms of concretes and terms of countries formed the other major material component of a file. Finally, lists of related terms on guide cards offered a mechanism by means of which to navigate a card index on the basis of the semantic relationships between terms. The differences in emphasis regarding the conceptual and material dimensions of these four sectors of the card index are palpable: statements and related terms constituted conceptual systems expressed more or less adequately in written language, whereas the unit cards bearing index items arrayed in a file and the guide cards interspersed among them represented material realizations of more abstract systems.

“Where there are fixed points, system is possible”, held Kaiser (1911, § 416). In his view, what made each of the four aforementioned aspects of a card index a system was that it ultimately had its basis in a single set of “fixed points”: the tripartite division of the index vocabulary into terms of concretes, terms of countries, and terms of processes. These three categories of terms, Kaiser maintained, “are the foundation of the entire index as an organisation They give the whole structure its stability” (§ 645; cf. Section 3 of the current chapter). The categorial fixed points were, of course, most directly associated with the constitution of statements, of which they formed the basic building blocks (See Sections 3 & 3.5 of present chapter). However, through the statement, they affected all the other sys-

⁵³³ The statement *qua* system could easily be mapped onto the categorial system *qua* classificatory structure and cross-references *qua* system largely coincided with related terms *qua* classificatory structure. The system of unit cards bearing index items arranged within a card file corresponded, to a large extent, to the alphabetical classification of index items; however, the latter did not cover the ordering of different elements of index items, such as the statement and, especially, the various components of the amplification, upon individual index items. As for the system of guide cards, their application in the card index involved two classificatory structures, namely, the categorial system and the alphabetical ordering of index items (See Section 5.2.1 of the current chapter, above).

tems composing a card index *qua* organization. The alphabetical ordering of index items in a card file was governed, in large measure, by the structure of statements, for alphabetization required that the indexer take into account, stepwise, the different terms making up the statements inscribed on the unit cards being filed: the position of each index item was determined by the alphabetical position of its first term within the sequence of other first terms in the file; the position of its second term, if it had one, within the sequence of other second terms subdividing the first term under which it was entered; and, finally, the position of its third term with the sequence of other third terms subdividing the first and/or second term under which it was entered (See Section 5.1 of the current chapter). By the same token, the structure of the statement was projected upon the system of five-position guides, so that the first and second guides corresponded to the first term of a statement; the third and fourth guides, to its second term; and the fifth guide, to its third term (See Section 5.2.1 of the present chapter, esp. p. 590, Figure 31). Finally, the system of related terms linking the main, or first, terms of statements likewise depended upon the categories, since cross-references could only be made between terms belonging to the same category (See Sections 2.2.2.4 & 5.3 of the current chapter).

To be sure, certain of the systems made use of other kinds of fixed points as a means to set their component elements into order. For example, Kaiser assigned invariable positions on an index card to the various component elements of an index item (See Section 4.4. of the present chapter): this constituted, on his view, “a systematic arrangement” or “systematic disposition” of the information on the card (Kaiser 1911, §§ 375, 647). Similarly, the conventions of alphabetical order assured that each index item received a “fixed position” (§ 183) or “fixed place” (§ 663, s.v. “Fixed Place”) within the sequence of items in a card file on the basis of the alphabetical position assigned to each of the component terms of its statement. Yet these other kinds of fixed points interacted, in one way or another with the statements formed from the different categories of terms. In the case of alphabetical sequence, we have just observed that alphabetization had to take the categorial structure of statements into account. As for the position of different elements of index items upon unit cards, these included locations for the inscription of the statement upon a card, configured in such a way as to highlight visually the first term over the second and third terms (See Section 4.4 of the current chapter): furthermore, it should be kept in mind that all the other elements on the card were but “amplifications” of the statement in the first place (See Sections 3 & 4.3 of the present chapter). In short, the three term categories, as fixed points,

provided a structural basis for all the different systems that Kaiser identified as components of a card index: it was on the basis of this shared common feature that these systems were correlated and harmonized into a single organization. Here, then, was another way in which SI could be considered to manifest the quality of systematicity.

Thus far, we have considered two perspectives in light of which SI could be viewed as embodying the quality of systematicity. From one point of view, implicit in Kaiser's writings but not developed by him, his method of indexing coordinated four different classifications into a single system: as such, it exemplified a process that he called systematization. From another vantage point, which Kaiser did set forth explicitly, SI coordinated four different sectors, or systems, of a card index into a single higher-level structural framework, that is to say, an organization: in this sense, it exemplified a process that he styled as organization. These two interpretations were not entirely consistent with one another, at least in theoretical terms. Kaiser (1911, § 99) considered systematization and organization to be different levels in a single continuum of increasingly complex organizational processes: on this view, the products of organization—namely, organizations—were composed of the products of systematization—namely, systems. To posit that SI—or, better, card indexes created in accordance with the protocols of SI—simultaneously embodied a system and an organization would have been to equate a part with its whole and so to lead to a contradiction within the framework of the continuum.

Yet if the interpretations of SI as a system and as an organization were not compatible with one another in the strict sense of the term, they were closely related and shared a fundamental point in common: both valorized classification as a critical element in the overall design of SI. Of course, they did so in different ways. The conceptualization of SI *qua* system presented four different kinds of classificatory structures—categorical classification, alphabetical classification, the logical classifications of related terms, and the document classification expressed by call numbers—as component parts of the system interacting with one another in different ways. The interpretation of SI *qua* organization, on the other hand, foregrounded one of these classificatory structures—the categorical classification of terms into terms of concretes, countries, and processes—and identified it as the source of the “fixed points”—the structural foundation—underlying the four different systems—statements; index items on unit cards, taken both singly and as elements of an alphabetically arranged card file; the five-position guide card system; and the system of cross-references—that conjointly constituted a card index. Whether one viewed SI as a

means of coordinating different kinds of classifications into a single system or considered it to be a method for combining different systems into an organization on the basis of a single set of categories, the emphasis was squarely upon the harmonious integration of different structures—be these conceptual or material—into the framework of a card index. Both interpretations, then, characterized SI as a method that generated systematically structured indexes and so displayed the quality of systematicity: in this respect, they complemented—indeed, reinforced—one another quite well despite the lack of strict theoretical congruence between them.

Kaiser's conceptualizations of SI *qua* system and *qua* organization were based primarily on structural features of the indexing scheme and the card indexes that resulted from its application. In this respect, he envisioned the systematicity of SI in terms of such contemporary definitions of "system" as "[a] plan or scheme according to which ideas or things are connected into a whole", "a number of things or parts so connected as to make one complex whole", or, more abstractly, as "orderly arrangement" (Murray et al., 1888–1928, Vol. 9/2, 394, II.10 s.v. "System"; Whitney & Smith 1911, Vol. 9, 6142, 1–2 s.v. "system"). On this widely-held view, a system was both an abstract scheme for arranging a disparate group of objects into an orderly, structured whole and the actual configuration of objects brought into alignment by means of that scheme: moreover, to be "systematic" meant to be "formed with regular connection and adaptation or subordination of parts to one another and to the design of the whole" (Whitney & Smith 1911, Vol. 9, 6143, 1 s.v. "systematic"). Yet there was another, third sense in which Kaiser's protocols for indexing could be understood as manifesting systematicity. The word "system" had a processual meaning, referring to "[a]n organized scheme or plan of action, esp[ecially] one of a complex or comprehensive kind" or "an orderly or regular method of procedure" (Murray et al., 1888–1928, Vol. 9/2, 394, II.9 s.v. "System"). Thus, a system could be a structured method of doing something—that is to say, a "complete set[] of rules of procedure for attaining a given end" (Whitney 1906, Vol. 5, 3740, 2 s.v. "method") or, in a slightly fuller formulation, "a method by which an operation or plan of anything may be started and carried forward with each operation in perfect harmony with the previous operation until completed as a whole" (Wagemaker 1908, 150); by the same token, to be "systematic" could mean "[to] proceed[] according to system or regular method" (Whitney & Smith 1911, Vol. 9, 6143, 2 s.v. "systematic"). This procedural notion of systematicity applied to SI no less than the structural one did.

To Kaiser's (1911, §§ 15, 579, 625, 647) mind, the goal of creating and maintaining a systematic card index was to allow the users thereof to exercise "systematic control" over the "large quantities of information" recorded upon unit cards and kept in index files. Now, in his view,

[t]he handling of large quantities means invariably specialization in the processes of handling with the object of turning out the maximum quantity at the minimum of cost. The most insignificant process is therefore important enough to be systematised and linked up with others in a carefully thought out chain of operations which collectively performs the work required in the most expeditious manner. Large quantities can only be handled successfully therefore on strict methodical lines (Kaiser 1908, § 160).

Kaiser did not hesitate to apply this general understanding of processes as chains of operations, which he had derived from the discourse of industrial management (See Sections 3.3.1–3.3.2 of the present chapter), to the activity of indexing as well. For example, in *Systematic Indexing*, he reduced "[t]he whole operation of making a card index" to a sequence of nine steps (§ 447 [cross-references & footnotes excluded]):

- 1 Select carefully what is to be indexed
- 2 Read and make up statement
- 3 Ring each concrete and country indexed in the original
- 4 Collect the material for the amplification of the statement, including call number
- 5 Write as many cards as the statement contains concretes and countries
- 6 Verify and check cards, especially statement
- 7 File cards
- 8 Make guides if necessary
- 9 Make related terms on guides

Nor was this the only place in his writings where Kaiser made use of such summaries to describe processes related to knowledge organization. Elsewhere in *Systematic Indexing*, he outlined an even more elaborate, twenty-step sequence of operations for preparing a book index (§ 597), while in *The Card System*, he offered a number of similar lists describing the processing of different kinds of office documents from receipt to filing. Here, for instance, is the list of activities involved in the treatment of letters from correspondents whose names were already on file in the registers for correspondence (See Chapter 6, Section 3.4) or, as Kaiser (1908, § 219 [footnote excluded]) called them, "[o]ld [c]orrespondents":

- 1 Read letter to see that all things referred to in it are in hand, that date and initials are put on.
- 2 Put on missing list what is not in hand.
- 3 Note enclosures, date etc. on letter if not done.
- 4 Look up names of letter in Alphabetical Register and ring in blue all names for which no cards found.
- 5 Put C number on letter and ring in blue all names for which no cards were found.
- 6 Get out binder, compare with letter.
- 7 Make changes on cards of names or addresses if any.
- 8 Make cards for names ringed blue.
- 9 File cards made.
- 10 Put call numbers on enclosures.
- 11 Make cross references on letter and enclosure.
- 12 Make cards for enclosures and file both.
- 13 Read letter for indexing and ring in red terms to be indexed.
- 14 Make index cards for terms ringed red and file.
- 15 Provide letter with adhesive tape if required.
- 16 Perforate letter.
- 17 File letter in binder.
- 18 File binder.

This sequence of steps covered the inspection and annotation of the letter and any items that might come with it (Steps 1–4, 10–11), the preparation and filing of cards for the relevant card register(s) (Steps 5–10, 12) as well as index items for the card index (Steps 13–14), and the integration of the letter into its binder and the filing of the latter (Steps 15–18). Similar, though less extensive summaries dealt with the operations of processing letters from new correspondents (§ 220); withdrawing superannuated documents and cards from the files, card registers, and card indexes (§ 221); and the treatment of press cuttings (§ 223), periodicals (§§ 244–245), books (§§ 256–257), and trade catalogs (§§ 265–266). It is striking that, in the example given here, the nine operations that Kaiser listed for making a card index were, in effect, reduced to two “macro-operations” in the summary for treating letters from old correspondents: this serves as a vivid reminder that indexing *qua* process was ultimately embedded within a larger workflow (See Chapter 6, Section 2.2, above).

Kaiser (1908, §§ 4, 219, n. *) stated that the object of summaries such as the foregoing was “to enumerate all possible steps in a given operation” and so to serve as a guides for workers in training, who could consult them “to ascertain that all the various steps” of a given procedure had been carried out without any omission. To be sure, it was somewhat of an exaggeration on his part to claim that these summaries itemized “all possible steps” in a given process, for many of the individual operations listed could, in theory, be resolved into further sequences for sub-processes: for example, Step 5 in the summary of making a card index—“Write as many cards as the statement contains concretes and countries”—could be decomposed into steps outlining the sequence in which different elements of the amplification were to be entered on a card (cf. Section 4.4 of the current chapter), while Step 9—“Make related terms”—could likewise be further broken down into a series of specific operations by which cross-references were to be determined and recorded (cf. Sections 5.2.2–5.2.2.2 of the present chapter). Yet if Kaiser did not spell out in detail every single possible step in the processes that he anatomized in the summaries, those that he did list were sufficient to serve as the basis for organizing the workflow for, and the distribution of labor among, the personnel of an office or intelligence department (cf. Kaiser 1908, § 163; Section 3.3.2 of the current chapter). In short, the enumeration of sequential steps provided the framework for carrying out the processes of registering and indexing in a regular and methodical—that is to say, systematic—manner.

Kaiser’s summaries provided basic procedural outlines for the creation of registers, the construction of indexes, and the constitution of document files. To carry out the steps of these outlines, however, the personnel of an intelligence department required guidelines on numerous matters of detail. What kinds of documentary materials were to be collected (See Chapter 6, Section 2.2; 4.1 of the current chapter, above)? How were these materials to be arranged in the files or on the shelves (See Chapter 6, Sections 3.1–3.2, above)? What kinds of registers would a department adopt and would it include a central register among them (See Chapter 6, Section 3.4)? In the particular case of indexes, what kinds of subjects would be selected for indexing (See Sections 1 & 4.1 of the present chapter)? What conventions for the normalization of terms would be adopted (See Sections 3.6 & 4.2 of the current chapter)? Would the amplifications in index items include descriptive annotations or informative condenses (See Section 4.3 of the present chapter)? To what level of detail were cross-references to be established (See Sections 5.2.2–5.2.2.2 of the current chapter)? Would there be separate index files for different kinds of documentary materials or would there be

one central index (See Section 5 of the present chapter)? What color-coding scheme would be used to distinguish files and cards associated with different kinds of documentary materials (See Chapter 6, Section 3.1; Section 5 of the current chapter, above)? Moreover, there were questions of policy regarding the use of the files, registers, and index(es) maintained by an intelligence department: which members of the parent organization were to be allowed access to the files in question? If a card index, as well as the card registers and document files with which it was associated, were to be constructed and maintained in a truly systematic manner, it was necessary to provide detailed instructions regarding the underlying schemes and rules for governing their implementation.

Kaiser held that the protocols explicating the design of the various components of a card system—namely, registers, indexes, and document files (See Chapter 6, Section 3.4)—and setting forth instructions for their operation, maintenance, and use should be recorded in writing. In this, he followed what was becoming a standard practice in late 19th- and early 20th-century business organizations, especially larger-scale corporations: the compilation of office manuals that expounded rules of procedure, general and/or specific instructions for work, and explanations of policy (Black 2007a, 135–140; Yates 1989, 71–72; Schulze 1913, 120–126). Whereas such documentary codifications of rules, instructions, and policies most frequently took the form of bound book(let)s or loose-leaf manuals (Yates 1989, 72), Kaiser (1908, §§ 336–341) stipulated that such information be entered upon cards filed together in a small cabinet that he dubbed the *key cabinet*. Serving as the written documentation relating to a card system, the key cabinet recapitulated, in part, the structure of the system in its own internal arrangement. Each separate file within the card system was represented by a distinct division within the key cabinet under which were entered the cards bearing instructions specific to it (§ 337). “Where possible”, urged Kaiser, the position of the guides and cards of each division “should correspond with the actual file, if only for quick identification” (§ 338): in *The Card System*, he provided an illustration of this with a picture of the key cabinet kept at the Tariff Commission (§§ 340–341).

Kaiser considered the key cabinet to be an important tool for the management of a card system, characterizing it in the following terms (§§ 336–337):

The function of the key cabinet is to gather up the threads of all the material and card files, in it are focused the individual arrangements of each file and its relative position and co-ordination with others. The key cabinet, as its name implies, is the head of the entire system, through it the files are managed and kept in order.

Whatever instructions are given as to the arrangement and management of the files of materials and cards should be noted in the key cabinet so that in case of doubt or difference the original instructions are available for comparison.

If the key cabinet cannot answer a given question, it must remain unanswered.

Providing an authoritative point of reference for the rules, instructions, and policies relating to the various elements of a card system, the key cabinet was also used to document any decisions regarding alterations to the system over time: in this respect, it was analogous to what office managers called “decision books”—book(let)s that recorded policy decisions made in response to questions that arose in the course of work (Schulze 1913, 126–128). Well aware that “beyond the confines of [a] system there are blank margins in all directions, which cannot be filled in until such cases arise as will compel us to extend the ramifications of our system into these margins”, Kaiser (1908, § 357) appreciated this aspect of the key cabinet’s function, for, as he wrote in his final account of SI,

[a] careful record should ... be kept of any developments, changes, etc. relating to the system and its operation. It is only by knowing exactly the road we have travelled that we shall be able at any time to determine whether any proposed change, etc., would be consistent with the system as a whole. If no record is kept, then control ceases to be effective, and the system will deteriorate (Kaiser 1926, 33, § 43).

Inasmuch as the key cabinet allowed one to keep track of modifications introduced into a card system over the course of its development and provided information that allowed one to assess the suitability of proposals for change as they arose, it materially contributed to conserving the systematicity of the latter.

Although Kaiser readily acknowledged that the various parts of a card system would inevitably require adjustment and alteration over the course of their use, he held that, ideally, they would be designed in such a way that changes would be minimal. He thus placed great stress on the need to plan carefully the design of, and rules for operation for, a card system prior to its implementation. Indeed, in his view, “[t]he laying out of plans is the most important work, for we must be prepared to stand or fall with our system; it will mean either success or failure”: accordingly, he averred, “we must act with great deliberation and circumspection”, for “once work is started, we cannot go back; patch work practically means failure” (Kaiser 1926, 32, § 39). In the case of a card index *qua* organization, it was first necessary to determine its basic structural elements, or fixed points. “When all our fixed points are determined”, Kaiser (1911, § 635) wrote,

we may proceed to lay out our plans of control more in detail. We have the foundation secure, we can now build on it. Mentally, we must build up our entire organisation, we must follow it out even to the details, we must apply the most severe tests, we must assume that all the possibilities known to mankind are bent on happening for the purpose of injuring our organisation, it must be able to withstand them all,—then the devising of the plans of our organisation is done.

Planning, he maintained, should be carried out on the understanding that the resultant design and rules for operation were to be permanent features of the index: “if a plan is adopted, no change of any kind can be made in it for a number of years and even then only rarely and for ample reason” (Kaiser 1926, 33, § 42). Once the plans for an index had been established and recorded in the key cabinet, it was crucial that they be implemented as rigorously and consistently as possible.

When our plans are available, we require the same patience and consistency to put them into execution. They must be carried out faithfully. The safest view to take is that nothing can be varied or altered without injuring the organisation as a whole. In a good organisation even the smallest details are so systematically linked up that there is no choice, they must be carried out exactly as planned. If a variation does not apparently affect the organisation as a whole, that is conclusive proof that the plans been thoroughly considered. There must be no mending and patching up as we go along. The organisation must become in all respects identical with the plans laid out (Kaiser 1911, § 636; cf. 1926, 33, § 43).

With his insistence that the persons involved in indexing work hew as closely as possible to the instructions, and policies recorded in the key cabinet, Kaiser brought to the fore a final dimension of the procedural systematicity of SI: to assure that the integrity of the structural systematicity of an index *qua* organization be maintained in practice, it was necessary that the persons responsible for implementing it execute the prescribed procedures in a consistently methodical—that is to say systematic—manner. Only in this way would the resultant index in fact exhibit the systematic structures prescribed by the protocols of SI.

7.6.2. Systematic Indexing and Individuality

We have just seen that Kaiser considered structural systematicity to be the defining feature of his indexing method and the indexes that it generated. This systematicity was ultimately rooted in the three categories of terms—terms of concretes, terms of countries, and terms of processes—which were combined into statements conforming to a limited set of syntactic structures (See Sections 3, 3.5, & 3.6 of the present chapter). In Kaiser’s view, the formulation of statements was of central importance to his scheme of indexing: indeed, he averred, “[t]o those who are not prepared to give sufficient attention to the statement,

my advice is: don't index by this method" (Kaiser 1911, § 315). The significance of statements lay in the fact that they and their component terms formed the basis for all other major aspects of an index, including the construction of index items (See Sections 3, 4.3, & 6.1 of the current chapter), the alphabetical ordering of index items in a card file (See Sections 5.1 & 6.1 of the present chapter), the arrangement of guide cards as locational aids in the card files (See Sections 5.2.1 & 6.1 of the current chapter), and the use of cross-references to make connections among alphabetically dispersed but semantically related terms (See Sections 5.2.2–5.3 & 6.1 of the present chapter). Strictly defined structures—be they those of statements, of index items typewritten on unit cards, or of guide card systems correlated with statements, or of card files—pervaded the systematic card index: as Kaiser (1911, § 645; cf. § 399) observed, “[w]e are working everywhere on a fixed plan”.

The foregoing characterization of SI as an indexing method yielding systematic indexes constructed on a fixed plan may convey the impression that Kaiser's method was rigid both in essence and application. In some crucial respects, it was: for instance, indexers could use only a limited repertoire of syntactic forms of statements; they were bound by strict rules regarding the situation of the various elements of index items on unit cards; and the rôle of each position in the five-position system of guide cards was strictly defined (See Sections 3, 3.4, 4.4, & 5.2.1 of the current chapter). However, these highly visible—indeed, method-constitutive—constraints should not obscure the fact that, in practice, the protocols of SI gave indexers considerable freedom in shaping both the content and the form of an index. We have encountered numerous examples of this over the course of this chapter: let us recall only a few of the most important ones for sake of illustration. Whereas Kaiser stipulated that each index term must belong to one of the three categories from which statements were composed, he did not prescribe which particular terms were to be used within an index: indeed, apart from stating that terms were to be derived directly from the textual units being indexed and that specific terms were generally preferable to collective terms, he left the selection thereof entirely to the discretion of the indexer who, he assumed, would make his choices on the basis of the particular interests of the organization for which he was working (See Sections 1, 2.2.3, 2.2.5, 3.6, & 4.2 of the present chapter). Indexers also enjoyed a good deal of latitude in the formulation of the amplification that, together with a statement, composed the individual index item relating to a piece of information derived from a given textual unit: in particular, it was up to them to decide whether the extensions of statements would take the form of annotations describing pieces of information in a

manner akin to that of an indicative abstract or whether they would be condenses summarizing the information in a manner akin to that of an informative abstract (See Section 4.4 of the current chapter). Moreover, Kaiser gave indexers free rein in choosing which cross-references to make among the main entry terms signaled by first and/or second guides in a card file: again, he assumed that the needs and interests of the organization for which the index was being prepared would guide the determination of the (kinds of) related terms incorporated into the cross-reference structure of the index (See Section 5.2.2.2 of the present chapter, esp. pp. 625–626, above). In short, within the constraints imposed by the elementary structural forms prescribed for statements, index items, card files, and cross-references, the indexer had ample opportunity to tailor the subject scope, terminological content, and, to some extent, the syndetic structure of an index to the particular context in which it was to be used.

Kaiser considered such elasticity in the application of the formal structures of SI to be an important feature of his indexing method: indeed, in *Systematic Indexing*, he prefaced his discussion of methodological protocols with the statement that

[d]ue allowance must be made always for the peculiarities of each business and the following rules and explanations must not be taken as something to be absolutely followed; on the contrary, they should be taken as examples of method; they should be adapted if they cannot be adopted (Kaiser 1911, § 312).

To be sure, Kaiser was not the only writer on indexing to insist on flexibility in indexing: contemporary authorities on back-of-the-book indexing likewise stressed that a mechanically uniform application of the rules and principles that they set forth was neither possible nor, for that matter, desirable (e.g., Nichols 1892, 407; Wheeler 1905, 466). Yet, as the opening clause of the passage cited above clearly indicates, Kaiser's (1908, § 76; cf. 1911, §§ 7, 418) underlying rationale for underscoring the need for flexibility in the use of SI was based not on general considerations of literary indexing but on a highly specific premise, namely that "[e]very business, each office has its individual character and individual requirements, and its individual internal organisation" and, accordingly, that "its system must do justice to this individual character". In other words, the protocols of SI had to be applied in such a way that they not only respected the basic structural templates for the constitution of statements, index items, card files, and cross-references, but also resulted in an index the contents of which reflected the individuality of the business organization for which it had been created.

In invoking the individuality of businesses, Kaiser drew upon a contemporary current of thought that can, perhaps, be best characterized as entrepreneurial individualism. This form of individualism, which had its natural home in the realm of business, operated at two distinct, but interrelated, levels: the corporate and the individual. On one hand, a business organization as such could be considered as a complex entity possessing distinctively individual features: for example, one American accountant writing on business education stated that such aspects of a business as its “policy”, its “internal and external organization”, its “financial interests”, and “the limits of its operations” all contributed to forming “what may be termed the *individuality* of the business” (Rowe 1902, 43 [emphasis his]), On the other, a business enterprise could be considered to be an expression of the individuality, or if one will, the personality of its creator or current director. Consider, for instance, the following passage from an article penned by A. Montgomery Ward, the founder of a major American mail-order firm, in which, citing the well-known example of the Scottish-American industrialist Andrew Carnegie, he ruminated on “the power of personality” in business:

This is the primary personality of business—the firm founder or head whose name stands for its policy. And around the personality is built up the organization which expresses that personal power in all the firm’s transactions.

Thus we find Carnegie founding the steel trust. He throws Carnegie personality into the organization. Carnegie power goes in also. Carnegie guarantee likewise—and we find the steel trust’s girders and beams labeled not “United States Steel Corporation,” but “Carnegie”.

Now, that personality of his influences every employee, stimulates every manager, creates duplication of each good idea upon the broadest plan till each part of the great combination is enjoying the best that each other part has, and finally finds imperishable expression in that lettering on the steel framework of the enormous buildings and bridges and elevated structures which are a greater monument to Carnegie than his libraries (Ward 1907, 341).

Ward was hardly alone in extolling the entrepreneurial businessman as the creative force and animating personality that bestowed individuality to a business. One of Carnegie’s former protégés, the steel magnate Charles M. Schwab, likewise celebrated the entrepreneur *qua* individual, proclaiming that

[t]he great business enterprises of the past have been built up by the individual interest and the individual efforts of certain individuals. If you will look back over the great businesses that have been built up you will find that they have been the result of some one great mind which has had all its interest in that business. The

result of that individualism was great progress, great extensions, great economies and great successes (Schwab 1902, 7; cf. 1920, 26).

Men like Ward and Schwab, not to mention Carnegie, were heads of large corporations or combinations thereof and, as such, ranked among the class of leading businessmen popularly known as “captains of industry” (Sears 1951, 403):⁵³⁴ it is perhaps unsurprising that they should have been susceptible to an interpretation of business enterprise that construed it as an expression of individual achievement. The notion of entrepreneurial individualism—the view that businesses were the products of individuals and, as such, bore the imprints of their founders and/or leaders—that they espoused also circulated widely in less rarefied business circles. Readers of general business magazines such as *System* were told that “BUSINESS is based upon the expression of individual characteristics” (Curtiss 1909), while trade journals in more restricted fields did not fail to include articles expounding on the theme that “[e]very business that rises above the ordinary portrays in many of its features the individuality of the governing spirit behind it” (The Individual 1902): such considerations typically formed the basis for exhortations to readers to imbue their business dealings with their own personality or individuality.

Kaiser subscribed fully to the assumptions of entrepreneurial individualism outlined above. We have already seen that he considered business firms to possess their own “individual character and requirements” (Kaiser 1911, § 7) *qua* organizations. He also held that the individuality of any given business organization, be it large or small, ultimately derived from the personal endeavors of the businessman or -men who conducted its affairs. This assumption found striking expression in several passages of *Systematic Indexing*. In Chapter 6, Section 2.2, we noted that Kaiser set forth an argument for the necessity of maintaining a department devoted to the storage and provision of information—i.e., an intelligence department—within a business organization. In doing so, he posited that all business transactions could ultimately be reduced to the application of a businessman’s enterprise, or energy, to the information that he had at his disposal. This line of reasoning was clearly intended to present information as a crucial factor in the successful prosecution of business activities. Yet, at the same time, he underscored the point that the individual qualities that a businessman deployed in utilizing the information to which he had access were of cardinal importance to determining the outcome of his activities:

⁵³⁴ On the history and semantic development of this term from its coinage by the English essayist Thomas Carlyle in 1843 through the first years of the 20th century, see Dixon 2002.

Information is useful, but the degree of its usefulness is very largely dependent on our powers of turning it to account. That the right kind and quantity of it is an important asset cannot be questioned, but the secret of its application, its successful exploitation lies within us (Kaiser 1911, § 5).

Our knowledge or information may be more or less public property and therefore not generally confined to ourselves, but our enterprise, our energy is something peculiarly our own, it is individual or special. Hence a transaction although based on what may be generally accessible to others will always retain certain individual characteristics. It has received the imprint of our individuality which differentiates it from others. Our individuality is our greatest asset (§ 23).

In addition to the energy—the combination of initiative, persistence, and industry deemed to lie at the heart of enterprise (See Chapter 6, Section 2.2, esp. p. 200, above)—that a businessman expended in the course of his activities, the intelligence and originality with which he made use of the knowledge that he had gained from his assimilation of information about affairs of interest to him in the business world was essential to determining the success of his enterprise. In Kaiser's (1911, § 58) estimation,

[a]ll great ideas have originated with individuals, it may take the majority sometimes a hundred years to grasp them. Wherever any business has prospered or has come into prominence, it will be found to have been the result of one individual's capacity.

As this passage, so reminiscent of the one from Schwab cited earlier, intimates, Kaiser considered the entrepreneurial individual running a business to play the leading rôle in determining its direction *qua* enterprise: in other words, the individuality of a business organization bore the imprint of the individuality of its leader.

Kaiser's acceptance of the tenets of entrepreneurial individualism appear to have been symptomatic of a general temperamental inclination toward individualism on his part, hints of which can, perhaps, already be discerned in his early *Lebenslauf*. Originally educated for a career in the trades in his German homeland, he had elected to follow a quite different occupational path upon immigrating to Queensland as an eighteen-year old: there he was active as an amateur musician and sought to make a living first as a freelance teacher of zither performance and German language in Brisbane and, later, as a schoolteacher in Toowoomba (See Chapter 2, Sections 1–2, above). The subjects in which he offered instruction as a freelance teacher were ones involving particular linguistic and musical knowledge that he possessed in virtue of his ethnic background and which was not widely diffused among members of the anglophone public of Brisbane: in other words, he quite consciously drew upon his own individual skills as resources with which to make his way

into an occupational sphere for which he had little formal preparation. It is also striking that, in many of the concerts at which he performed, he did so as a soloist: it was as an individual performer that he made his mark on the local musical scene. After his move to Chile, where he worked in private schools first as a senior master and, then, headmaster, he altered the form of his surname from its original form “Kaeser” to “Kaiser” (See Chapter 2, Section 3, above): whatever the motivation may have been, the change of name signaled a willingness to remold, on his own terms, an important feature of his public identity. Taken in isolation, these aspects of Kaiser’s early life may seem to have little, if anything, to do with one another, but when they are viewed in tandem and in light of later developments, they suggest that, already as a young man, Kaiser possessed both personal initiative—a modicum of entrepreneurship, if one will—and a sufficient sense of his own individual strengths to deploy them for his own occupational advantage: here was somebody for whom the bromide that “[o]ur individuality is our greatest asset” (Kaiser’s 1911, § 23) could not but carry conviction.

Whereas Kaiser’s own temperament and experiences may well have rendered him receptive to the notion of entrepreneurial individualism, another factor seems to have confirmed his adhesion thereto: the fact that this current of thought pervaded the contemporary discourse of office organization and system within which he situated his own work (See Chapter 1, Section 5.2.1, above). Proponents of the use of card systems in business took it as axiomatic that, in practice, filing systems and their accompanying card indexes had to be designed in such a way that they corresponded to the informational requirements of the businesses in which they were used. For example, the American author of a manual on indexing and filing noted in the preface to his work that

[i]t must be kept in mind ... that no two organizations, even in the same line of business can operate under exactly the same system, and modifications or amplifications of the methods here described must be made as they are found necessary” (Hudders 1916, vi).

In much the same vein, an English writer on card index systems observed, with regard to the physical organization and indexing of correspondence, that

In considering the question of classification the requirements of the particular firm concerned must be the first consideration

the card system provides opportunities for indexing the correspondence itself in a way that is possible under no other system. To do this effectively requires a certain amount of judgment and intelligence, and as the requirements of different firms

differ so considerably, it is hardly possible to do more than indicate the methods employed (Byles [1911], 16, 19).

Underlying statements such as these was the assumption that each and every individual business organization had its own unique needs to which the methods of filing and indexing used in its systems should be conformed.

Whereas writers such as the foregoing focused on business organizations as individuals, others drew a direct link between the businesses and the individuals behind them. For instance, the author of a protreptic editorial on the importance of system in business published in the journal *System* told his readers that

System is a living being. Its home is your office—your workshop—your factory—your store—or even your desk. It lives on your work—devours your detail.

Your System is your creature. You fashion it yourself. You may make it do the very things you want it to do—or you may let it grow rank and suffocate your business. It will be a good system or a bad system according as you have designed it well or poorly.

... As your System lives, so will your business live. And, as it dies, so will your business die.

System is your second self. ... ([Untitled Editorial] 1904, [1]).

On this view, there was no significant distinction between the interests of the individual businessman and those of the particular enterprise that he directed, the latter being simply an outgrowth or extension of the former. Accordingly, the various files, documentary materials, and card indexes comprising the “System” within which information about the operation of the firm was compiled, indexed, and stored for reference could be conceptualized as the personal tools of the individual business firm as well as the organizational tools of the business at the head of which he stood.

The intimate conceptual linkage between individual business organizations and the individuals who directed them afforded Kaiser the opportunity to bring the tenets of entrepreneurial individualism into alignment with his own version of epistemological individualism (See Section 2.1 of the present chapter, esp. pp. 308–310, above). We have seen that he considered all knowledge to be ultimately derived from observation of things in the world and “the conditions attaching to them” (Kaiser 1911, § 52): observations, whether experienced at first hand or recorded in documentary form, provided the primordial data to which could be applied the various processes of reasoning leading to

“deductions” (§§ 74, 297) and “generalizations” (§ 79) about phenomena of interest, as well as to judgments about how to act with regard to them. We have also observed that, in his view, all observation was individual and that, accordingly, “[t]he individuality of an observer will be expressed in each of his observations and their application” (§ 57). By the same token, reasoning from facts, whether based on one’s own observations or on written reports of observations made and interpreted by others, would vary from individual to individual: as Kaiser put it, “generalisations ... will always show individual tendencies” (§ 79). On this view, each individual businessman regarded the world from a particular—indeed, unique—perspective through which he interpreted the phenomena that he observed or about which he read. Although Kaiser considered it important that businessmen consider the views of others in deliberating about matters of interest to them (§ 57), he nevertheless maintained that, as a rule, “individual observation is best followed by individual application of the knowledge gained” (§ 58). In other words, the individual nature of business activity posited by entrepreneurial individualism was ultimately rooted in the individual nature of knowledge acquisition as presupposed by epistemological individualism.

Kaiser’s conceptual amalgamation of epistemological and entrepreneurial individualism shaped his views on the question of what kinds of tools of knowledge organization were most appropriate for use in a business organization’s intelligence department. His ideas on this score encompassed both negative, or critical, and positive, or constructive, considerations. On the negative side, he held firm opinions about what kinds of aids to knowledge organization were unsuitable for such a setting. We have already had occasion to note this for such bibliographic instruments as “published indexes, catalogues and bibliographies to periodical and other literature” (Kaiser 1911, § 6). One of Kaiser’s reasons for considering such items to be insufficient tools of search for information in a business context was that they catered to “the common requirements of a number of subscribers”, whereas “[e]very individual moves in a sphere of his own and covers individual ground such as a printed index cannot touch”: to his mind, they were simply too generic in their subject coverage to correspond fully to the informational needs of any particular business organization (See Section 1 of the current chapter, esp. pp. 275–276).

Kaiser would go on to develop a similar, but much more detailed and far-reaching, argument with reference to bibliographic classifications. He chose as his example a classification that he characterized as being currently “the last word in arranging books” (Kaiser 1911, § 246) in libraries, the DDC. Now Kaiser thought that the DDC was worthy of

criticism on a number of different fronts: among other things, he thoroughly disliked, for highly idiosyncratic reasons, the principles on which its notational system was based (§§ 128, 134, 258–263);⁵³⁵ he critiqued what he perceived to be a bias toward the United States in the articulation of its geographical classes (§ 266);⁵³⁶ and he had hard things to say about

⁵³⁵ Kaiser had two primary objections regarding the DDC's decimal notation. First, taking as an axiom the statement that "[n]otation and classification should show identical construction so far as that is practicable" (Kaiser 1911, § 133), he thought that the ordinal sequence of decimal numbers in the notation distorted the representation of the classification's hierarchical structure. In his view, this distortion occurred in the fact that the more specific (and, hence, extensionally "smaller") a class, the larger the numerical value of the decimal assigned to that class. For example, 621 was the class number for Mechanical Engineering, whereas 621.1 was that for Steam Engineering: despite the fact that Steam Engineering was a subdivision of mechanical engineering and hence, in principle a "smaller" class, the numerical value of the decimal class number assigned to it was greater than that assigned to its superordinate class, for 621.1 (= .6211) > 620 (= .620). To Kaiser's mind, the fact that a larger decimal number should be assigned to a hierarchically "smaller" class was a scandal (§§ 258–259).

Second, he deplored the fact that 0, or "nought", played a prominent rôle as a digit in the DDC. *Inter alia*, it served as the base for the class numbers pertaining to General Works (sci., 000–099) and the digits serving as notation for the ten divisions at each hierarchical level of the classification did not run from 1 to 10 but from 0 to 9. Now, to Kaiser's mind, "[n]ought has no numerical value like 1 or 2, it indicates the absence of *any* numerical value. If it deserves to be called a number at all, it must be put into a class by itself. To speak of nought as a unit is absurd. ... A series of numbers must always start on 1 as a unit, it cannot reasonably start on nought" (Kaiser 1911, § 126). Accordingly, he thought the use of 0 in DDC to be what he later called "a wholly unjustifiable perversion of an age-long practice" (1926, 30, n. 4). In this, Kaiser apparently wanted notation to reflect what he considered to be an obvious piece of notational metaphysics—if 0 meant nothing, it should not stand for something (cf. Metcalfe 1977, 177). Needless to say, his arguments were not bound to carry conviction: even one of his greatest latter-day admirers would later characterize him as being "uncharacteristically blind" in his judgment of the DDC's notation and considered his argument against the use of 0 to be based on a "fixed and prejudiced idea[]" (Metcalfe 1957, 235; 1976, 177).

Finally, it may be noted, as an aside, that Kaiser (1911, §§ 273–275) was no less sparing of the UDC's adaptation of the DDC's decimal notation. Using examples interpreted in an uncommonly tendentious way, he argued that the long class numbers characteristic of the UDC were unwieldy to use and, despite their length, did not always refer to specific classes: he gave the example of 629.123.25, which, he claimed, was used in the IIB's *Index of the Technical Press* (on which, cf. p. 289, text to n. 286, above) to denote "Ice-breakers, Two-screw Tugs, Wrecking Vessels and Ferryboats": "This number has five decimals, i.e. the subject 629 has been split up into 100,000 divisions and with what result? We have only just emerged far enough from the fog to mistake an Icebreaker for a Ferryboat" (Kaiser 1911, § 273; cf. Metcalfe 1957, 235)! The UDC, in his view, was no improvement over the DDC in its notation and, he argued, generally less efficient to use as a means of indexing than systems, such as his own, using terms taking the form of natural-language words.

⁵³⁶ In his words, "[t]he Dewey classification has been designed for use in the United States; that is obvious from the distribution of the locality numbers [sci. actually, the class numbers in the 900s, or History, class, which also included geography—TMD]. Whereas the United States are allotted 7 whole numbers [sci., 973–979—TMD], the United Kingdom has only 2 [sci., 941–942—TMD], Germany, Austria and Hungary combined only 1 [sci., 943—TMD]. Needless to say that the Magyars for instance would have to employ a large number of decimals [sci., build long class numbers—TMD] to provide at all acceptable divisions of their territory. This difficulty must limit the application of the classification in countries outside of the United States". The contention set forth in the final sentence of this passage proved not to be accurate: by 1910, the DDC had gained a foothold in both the United Kingdom and Australia (cf. Bowman 2005, 150–153; Rayward 1983, 153–167; Sayers 1910, 318),

the distribution of classes and the level of granularity of subdivisions within the scheme (§§ 267–268).⁵³⁷ However, his fundamental objection to what he called the “Dewey classification” was that it offered a paradigm case of a more general phenomenon—the uniform application of a standardized, ready-made classification scheme across different institutions without due regard for the particularities of the contexts in which it was being deployed.

Kaiser (1911) launched this aspect of his critique by painting for his British readers a vivid, albeit highly exaggerated, picture of the uniformity and (near-)universality with which with the DDC was being applied in what he regarded as its natural setting—namely, American public libraries:⁵³⁸

To be able to visit any number of some thousands of public libraries scattered over the area of the United States, and to find in each applied the same Dewey

while in continental Europe, its offspring, the UDC enjoyed a vogue not as a bibliothecal, but rather, a bibliographical classification (Rayward 1983, 167–168; Sayers 1910, 318).

⁵³⁷ Kaiser noted that a number of subjects in enumerated in the schedules of the DDC’s 6th edition were not (yet) subdivided to any great depth or, alternatively, that certain specific subjects were not listed in the schedules and so were, *de facto*, absorbed into classes of greater generality. As an example of the first scenario, he gave the example of the subject of Foreign Trade, which had the class number 382 and was not subdivided any further (Kaiser 1911, § 267); as an example of the second, he cited the case of the subject Telephone Engineering, for which the only two suitable numbers in the schedules, in his estimation, were 629 (“Useful Arts: Engineering: Other Branches of Engineering”) and 654.6 (“Useful Arts: Communication & Commerce: Telegraph, Cables, & Signals: Telephones”), each of which was notably broader than the subject in question (§ 268). Kaiser noted that, although a business library could, in theory, introduce its own subdivisions to cover more specific subjects, Dewey’s policy of adding subdivisions in new editions of the classifications posed a practical impediment to this practice, for if the subdivisions added to an insufficiently specific subject by the staff of a business library in an earlier edition did not match those introduced by Dewey and his collaborators in a newer edition, then the staff would be compelled either to reclassify its homegrown subdivisions to align them with the new edition or to ignore the newer edition. Thus, Kaiser concluded, “[t]he user is put into this dilemma:

- 1 he must use the classification as it stands,
- 2 he is almost certain to require additional subdivisions,
- 3 if he adds anything at all, he puts himself out of touch with any new issue of the classification,
- 4 if he adds nothing, then he must expect to land on some unmanageable collective, which is of hardly any use to him” (§ 268).

⁵³⁸ Kaiser’s (1911, § 250) wrote that “originally it [sci., the DDC—TMD] was intended for the books of a public library”. Strictly speaking, this was incorrect, for, as is well known to library historians, Dewey first developed and applied his scheme at the library of Amherst College (Wiegand 1998). This inaccuracy in Kaiser’s representation of the institutional origins of the DDC most probably stems from the fact that, having no experience of college or university libraries, he considered the public library to be the prototype of the kind of library that housed general collections of books: insofar as the Dewey classification enjoyed a great vogue in American public libraries in the late 19th and early 20th centuries (cf. Richardson 1901, 199, cited in Sayers 1910, 318, but cf. Dewey 1899, 8),

classification, to find in each the same book by means of the same numbers and in the same numerical place, to be able to call for whatever books be required by giving the identical numbers at any of these libraries is a magnificent example of organisation whose practical utility seems beyond dispute (§ 243).

Acknowledging that many proponents of system might regard the standardized use of a single classificatory system across many different libraries with favor, he nevertheless noted that there was an unsettling undercurrent to this image of efficient and orderly uniformity:

In spite of its grandeur ... such a universal application of the Dewey classification—or any other classification—reminds one on second thought very forcibly of the network of straight streets for which American cities are noted. At first you are struck by the eminent simplicity and utility of these grid iron arrangements; they are so convenient and helpful, especially to the stranger. But when you have learnt to find your way about sufficiently to indulge in an ordinary constitutional, the fascination of the grid iron soon vanishes. For miles you walk in the same straight line, the monotony soon becomes exasperating but you cannot get away from it. In despair you turn the corner, only to find the same endless expanse before you. What a relief an occasional irregularity would give (§ 244)!

Apparently drawing upon impressions formed during his time in the United States, Kaiser strikingly evoked the sense of affective tedium that the undeviating regularity of orthogonally laid-out street plans in American cities engendered in the pedestrian imagistically to characterize the limiting and oppressive effects that, in his estimation, attended the uniform use of a single, standardized bibliographic classification across different libraries.

In presenting the idea of universal conformity to a single standard classification in this unfavorable light, Kaiser did not, by any means, wish to deny the utility or the desirability of standardization as such. Indeed, he maintained that “[s]tandardisation is a very old idea” and that “[t]here is a large field for its legitimate application; it has worked wonders in the army, at the factory etc” (Kaiser 1911, § 245). Yet, he observed, there were spheres of life in which standardization “has been tried and found wanting”: as examples, he cited two cases of what he saw as inappropriate attempts to impose universal standards upon human social arrangements and activities:

There are the socialists who would ultimately standardise the whole of human institutions; there are the pan-linguists who would have us all speak the same language. The socialists forget that even if they could carry out their plans, that would be of no avail unless they succeeded also in maintaining the new state of affairs, and this would only be possible if they succeeded in standardising the human intellect. The pan-linguists forget that local influences over which they can

exercise no control would soon distort their universal language, even if they had succeeded in capturing the human intellect (§ 245)

In Kaiser's estimation, any endeavors to regiment human intellectual activity in accordance with a single universal system, whether this took the form of an ideology or an international language, were foredoomed to failure, for they ran afoul of what he considered to be an axiomatic truth about human beings: "you cannot standardise the intellect", for "[d]ivergence of views is ... universal and necessarily so" (§ 57; cf. Section 2.1 of the present chapter, esp. p. 309, above). His firm belief that intellectual and linguistic diversity are ineluctable and unalterable facts of life was a direct expression of his thoroughgoing epistemological individualism, most likely reinforced by his experience of having lived in five different countries on four continents and of having knowledge of at least four languages (See Chapters 2–5, above).

Similar considerations informed Kaiser's attitude to the DDC and other classifications. He regarded the notion that a single general classification should be uniformly applied in all public libraries to be a fundamentally flawed idea, for such a classification failed to account for the particularities of the individual locales served by those libraries and, over time, its use threatened to efface them altogether: as he put it, "[a] library cannot emancipate itself from local influences, it should be the outgrowth of those influences, and they would be first to suffer by the adoption of a universal classification, it would tend to destroy them" (Kaiser 1911, § 246). What held for public libraries was *a fortiori* true for business libraries and intelligence departments, into which, Kaiser noted with disquiet, use of the DDC had been making inroads (§ 246; see Chapter 1, Section 5.2.4 & Chapter 6, Section 3.2, above):

[i]f the same classification is pressed into the service of all manner of business organisations, it must be regarded as a distinct misfortune, and on the face of it, it is doomed to failure, for once we admit the principle that ready-made methods can be adopted whether they take into account our specific purpose or not, then nothing but confusion can be expected (§ 247).

The generic nature of classifications like the DDC, which, to Kaiser's mind, were more-or-less appropriate for use in a public library setting ran counter to the imperatives of entrepreneurial and epistemological individualism, which called for a mode of knowledge organization that reflected the particular vantage points of particular business organizations:

A business man has marked out for himself a certain field of action, he is presumed to be an expert, a specialist in that field. He orders his materials to fall in with his set

purpose, he creates his machinery, he organises, he forms classes and brings them into relative positions. Why should he abandon his own natural classification with which he is familiar and which he understands and controls perfectly, for the sake of adopting a ready-made scheme which is based on a wholly different perspective? Every business is an entity, however specialised in subjects, and it is incompatible with its interests to treat itself as a mere fraction of Dewey, as it would have to do, if it made use of his classification (§ 249).

Much as the subject scope of printed indexes typically did not account for the full range of an individual business(man)'s domain of interests, so, argued Kaiser, the DDC and other general classifications failed to reflect the "natural" classificatory perspective of the individual business(man). Taken in tandem with the arguments against the use of the DDC and its congeners for shelf classification (See Chapter 6, Sections 3.2.1–3.2.2, above), these considerations confirmed his belief that bibliographical classifications were unsuitable to serve as a means of knowledge organization in an intelligence department or business library.

In Kaiser's view, then, printed indexes and bibliographic classifications alike were generic and prefabricated bibliographic tools intended for general use across multiple institutions and by persons from different backgrounds. As such, he argued, they could not adequately reflect the unique perspective or informational needs of any given business organization or businessman; they were thus inappropriate for use in an intelligence department or business library. By contrast, a homegrown systematic card index constructed in accordance with the protocols of SI could be readily customized to fit the particular field of interest of a given business. Unlike the printed index, catalog, or bibliography, which provided guidance to a fixed corpus of published articles or books, a systematic card index would contain index items drawn published and unpublished documentary materials alike that had been selected by the indexer for inclusion (See Chapter 6, Sections 2.2–2.3; Section 4.1 of the current chapter, above): as Kaiser (1911, § 97; cf. § 15) put it, "[w]e ourselves can best supply our own indexes, because we can cover *all* our literature, we possess the special knowledge required to do justice to our own wants, we can discriminate best to meet our own case". Unlike printed indexes and bibliographic classifications, which offered their users a limited and predetermined corpus of subjects with which documentary units were (to be) characterized, a systematic card index created by the personnel of an intelligence department had a subject scope directly determined by the particular informational interests and needs of its parent organization, for it was up to its indexer(s) to select the terms to be admitted into the index vocabulary (See Sections 2.2.5 & 4.2 of the present

chapter). And, unlike bibliographic classifications, in which the semantic relationships between the members of the limited corpus of subjects were, in large measure, fixed in monohierarchical classificatory structures encoded in the classification schedules, the canons of SI gave indexer(s) leave to set the main entry terms in a systematic card index into relationship with one another by means of cross-references “so far ... as the relationship actually exists from the point of view of the business which the index is to serve” (Kaiser 1911, § 425)—a measure that allowed for the creation of customized, poly-hierarchical classificatory structures reflecting the perspective of the organization in question (See Sections 5.2.2 & 5.2.2.2 of the current chapter). In short, the protocols of SI were sufficiently latitudinarian in their formulation to allow for the creation of systematic indexes the content and syndetic structures of which were directly aligned with the subject interests and informational needs of particular businesses (cf. Kaiser 1911, §§ 643, 646). SI thus fulfilled the imperatives of entrepreneurial and epistemological individualism and, accordingly, Kaiser considered it to be a method of knowledge organization eminently suitable for use in an intelligence department or a business library.

The tenet that the individuality of a business organization should be reflected by the method of knowledge organization employed in its intelligence department thus occupied a crucial place in Kaiser’s conceptualization of SI. It provided justification for undertaking the laborious and costly task of designing and implementing one’s own systematic index rather than relying on ready-made indexes and classification schemes derived from other sources and so less easily accommodable to the unique conjuncture of needs and interests animating the activities of one’s enterprise (cf. Kaiser 1911, §§ 7, 18, 639): to that extent, it provided a *raison d’être* for employing SI in the first place. No less important, it served as the warrant for giving those persons charged with designing and maintaining a systematic index the freedom to make decisions regarding such matters as “[t]he selection or rejection of information, the kinds of concrete, country and process terms, the extension and additions to the statement” in the index item, and the choice of related terms in the cross-references (§ 649): after all, Kaiser expected that the intelligence department of a given business organization would design its index to “fit [its] own purposes” (§ 642) and giving indexers “latitude” in the aforementioned areas was “merely making allowance for the divergence in purpose of the various indexes” belonging to different intelligence departments (§ 643).

Yet, if Kaiser's valorization of individuality and his firm belief that individual business organizations were best served by indexes customized to fit their particular purposes, interests and needs, led him to make provisions for incorporating some flexibility in design into his protocols for SI, there were definite limits to his latitudinarianism on this score. For one thing, as we have already noted, adherence to the general rules for forming the basic structural elements of SI—the statement, the index item, the alphabetical card file, and cross-references—was obligatory: Thus, for instance, whereas an indexer was at liberty to choose which terms of concretes, countries, and processes to incorporate into the vocabulary of his index and, within limits, the degree of normalization to which they subjected (See Sections 2.2.5, 3.6, & 4.2 of the current chapter), he could not deviate from the syntactic forms of statements prescribed in the protocols (See Sections 3 & 3.5 of the present chapter). Moreover, whereas Kaiser firmly believed that individual indexes would invariably differ from one another in purpose, scope, and content and that such divergences had to be accommodated by his indexing method, he was no less adamant that one should maintain stringent self-consistency and systematicity in the design, implementation, and maintenance of any single system: as he put it, “[a]n index is an organization” and “[t]here can be no latitude in organisation work the moment we are concerned with one organisation” (Kaiser 1911, §§ 629, 643).

It was at this point that the concept of individuality became both paradoxical and somewhat problematic. Thus far, we have seen that Kaiser's version of entrepreneurial individualism situated individuality primarily at the level of the business organization and the businessman directing it: indeed, the former derived directly from the second and Kaiser tended to speak of the two as being, for all practical purposes, interchangeable. And yet, individuality as a factor in business went well beyond the level of a business organization *qua* entity or of its director. A business organization was itself composed of departments, each of which had its own rôle within the framework of the whole and, hence, constituted a distinct, individual unit (cf. Chapter 6, Section 2.2, above); each department, in turn, was made up of employees, each of whom, of course, was a person possessing an irreducibly unique individuality. Now Kaiser (1911, § 57) held that “[e]ach individual represents an organisation, a system peculiarly his own, and his work is systematic to the extent of his capacity”: this meant that “[y]ou cannot get exactly the same work from any two individuals” (on this latter point, cf. Kaiser 1908, § 363). At the same time, the incomparable singularity of each individual person meant that his individuality would find

expression in his work, for, ultimately, “he must be consistent with himself” (Kaiser 1911, § 57). Although Kaiser laid out this somewhat idiosyncratically—indeed, almost cybernetically—formulated account of the individual person *qua* unique organisation or system in a discussion of observation and primarily had in mind the intellectual work associated with this perceptual-cognitive act (cf. Section 2.1 of the present chapter, above), it was no less applicable to work in general: after all, epistemological individualism generally betokens individualism *simpliciter*. The thesis that a single individual’s work possessed a natural coherence all its own led to a further corollary—namely that, all things being equal, there was a greater consistency in individual than in cooperative work:

[d]ivision of labour or concerted action although unavoidable, and even if under the control of one individual, cannot come up to the standard of the best individual work, for there is already a compromise, however small, a mixing of systems (Kaiser 1911, § 57).

Whether at the level of a department of a business organization or at the level of the organization as a whole, the collective work of any aggregate unit made up of interacting persons was a composite of the individual work of those persons, each of whom brought his or her own individual tendencies and capacities to the execution of his or her task. In general, then, the diversity of individual tendencies and capacities inevitably involved in the execution of collective work rendered it difficult to achieve full internal consistency therein.

Now Kaiser (1908, § 356) took it as axiomatic that “[s]ystem without consistency is an impossibility”. Since he assumed that, in larger business organizations at least, an intelligence department would have several persons taking part in the various tasks associated with filing and indexing (cf. §§ 62, 363), his general thesis that the participation of different individuals in the prosecution of collective work threatened the consistency thereof led to a dilemma: how were the systematic card indexes, card registers, and document files making up a card system to be implemented, operated, and maintained in a consistent, and hence, systematic manner, given that the individual tendencies of the workers involved would inevitably manifest themselves in their work and were likely to lead to variations and inconsistencies within the work as a whole? To Kaiser, who, it should be remembered, had overseen filing and indexing work carried out by others at the PCM and the Tariff Commission (See Chapter 3, Section 3.3 & Chapter 5, Section 3, above), the only solution to the problem of coordinating the centrifugal force of personal individuality lay in effective management of the system and the personnel engaged in operating it.

A first consideration in the management of a systematic card index, its associated card registers, and document files pertained to who should do the managing. Kaiser (1908, §359) contended that “the control of a system should be in one hand—and absolutely so ...”. The underlying rationale for this was clear: given his belief that “[i]f two do the same work, there will be slight variations, however much we may try to obviate it”, it stood to reason that “the more controlling minds” there were involved, “the less consistency” there would be in the system as a whole (§§ 363, 359). Furthermore, Kaiser held that the ideal person to oversee the operation of a system was the one who had designed it in the first place, on the grounds that he was bound to have special insight into how the system was intended to function as a whole and so was in the best position to resolve any questions regarding its extension into previously “undefined margins” as circumstances to do so arose (§ 357).⁵³⁹ In Kaiser’s view, the capacity to deal adequately the latter was especially important, since “[i]t is precisely these undefined margins which in most cases put consistency on its trial”. As the person entrusted with maintaining the integrity of the design of a system, the manager of a systematic card index, its associated card registers, and related document files was also to be given charge of the key cabinet in which the rules, instructions, and policies for the operation of the system were documented in written form (§ 339; cf. Section 6.1 of the current chapter).

The person in charge of a given system of indexes, registers, and document files was responsible not only for making decisions about its design and assuring that any changes made to it over time did not compromise the consistency thereof but also for seeing to it that it was implemented properly. Here, Kaiser (1908, § 360) noted, the manager of a system had “an opportunity to bring individuality into play”. He counseled that it was necessary for the manager to do so because

[i]f we are not prepared to assert our individuality within and without the limits set by the system, we may depend upon it that our collaborators or subordinates will assert theirs, consciously or unconsciously, and we shall find in the end that our system has been distorted in all directions, without necessarily transgressing our rules, although the latter will be but a matter of time (§ 360).

⁵³⁹ Kaiser (1908, 357, n. *) subverted this argument with the concession that “[i]n most cases it will require two experts to work out a system, one to look after the interests of the technical side of the business and the other to look after the interests of the technical side of system per se”. In such situations, he noted, “both business expert and system expert should agree, but each should have the last say in his own sphere”. Although Kaiser did not say so explicitly, it is likely that, in such cases, the management of the system and the personnel involved in carrying it out would have devolved upon the system expert.

Whereas Kaiser did not believe that one could—or should—eradicate the individuality that each member of an intelligence department brought to his or her work, he prescribed careful supervision of their labor as a means of assuring that individual deviations from the norms of the system be kept to a minimum: in his words, “it is ... necessary to supervise sufficiently so as to keep the individuality (expressed in their work) of our workers within bounds” (§ 360). Thus, with regards to the degree of oversight that the manager of an intelligence department should keep over his subordinates, Kaiser advised that one seek to strike a balance between assuring consistency in the system and allowing workers some scope for expressing their individuality:

Don't supervise too much, for you will reduce your staff to mere automatons whose only interest is to watch the clock for the hour of closing; don't supervise too little, otherwise your staff will soon become prolific in the production and application of all manner of improvements,⁵⁴⁰ which must eventually prove fatal; supervise enough to assure adequate continuity and consistency in the system, and to leave your staff sufficient of their individuality to make their work interesting to them. You are doing police duty, keep the policeman in the background as far as you can (§ 361).

Such a managerial policy entailed that one could not expect, in practice, a systematic card index or any other element of a card system to attain a state of perfectly self-consistent systematicity: indeed, as Kaiser frankly conceded, “a system” was “an ideal, fixed and immutable” that “can never be reached” and one could aspire, at best, to attain a suitable “degree of approximation” thereto (§ 354). The manager of an index and its associated files might well narrow the distance between ideal and degree of approximation by formulating the procedural rules for implementing it in a clear and judicious manner (§ 362), by training his subordinates thoroughly and so turning them into knowledgeable workers constituting “expert labour” (§§ 352–353), and by exercising a style of supervision that reinforced this training and assured compliance with the rules, instructions, and standards set forth in the key cabinet: nevertheless, the irreducible and, ultimately, incorrigible individuality of the

⁵⁴⁰ In this context, Kaiser clearly intended that “improvements” be understood in an ironic sense. However, he was not at all averse to the notion that the manager of an intelligence department take into consideration suggestions from his subordinates: “We should always be ready to consider improvements and to encourage our staff to contribute their share. However much we may be masters of our own systems, in their own particular sphere they are (or should be) more expert than we are. Even an office boy may have a good idea occasionally. Besides, recognition acts as an incentive to work, and to work well; it adds interest even to humdrum work” (Kaiser 1908, § 364). Yet, at the same time, he urged all due circumspection in taking up such suggestions: “It is prudent to mature well before improvements are adopted. Improvements rashly introduced may give cause for regret when it is too late to turn back” (§ 364).

different workers involved in the implementation of a systematic card index and other elements of a system meant that variation was an inevitable feature of the final realization of the underlying design.

Individuality, then, was a double-edged concept for Kaiser. Operating within the framework of entrepreneurial individualism, in which a business organization was understood to be an individual entity imbued with the personality of its founder or director, he considered it to be a crucial parameter in the design of a systematic card index. In his view, the designer of an index and his staff were to apply the basic structural patterns prescribed by SI in a systematic, yet flexible, manner to create an index the scope and contents of which corresponded to the particular purposes, needs, and interests of the organization that it was constructed to serve: that is to say, the design and contents of the index were to reflect the individuality of the business organization. Yet if Kaiser regarded individuality—understood as the individuality of a business—to be an important factor in the design of a systematic index, his deep commitment to the notion of epistemological individualism also led him to pay due regard to another kind of individuality—that of the different persons who formed part of an organization and, in particular, those persons within an intelligence department charged with the task of indexing and filing. Insofar as he considered personal individuality to be indissolubly linked to individual differences in perspective and performance in work, he considered this form of individuality to pose a challenge to the implementation of a systematic index, for, in his view, individual variations among the persons working on it would inevitably lead to individual deviations, whether great or small, from the norms of design. In short, whereas the collective individuality of the business for which a systematic index had been created served as one of the determinants of the design of the index, the personal individuality of the persons involved in realizing this design in practice represented a potentially disruptive force tending towards destabilization of the consistency and, hence, the systematicity of the index. At one level, then, systematicity and individuality reinforced one another in a complementary way, while, paradoxically enough, at another level they stood in tension to one another. These interactions between systematicity and individuality formed a significant undercurrent in Kaiser's conceptualization of SI, one that ultimately owed much to wider discussions in the business world about the need to conform card systems to the individual requirements of businesses and about the concomitant need to conform the efforts of workers to the routines assigned to them by the management of the organizations to which they belonged.

Chapter 8. Indexing Work in Great Britain, 1911–1914: The Implementation and Diffusion of SI

8.1. Kaiser, the Indexing Expert, and an Interlude at Vickers, Ltd.

If Kaiser's aims in writing his books had been to fill a gap in the literature on card indexing and to broadcast his expertise in the subject, he succeeded in meeting them, for his works were given a warm reception. In England, members of the trade press hailed *The Card System* as "a most thorough and exhaustive treatise on the practical principles of card indexing" (*Stationer*, April 1910, in Kaiser 1911, "Some opinions of the press", [5]), "the first adequate book on the card system which has been published in this country" (*Ironmonger*, 3 October 1908, in Kaiser 1911, "Some opinions of the press", p. [2]), and a "masterly analysis of card indexing system" constituting "the best book which has yet been written on the subject" (*Contract Journal*, 3 March 1909, in Kaiser 1911, "Some opinions of the press", [4]). Comparable sentiments were voiced in France, where a reviewer for a leading journal on office organization lauded the book as "the most complete work on index cards and their multiple applications to have been written" (*Mon Bureau*, June 1910, in Kaiser 1911, "Some Opinions of the Press", [6]): indeed, within a few years, a French translation appeared at the hands of that journal's publisher (Kaiser 1914). A number of reviewers noted Kaiser's (1908, § 76) insistence that the card system of a given business organization must be configured to that business's "individual requirements" (e.g., *Iron and Coal Trades Review*, 13 November 1908, in Kaiser 1911, "Some opinions of the press", [3]; *Modern Business*, November 1908, in Kaiser 1911, "Some opinions of the press", [4]; *Machinery Market*, 9 January 1909, in Kaiser 1911, "Some opinions of the press", [4] *Textile Recorder*, 15 May 1909, in Kaiser 1911, "Some opinions of the press", [5]): as one approvingly observed, Kaiser's treatment "does not attempt the hopeless task of discussing a universal system to be adopted in any office, but wisely confines itself to creating a sound basis on which the individuality of "the chief" can exercise itself to some purpose" (*Manchester Courier*, 21 September 1908, in Kaiser 1911, "Some opinions of the press", [1]). Some commentators appreciated his general advice for managing a system (e.g., *Contract Journal*, 3 March 1909, in Kaiser 1911, "Some opinions of the press", [5]; *Stationer*, April 1910, in Kaiser 1911, "Some opinions of the press", [6]), while others valued his detailed discussion of the method of preparing registers and indexes, even if they dissented from some of the measures that he laid out:

The paragraphs dealing with the whole subject of indexing are particularly interesting, and without expressing our agreement with every detail of the system, we have no hesitation in saying that this part of the subject, particularly in its relation to the indexing of business correspondence, is full of most valuable suggestions (Ironmonger, 3 October 1908, in Kaiser 1911, "Some opinions of the press", [2]–[3]).

In short, both the subject matter of *The Card System* and Kaiser's treatment thereof led reviewers in trade papers, newspapers, and business magazines to recommend the book with enthusiasm to their readers. "Success in modern industrialism is so dependent upon method and order that Mr. Kaiser's book cannot fail to be of the widest use and interest" (*Standard*, 2 October 1908, in Kaiser 1911, "Some opinions of the press", [1]), intoned one writer, while another concluded, in similar terms, that "[t]he careful study of Mr. Kaiser's book cannot fail to be advantageous to all who wish efficiency to be the keynote of their office organisation" (*Modern Business*, November 1908, in Kaiser 1911, "Some opinions of the press", [4]).

Unlike *The Card System*, which appears to have been reviewed exclusively in business-oriented publications, *Systematic Indexing* attracted notice not only in the pages of British trade journals and newspapers but also in periodicals emanating from the realm of librarianship and documentation. Commentators in the business world were, as a rule, positive in their assessments. For example, one reviewer writing in the *Manchester Courier* praised the book as

[a] very lucid exposition deal[ing] *inter alia* with the natural growth and organisation of an intelligence department such as those maintained by the large undertakings of to-day, as well as from a literary and bibliographical standpoint. The whole subject has evidently been very carefully and completely studied in every feature, being the result of actual experience, and the telling examples of the application of workable card-indexes to various commercial instances certainly deserve close and attentive study. Business men who closely follow the details of the ramifications of extensive businesses will do well to familiarise themselves with the work (*Manchester Courier*, in Cope [1913], half-title p., *verso*).

Even more enthusiastic was the judgment of a writer for the *Liverpool Journal of Commerce*, who declared that

[e]very bit of his book is worth reading; he not only shows what should be done, but why it should be done, and the reason that some other method should not be adopted. He gives very frequent illustrations to amplify his text, and a careful perusal of his views will enable the ordinary business man to quickly seize upon the essentials in useful indexing (*Liverpool Journal of Commerce*, in Isaac Pitman & Sons 1914, 15).

Somewhat more reserved was the author of a joint review of *The Card Index* and *Systematic Indexing* in *The Accountant*, who found both books to be “well worthy of the careful attention of all students of modern business methods”, yet cautioned that Kaiser’s system was better suited for very large firms than for the “moderate-sized concerns, which, after all, represent the vast majority—at all events, in this country” (Review 1912). With regard to the latter book, he remarked on the copiousness of its exposition, remarking that even “a perfunctory perusal of its pages will probably prove sufficient to convince the casual reader that there is a lot more in the matter of systematic indexing than he had ever dreamt of”. This fullness of detail was, in his eyes, a mixed blessing:

If there is one application of cards where their suitability is less likely to be disputed than another, we should imagine that it would be in connection with indexing. Here, again, we feel the want of something a little more concise, and for that reason more useful to the majority, but the subject is an exceedingly interesting one, dealt with here in an unusually able and readable manner. Even, therefore, if it should happen to be dealt with at greater length than the reader requires for his immediate purposes, it by no means necessarily follows that his time will have been wasted.

The reviewer for the *Chamber of Commerce Journal* praised Kaiser for having treated “in a clear and concise manner ... the methods of classification and systematic indexing by means of which a well-arranged “Intelligence department” may be organised”, concluding that “we feel that his book, which is intensely practical, will meet the wants of the business man” (Reviews 1911). While *Systematic Indexing* does not appear to have garnered reviews in the American trade press, there is some evidence that, by 1915, the book was finding readers in the United States as well: for example, the claims attorney for the Boston Elevated Railway Company paid Kaiser the dubious compliment of plagiarizing numerous passages from it in a paper on the theme of “a card index and what it means” that he delivered in that year at a conference of the American Electric Railway Claims Association (Reynolds 1915).⁵⁴¹

Contemporary commentators on *Systematic Indexing* from the realm of librarianship and documentation were also, as a rule, favorably disposed to the work, though their praise was not unqualified. The author of an unsigned review of the book in English library journal, *The Librarian*, perceptively noted the centrality of classification in Kaiser’s indexing method: “Systematic indexing”, he declared, “is but an extension, an amplification of

⁵⁴¹ More specifically, the first six pages of a thirty-four page paper (including audience discussion) are essentially a pastiche of a series of passages from Kaiser 1911, presented in the following sequence, without attribution and with minimal modification in wording: §§ 34, 50, 51, 629, 651, 369, 391, 647, 1, 56–58, 2, 3, 9, 4, 5, 18. 30, 34, 12, 15.

classification, with the importance and advantages of which every librarian is familiar” (Filing Systems and Indexing 1911–1912, 462). To his mind, the great merit of Kaiser’s book, which he identified as a contribution to the discourse of filing and indexing, was that it “realizes more than any other we have seen th[e] inevitable relationship between “classification, indexing and filing” (p. 463): nevertheless, he was quick to add, the book was not given over wholly to theorizing, but was “essentially practical” (p. 464) in nature.

Johan A. Zaalberg (1858–1934), a Dutch administrative archivist with ties to Paul Otlet (Ketelaar 2000), who wrote a combined review for *The Card Index* and *Systematic Indexing*, likewise found much to commend in them. He noted that “in recent years, the arrangement (*rangschikken*) and ordering (*ordenen*) of documents is beginning to develop into a science (*wetenschap*)”. This nascent science was the science of filing and indexing, the roots of which he traced to America and the practitioners of which he identified as “organisation engineers” (Zaalberg 1913, 147). Much like the English reviewers of *The Card Index*, he felt that authoritative literature on this emergent field had been sorely lacking and so considered Kaiser’s books to be a laudable contribution to its discourse. “I have read them with constantly increasing interest”, he averred. “Mr. Kaiser handles the material in a scientific manner (*op wetenschappelijke wijze*). There is a logical connection in the considerations. ... The undersigned gladly declares, that the study of these works has broadened his view and increased his knowledge” (pp. 147, 150). Although generally lavish in his praise of Kaiser, Zaalberg manifested greater interest in Kaiser’s model of document classification than in SI as such. He also took exception to what he considered to be excesses in Kaiser’s critique of the DDC and other classification systems (cf. Chapter 7, Section 6.2, esp. pp. 684–685, nn. 535–537, above). Conceding that some of the criticisms were justified, he nevertheless sought to rebut Kaiser’s objections to the decimal notation (p. 148) and, as might be expected of an associate of Otlet, defended the decimal classification as the best model for a single standard system (*uniform-stelsel*) for use in archival registration and filing (*registratuur*) (p. 149).

By contrast, it was precisely Kaiser’s critique of the DDC that drew the Australian librarian, author, and amateur printer Amos Brazier (1862–1929), a fervent opponent of Dewey’s classification, to *Systematic Indexing*. In 1912, in the wake of a bitter internal dispute at the Melbourne Public Library about the application of the DDC to the organization of its reference collection in which he was on the losing side,⁵⁴² Brazier published,

⁵⁴² For discussion of this dispute and Brazier’s rôle in it, see Carroll & Reynolds 2012, esp. 153–158.

under the *nom de plume* of “A Mere Librarian”, a tract for the times entitled *Libraries and Librarianship*. The central feature of this self-published pamphlet was a sustained attack on the notion of using Dewey’s classification as a shelf classification and Brazier was not slow to make use of *Systematic Indexing* as a source of inspiration for many of the arguments that he presented therein (A Mere Librarian 1912, §§ 3.i, 4.iii, 9.ii, 10, 12.i, 12.iii, 14.i). Characterizing Kaiser as an authority on classification, Brazier offered his readers—whom he identified as comprising “librarians”, “amateur librarians”, and “the public generally”—the following description and assessment of his book:

Mr. Kaiser’s book is written in sections, which are numbered; ... It may be noted here, also, that a perusal of such books as this by business men would be a valuable use of time. This book illustrates the “card system” of recording, arranging, and preserving information, of all kinds, conveniently. In a large establishment such a system must prove of great assistance by saving time and much superfluous labour. It saves the necessity of memorising much information that can be easily recorded in a handy and business-like way; and the information may so be made both reliably full and ready in the minimum of time. Indeed, the book is designed and written specially for business men (§ 3.ii).

As this passage indicates, Brazier held that Kaiser, although a librarian, had contributed primarily to the discourse of business organization: it is unsurprising, then, that he used his work selectively. On one hand, in addition to deploying Kaiser’s arguments *contra* the DDC to buttress his own, Brazier imitated his practice of eschewing page numbers entirely in favor of paragraph—or, more precisely, section—numbers (cf. Chapter 5, Section 4, esp. pp. 185–187, above). On the other hand, much like Zaalberg, he paid little attention to SI as such: in fact, the kind of knowledge organization régime that he preferred for the library—a shelf classification based on fixed location on shelves complemented by a divided “dictionary catalogue”, the subject portion of which would be arranged by the DDC or, better, the UDC (A Mere Librarian 1912, §§ 17–18)—was hardly one that would have found favor with Kaiser. As with Zaalberg, a general appreciation of Kaiser’s work did not result in an endorsement of SI or even much attention to its specific features.

Perhaps the most extensive engagement with SI in the contemporary library press appeared in the review of *Systematic Indexing* published by Arthur A. Brooks (1856–1941), a Brooklyn-based Unitarian minister and writer, who was also a literary indexer and occasional commentator on indexing (e.g., Brooks 1910) in the pages of the *American Library Journal*. Like other commentators, he adverted to the business-oriented nature of Kaiser’s system, writing that “[t]he purpose of the book is to apply a system of indexing by

cards to the entire mass of information in the possession of any business for the use of the manager of that business”, and also noted the critique of the DDC and other classification systems, judging it to be “in the main, sound” but “rather captious” in its treatment of Dewey (Brooks 1913, 371). Belauding Kaiser’s aspiration to present a systematic approach to indexing, Brooks highlighted the originality of his exposition, asserting that

the author of “Systematic indexing” disagrees with almost everything that has so far been done in the matter with which he concerns himself. He differs in his terminology, in his classification, in his alphabeting and in his punctuation, as well as in his system of indexing (p. 371).

Although Brooks demurred from attempting an exposition of Kaiser’s system on the grounds that it was “too extensive” and elaborate to be set forth within the compass of a review, he did allow himself the observation that SI was based on a set of general principles that allowed it to be used across different contexts:

It is evident that, in order to be useful, a system must meet ready and general acceptance, and be based on common and not individual needs. The author’s system, in its main rule of observing the order “concrete, country, process,” or, in simpler phrase *what, where, how*, is based on a natural and generally accepted principle (p. 371 [emphases his]).

Although his valuation of the general over the individual ran counter to Kaiser’s own views on the matter, Brooks quite rightly foregrounded the categories of terms and the structural form of the statements constructed from them as the cardinal feature of SI. He considered Kaiser’s protocols to constitute a “broad and well-reasoned plan of indexing” that was likely to be efficacious in the contexts for which it was intended:

[t]he reader of his book will find a clear presentation and development of principles of classification and arrangement that can be applied to any subject—commercial, technical or professional—and be extended without limit. Well mastered and rigorously applied, this system would probably meet every possible requirement (p. 371).

Nevertheless, Brooks did not forbear to mingle criticism with praise. Himself the proponent of an austere brevity and simplicity in the formulation of headings for book indexes (Brooks 1910), he did not believe that the elaborateness of SI rendered it an efficient method for the making of book indexes; furthermore, he disagreed strongly with Kaiser’s valorization of the paragraph over the page as the basis for locating information within a book. Considerations such as these led him to temper his final verdict on Kaiser’s account of SI: “On the whole, the reader of this work, after he has overcome a certain unfavorable

impression due to typographical oddities and impracticable recommendations, will find it suggestive and valuable" (Brooks 1913, 372).

Although various writers might, like Brooks, express reservations about certain aspects of Kaiser's system of indexing or, like Zaalberg and Brazier, concentrate on his critique of other KOSs rather than on the constructive elements of SI, all early reviewers of *The Card System* and *Systematic Indexing* readily acknowledged that Kaiser was an expert in his field. An English commentator enthusiastically hailed him as "a past master in all that appertains to carding, filing, and indexing systems" (*Ironmonger*, October 3, 1908, in Kaiser 1911, "Some opinions of the press", [2]), Brazier characterized *Systematic Indexing* as "evidently the work of a man who knows and knows that he knows" (A Mere Librarian 1912, § 3.ii), while Zaalberg (1913, 147) noted that "[i]n studying [Kaiser's books], the reader continually gets the impression that the author is ... a very capable man (*een zeer bekwaam man*)". Reviewers frequently adverted to the fund of experience that lay behind Kaiser's exposition of his protocols for card index design: one British reader of the *Card Index* opined that "the author, in his position as Librarian of the Tariff Commission and formerly of the Philadelphia Commercial Museum had exceptional experience of the practical use of Card Indexing" (*Stationer*, April 1910, in Kaiser 1911, "Some opinions of the press", [5]–[6]), while another proclaimed that

the experience gained by Mr. Kaiser as the Librarian of the Tariff Commission, and formerly as Librarian of the Philadelphia Commercial Museum, peculiarly fits him ... for explaining the system which has been evolved to deal with the records of the Tariff Commission, and how this system may be applied in any industrial or other concern where large and varied masses of materials have to be made readily available for reference (*Standard*, October 2, 1908, in Kaiser 1911, "Some opinions of the press", p. [1]).

Even those readers who harbored reservations about details of SI or the merits of card indexing in general did not question the author's mastery of the subject: as one otherwise skeptical British reviewer of *The Card System* put it, "we are not in love with the subject of Mr. Kaiser's book, but we recognize that he is an expert on card systems, and offers his readers a great deal of valuable information based on practical knowledge" (New Literature 1908).

By 1911, then, Kaiser had become "a recognized authority upon indexing" (American Society of Mechanical Engineers 1928) in the British context, in large part because of *The Card Index*, a reputation that only increased with the appearance of *Systematic Indexing* in that year. This reputation opened the doors to new opportunities for work as an indexing

consultant. One came from a major and storied industrial concern, that of Vickers, Ltd. Originally established in 1828 as a family steel foundry in Sheffield, the company had developed over the course of the 19th century, under various incarnations, into a major producer of steel products of various sorts, from machine-tools, through railway castings, to heavy marine shafting (Scott 1962, 3–20; Trebilcock 1977, 27–29). In the late 1880s and 1890s, the sons of the founder, Thomas and Albert Vickers, had moved the firm into the production of armaments, initially manufacturing armor plates and artillery castings (Scott 1962, 20, 40–44; Trebilcock 1977, 30). The company expanded and diversified its interests, primarily through the absorption of other firms. Among its most notable prizes were the Maxim Nordenfelt Gun and Ammunition Company and the Naval Construction & Armaments Company, both of which were brought into the fold in 1897; thanks to these, the now renamed Vickers, Maxim and Sons, Ltd., became a leading manufacturer of light artillery and warships (Scott 1962, 44–45; Trebilcock 1977, 37–38). In the first decade of the twentieth century, Vickers, Maxim and Sons, Ltd., developed its line of naval armaments, which now encompassed submarines as well as battleships; began making inroads into the production of aircraft; and acquired interest in a number of subsidiary companies, including munitions plants abroad and even automobiles at home (Scott 1962, 46–75; 82–86). By the end of the decade, this industrial powerhouse had established itself firmly as one of the two leading armaments firms in Britain, with head offices in London and flagship plants at Sheffield, Barrow-in-Furness, and Erith.

In May of 1911, Vickers, Maxim and Sons, Ltd., altered its name to Vickers, Ltd. (Scott 1962, 82; Trade Announcements 1911a) and, a month later, it moved its London headquarters from 32 Victoria Street, Westminster, to Vickers House, Broadway, Westminster (Trade Announcements 1911b; Trade Notes 1911). This relocation apparently provided the occasion for further changes in office administration, for, later that year, Vickers, Ltd., invited Kaiser “to reorganize the management of correspondence in [its] head office” (American Society of Mechanical Engineers 1928). Although little is known about the circumstances of this invitation, personal connections may well have been a factor. Sir Vincent Caillard, who was, at the time, the financial director of Vickers, Ltd., and exercised control over much of the firm’s internal administration (Scott 1962, 78; Trebilcock 1977, 46–47, 89), was also one of the founding members of the Tariff Commission and had served, since 1905, as its chairman (Tariff Commission 1922, 15): he was thus surely aware of

Kaiser's work for the Commission and in a privileged position to assess it.⁵⁴³ In this regard, it is worth noting that Hewins (1929, Vol. 1, 83), the secretary of the Commission, claimed in his memoirs that "[g]reat business firms applied to us to assist them in establishing in their own offices methods of filing and analysis which we had invented". Although this is most likely a hyperbolic allusion to the guided inspections of the Commission's files noted earlier (See Chapter 5, Section 4, p. 181, n. 221, above), one cannot discount the possibility that it also hints at the fact that Vickers, Ltd.—which undoubtedly qualified as a "great business firm"—called upon the creator of the Commission's "methods of filing and analysis" to implement them in its own offices, perhaps with Hewins's acquiescence. However that may be, Kaiser heeded the call and, at a date yet unknown in the latter half of 1911, he left the Tariff Commission to take up work at Vickers House.⁵⁴⁴ Of his time there, virtually nothing is known, save for the fact that his engagement appears to have been a relatively short one; by the summer of the new year, he had taken on a new consulting position that would prove far more consequential for his future and that of his indexing system.⁵⁴⁵

⁵⁴³ See, e.g., TCP 6/1/1, Hurd to Caillard, 26 July 1911, a letter in the *post scriptum* of which Hurd explicitly mentions Kaiser, noting that he has been preparing a list of directors of leading engineering firms—doubtless a topic of interest of Caillard.

⁵⁴⁴ The chronology that can be reconstructed from the sources at my disposal is decidedly hazy. One of Kaiser's obituaries gives 1911 as the date of Kaiser's departure from the Tariff Commission (American Society of Mechanical Engineers 1928) but does not specify a month. A *terminus post quem* is late July of 1911, when the letter from Hurd to Caillard cited in the previous footnote was written. The fact that Kaiser is still listed as "librarian of the Tariff Commission" on the title page of *Systematic Indexing*, which was published in mid-September of that year, does not mean that he still held the position at that date, for the copies of the volume had doubtless been printed well in advance of publication. My own examination of the Tariff Commission's papers housed at the British Library of Political and Economic Science at the London School of Economics did not turn up any documents dealing with Kaiser's departure from the organization, but I make no claim to have uncovered all the potentially relevant papers in that rich and extensive collection. It is possible that relevant documents regarding the circumstances of Kaiser's departure from the Commission are to be found in the Hewins Papers kept at the University Library of the University of Sheffield (<http://www.sheffield.ac.uk/library/special/hewins>), which I have, regrettably, not had the opportunity to consult.

⁵⁴⁵ It is likely that the Vickers archive housed in the Department of Manuscripts and University Archives of the Cambridge University Library (<http://archiveshub.ac.uk/data/gb012-ms.vickers>), contains documents that can shed some light on this obscure period of Kaiser's career. For overviews of their rich holdings, see <http://archiveshub.ac.uk/features/02102501.html> and Trebilcock 1977, xxxviii, 164–165 (note, however, that the latter's description dates to a time before the company's papers were transferred to Cambridge University). I have, unfortunately, not had occasion to make use of this collection.

8.2. At Nobel's Explosives Company, Ltd., 1912–1914

Ever since Kaiser's arrival in Great Britain in October of 1899, he had worked for organizations situated in the bustling central commercial districts of London. Little did he know, on the first day of 1912, that he would soon have occasion to enter the service of a company located in a vastly different milieu, a desolate peninsula lying on the Firth of Clyde, a little over thirty miles to the southwest of the Scottish city of Glasgow. The name of this isolated tongue of land, the landscape of which consisted of sand hills and little else, was Ardeer. In 1871, the British Dynamite Company, Ltd., recently formed by the inventor of explosive devices and industrial magnate Alfred Nobel (1833–1896) together with a consortium of Glaswegian entrepreneurs for the purpose of manufacturing explosives had chosen this conveniently remote location as the site for its plant (Miles 1955, 18; Reader 1970, 26–27; Trotter 1938, 10, 21–23). The factory, which commenced operations in 1873, began with the production of nitroglycerine: over time, as the repertoire of substances used for making detonative devices increased, it came to manufacture a wide variety of explosive materials including, *inter alia*, blasting gelatin (1877), nitrocotton (1881), ballistite (1892), guncotton (1892), cordite (1895), various nitrocellulose powders (1900–1904), picric acid (1902), and T.N.T. (1907) (Miles 1955, 23, 31, 39–40; Trotter 1938, 60, 64, 69, 100–102, 104–105).

Reconstituted as Nobel's Explosives Company, Ltd., in 1877, the firm complemented its manufacturing work with chemical research (Miles 1955, 19, 21; Reader 1970, 31; Trotter 1938, 54). Initially, the latter was oriented towards the testing of raw materials and products and the control and enhancement of the factory's manufacturing processes. In due course, the company undertook to develop its research activities to a greater degree: in 1886, operating management of the factory was placed under the control of its chemists and, in 1888, a research department was formally instituted (Miles 1955, 22, 27–28; Trotter 1938, 70–71). Although, in the following years, this department yielded very respectable results in securing patents for its discoveries, it was small and its activities were poorly coordinated. As one latter-day commentator characterized the research culture at the plant in the first decade of the 20th century,

[i]nvestigation ... [was] too individualistic. Each of the few research chemists worked alone and was enjoined not to talk about his work to the others. Secrecy was the rule. A few responsible persons tended to become laws unto themselves, and the history of the investigations they had carried out in the past could not always be traced, for although reports were written they were rare, and few persons knew where to find them (Miles 1955, 42).

This state of affairs began to change in the latter half of 1909, when Nobel's Explosives Co., Ltd., engaged the services of Sir Frederick L. Nathan (1861–1933) and William Rintoul (1870–1936). Nathan, who had previously served as an artillery officer and been superintendent of the Royal Gunpowder Factory at Waltham Abbey for seventeen years, became general manager of the Ardeer plant, while Rintoul, who had extensive practical experience in industrial chemistry and had worked under Nathan at Waltham Abbey, took up the position of manager of research (Miles 1955, 47–50; Robertson 1934; 1936). Both men were gifted administrators and they soon began to transform the plant's mode of operation. Nathan, a devotee of efficiency who "insisted that everything should be done in due form and order and be properly recorded", set the tone for the factory as a whole, taking the lead in rationalizing its manufacturing operations and introducing improvements into its safety procedures (Miles 1955, 49; Rintoul 1934, 564). Rintoul, who was charged with overseeing research at the factory, implemented a number of administrative reforms and innovations, including a reorganization of its laboratories; the introduction of a so-called programme system to collate information about, and monitor the progress of, the various lines of research prosecuted by the company's chemists; and the framing of policies for improving the training of technical assistants (Miles 1955, 54–66; Robertson 1936, 429). Under the management of Nathan and Rintoul, organization became an institutional watchword at Ardeer as both manufacturing operations and the administration of research underwent systematization.

A central element in Nathan's and Rintoul's reforms was the institution and development of an information service that would support research at the plant and the *locus* around which they decided to build up this service was the factory's technical library. As is the case with many early company libraries, its origins and early history are obscure. Commentators have often claimed that the library at Ardeer was established in 1909 or 1910 (e.g., Ashworth 1971, 636; Brown 1950, 87): this, however, requires some qualification. According to the author of the official history of the Nobel research division, a "technical library" had come into existence on the factory grounds "many years before 1909" (Miles 1955, 66). This library appears to have been set up in conjunction with laboratory research, for it was originally housed in one of the plant's laboratory buildings; thence it was transferred, around 1906, to a newly constructed general office building, where it would remain, ensconced in "two upstairs rooms", until 1927 (p. 66, n. *). A collection of materials encompassing books, periodicals, research reports, and other

documents, was thus already present when Nathan and Rintoul came in 1909: their contribution was to organize this collection more thoroughly and to integrate the management of its contents more systematically into the workflow of research than had previously been the case.⁵⁴⁶

Shortly after arriving at Ardeer, Rintoul set into motion the process of reorganizing the library. He delegated the task of reorganization to George Henry Beckett, a veteran chemist who was then serving as librarian (Rintoul 1924), and three research chemists appointed to a permanent committee that was to assist Beckett in planning and carrying out this work (Miles 1955, 66–67). Initially, the project seems to have proceeded apace: the committee developed “new methods of classifying books, journal and reports”; the library staff began the laborious process of copying the firm’s old research reports onto new standard forms, classifying, and indexing them; “[t]he list of periodicals taken in was revised and expanded”; and “arrangements were made to issue a weekly digest of information abstracted from the journals and from other sources to all members of the senior staff of both the Factory and the Research Departments” (p. 67). However, when the committee undertook the creation of a card index to its collection, it encountered grave difficulties. Its initial goal was to construct an index *de novo*. However, none of its members had experience in indexing and their initial efforts faltered badly; as Rintoul (1918, 57R), who appears to have taken part in the proceedings, later recalled,

[a]fter some months of work it was found that so many contradictory decisions had been made that much confusion had already been introduced, and it was realized that in a very few years’ time the index would be so complicated as to be unworkable.

Abandoning their attempt at fashioning a homegrown indexing scheme, the committee members conducted a review of publicly known indexing systems with the aim of selecting one to serve as a template for their index: among those under consideration was SI, of which they had learned through “reviews of a book on card indexing by J. Kaiser”, almost certainly *Systematic Indexing* (Miles 1955, 68; Rintoul 1918, 57R; 1925, 166). After mulling over the various options and narrowing the choices down to the UDC and SI, the committee ultimately opted for the latter on the grounds that it provided the best fit for the particular

⁵⁴⁶ Insofar as one wishes to identify 1909 as an emblematic date in the history of the Ardeer library, it seems most appropriate to characterize it as the year in which “the Nobel Explosives Company organized a collection” (Black 2004, 422; 2007b, 154; 2011, 7)—or better yet, “began to reorganize its collection”, for, in truth, the process took several years.

circumstances of their library (Rintoul 1918, 57R). Accordingly, the management at Ardeer contacted Kaiser through his publisher and asked him to recommend somebody who could implement his indexing system for them. The challenge of designing a new technical index must have appealed to him, for, in his reply, he offered to come and take on the job himself (Miles 1955, 68).⁵⁴⁷ Nathan and Rintoul weighed his offer carefully, canvassing the opinion of the Tariff Commission whether SI was, indeed, a “thoroughly sound ... system of indexing”.⁵⁴⁸ Receiving an affirmative reply from the Commission and, apparently, impressed by an interview with Kaiser, they decided to accept his services and so, in the late spring or early summer of 1912, he betook himself to Ardeer to begin his work there.⁵⁴⁹

Once at Ardeer, Kaiser worked closely with the committee on formulating plans for an index. He began by helping the committee to determine its scope. This required studying what the “requirements”, or information needs, of the intended users were (Rintoul 1925, 166). William Barbour (1878–1958), a committee member who would later succeed Beckett as librarian and take on the day-to-day management of the index, left a brief account of this phase of the work. He reported that he had been “much impressed by the extreme care with which Mr. Kaiser collected and surveyed the considered opinions

⁵⁴⁷ Miles (1955, 68) writes that, in his reply, Kaiser claimed to be “engaged by the Tariff Reform League”. What to make of this statement is unclear, for neither of our chief sources for Kaiser’s professional *cursum*, his obituaries, mentions the Tariff Reform League as one of his employers. One can envision at least two interpretative possibilities. First, Kaiser may have engaged himself to work for the Tariff Reform League during, or shortly after, his time at Vickers, Ltd., but dissolved the agreement to take up a position at Ardeer: the brevity of his time with the League might then explain the lack of its mention in his obituaries. Second, Miles may have meant to write “engaged by the Tariff Commission” but erroneously substituted the “Tariff Reform League” in its stead: after all, he was writing well after the fact and, even during the heyday of Commission, contemporary commentators tended to confuse its name with that of the League (Marrison 1996, 136). If this latter scenario should, indeed, have happened to be the case, then Miles’s statement would be incorrect, for a letter from a representative of the Commission to the Nobel’s Explosives Company, Ltd., written shortly after the latter had made contact with Kaiser, uses the past tense in speaking of his work for the Commission in a passage otherwise couched in the present tense—a clear indication that he no longer was working for the Commission by that time; see TC 6/3/18, PH (Hurd) in the name of the Secretary to Nobel’s Explosives Company, Ltd., 25 April 1912.

⁵⁴⁸ TCP 6/3/18, Frederick Nathan to Hewins, 24 April 1912; PH (Hurd) in the name of the Secretary to Nobel’s Explosives Company, Ltd., 25 April 1912.

⁵⁴⁹ Extant accounts of Kaiser’s time at Ardeer vary in their dating of the commencement of his work there. Barbour (1921, 166) and Miles (1955, 68) both gave 1912 as the year in which Kaiser began working for Nobel’s Explosives Company, Ltd., while Nathan stated that “[h]is system was tried and had remained in use in Ardeer since 1910” (Nathan, *apud* Kaiser 1926, 42). The dates of the letters between Nathan and members of the Tariff Commission cited in the previous footnote offer conclusive evidence that Barbour and Miles were correct in their chronology: as for Nathan, he may have well confused the date at which Kaiser introduced his system at Ardeer with the date at which the committee first began working on an index. The aforementioned letters also provide a *terminus post quem* for dating Kaiser’s entry into the employ of Nobel’s Explosives Company, Ltd.

regarding the scope of the index of all members of the staff holding responsible positions” (Barbour, in Kaiser 1926, 36). In Barbour’s recollection, Kaiser “was most careful to weigh the possibilities either of failure to cover completely the whole of the ground in which they were interested or of expending useless effort in indexing information of little or no value” (p. 36). These efforts led to a determination of which (kinds of) subjects and index terms to include within the compass of the index (Miles 1955, 69–70). According to Barbour, “every case was fully debated and every decision was recorded in a small Key Cabinet’ (Barbour, in Kaiser 1926, 36), just as Kaiser had outlined in *The Card System* (Kaiser 1908, §§ 336–341; see Chapter 7, Section 6.1, esp. pp. 673–674, above). Throughout this consultative process, Kaiser played a maieutic rôle, advising the committee as it made its decisions about the index’s contents: as Barbour put it, “the scope of the index was defined by the members of the staff after adequate consideration stimulated by the alert cross-examination to which they were subjected by Mr. Kaiser and guided by the results of his previous experience” (Barbour, in Kaiser 1926, 36). However, Kaiser did not act simply as a facilitator for the committee. He also initiated its members into his approach to the construction of indexes: years later, Rintoul (1925, 170) would still recall his “very emphatic” insistence that, once “definite regulations” for an index had been laid down, the operators of the index should adhere to them with the utmost consistency and brook no exceptions (cf. Kaiser 1926, 33, § 43). Kaiser also exercised a determinative influence on the design of the index and its integration into the broader framework of knowledge organization at the Ardeer library. The scheme of filing and indexing that emerged from his and the committee’s work was based on the methods that he had presented in *The Card System* and *Systematic Indexing*, yet, as Barbour’s (1919, 1921) and Rintoul’s (1919, 1925) descriptions thereof make clear, it also departed in some notable ways from the rules laid out in Kaiser’s writings and also involved some adjustments in the conceptualization of the system.

8.2.1. Knowledge Organization at Ardeer

As regards the physical organization of documents, the library at Ardeer followed the protocols of *The Card Index* in taking “the mechanical form in which the information is presented”—i.e., the document type—as the basis of classification (Rintoul 1919, 57R; see Chapter 6, Section 3.1, above). In Rintoul’s (1919, 57R) view, the primary advantage of organizing documentary materials by document type lay in the “compactness” and “the economical use of the space available” that it fostered. The collection of the library was

partitioned into nine documentary classes: patents (Class A); books and pamphlets (Class B); correspondence (Class C); drawings (Class D); extracts and cuttings (Class E); graphs and charts (Class G); periodicals (Class P); typewritten (copies of) reports from external sources (Class Q); and reports generated at, or controlled by, Ardeer (Class R) (Barbour 1919, 37R; 1921, 166). Six of these main classes were divided into subclasses. Patents were subdivided primarily on geographical lines into classes for patents granted in the United Kingdom (Class A1), the British Colonies (Class A2), France (Class A3), Germany (Class A4), Belgium (Class A5), the United States (Class A6), other countries (Class A7), and books of patents (Class A8); books, by both broad subject areas—namely, Science (Class B1), General Technology (Class B2), Explosives Technology (Class B3), and Engineering (Class B4), and genres—namely, General books (Class B5), Trade Catalogues (Class B6), and “Books, written or typewritten, and not subject to alteration” (Class B7);⁵⁵⁰ graphs and charts, by kind of graph; typewritten reports, whether derived from sources external to Nobel’s Explosives Company or generated internally within the company, by their origin; and periodicals, by title (Barbour 1919, 37R; 1921, 166–171). As the examples for patents and books indicate, these subdivisions were largely pragmatic in nature and tended not to follow the rules of logical division to the letter: structurally coordinate subclasses within a single main class were generated by more than one principle of division and subjects that could, in theory, stand in a hierarchical generic relationship of super- and subordination to one another (e.g., “General Technology” and “Explosives Technology”) were telescoped into a single classificatory array. In this respect, the treatment of subject-based subdivisions was consistent with Kaiser’s (1911, §§ 192, 188) belief that the classification of books and other documents by subject did not—and, by its very nature, could not—involve logical classification in the strict sense of the term but rather entailed the formation of “loosely connected groups” of classes representing “such collective headings as are convenient for our purposes”.⁵⁵¹

⁵⁵⁰ Neither Barbour nor Rintoul explained what kinds of materials fell under the somewhat enigmatic rubric “books, written or typewritten, and not subject to alteration”. The proviso “written or typewritten” suggests that the class may have encompassed works in manuscript form that were not reports in the strict sense of the term and had attained a definitive state of composition: in light of the lack of collateral evidence, however, this explanation must be viewed as conjectural.

⁵⁵¹ It should be noted, however, that there was a rationale behind the apparent “loose arrangement[s]” of subdivisions under Patents and Books in the Ardeer classification. In the case of Patents, the United Kingdom and its colonies were followed by major continental European nations, the United States, and then all other countries: here the, ordering of the geographically-defined subdivision was distinctively “Britannocentric” in perspective, beginning with the country in which

Within each subdivision of the foregoing six classes, individual documents or filing units were arranged in numerical sequence on the basis of the order in which they entered into the collection (Barbour 1919, 37R; 1921, 166–171). The remaining three classes—correspondence; extracts, or press cuttings; and drawings—did not have subdivisions, but documents assigned to them were directly organized by numerical sequence based either on accession order—this was the case for extracts and cuttings, for which the unit of numbering was the individual press cutting—or on ordinal schemes specific to the factory, which were applied to correspondence and drawings (Barbour 1919, 37R; 1921, 169–170). This direct numerical subarrangement of main classes had good precedent, for Kaiser had utilized it at British Westinghouse (See Chapter 4, Section 2, above) and the Tariff Commission (See Chapter 5, Section 3, above) and had presented it as the structural norm for document classification in *The Card Index* (See Chapter 6, Section 3.1, above). Indeed, what differentiated the version of Kaiser’s scheme of document classification at Ardeer from the earlier implementations and codifications thereof was its much greater use of subdivisions for main classes: whereas earlier forms of the scheme had confined subdivisions primarily to the class of periodicals and, in certain contexts, that of trade catalogs (Kaiser 1908, §§ 83, 238, 262; see Chapter 6, Section 3.1, above), the one at Ardeer extended them to two-thirds of the main classes comprising it. As a consequence, it did not exhibit a constitutive classificatory structure (See Chapter 6, Section 3.1, above) as its predecessors had done, even though its hierarchical structure as a whole still tended to be very shallow, generally extending no further than the subdivisions of the main classes.

Each individual document was assigned a call number, the structure of which indicated the main class, subdivision (if there was one), and place within the numerical sequence of documents under the main class and subdivision to which it belonged (Barbour 1919, 37R; 1921, 171). In this, the library at Ardeer followed the principle enunciated by Kaiser (1911, § 133) that the structure of a notational scheme should be coordinated with that of the

Nobel’s Explosives Company was situated, progressing to its colonies, moving on to the major technologically-advanced and patent-granting nation-states of neighboring Western Europe, advancing on to the other, geographically more distant power, the United States, and, finally, ending with a class for all other patent-granting countries. As for Books, the subject-based part of the classification began with two general subjects, Science and General Technology, the former being theoretical and the latter being applied, followed by two subjects that were specific to the interests of the researchers at Ardeer, Explosives Technology and Engineering: in this, it followed Kaiser’s (1911, §§ 167, 211) general preference that, in a logical classification, general classes precede specific ones. Finally, in both classes, the geographical (in the case of Patents) or subject-based (in the case of Books) classes were followed by general form classes, another convention of arrangement favored by Kaiser (See Chapter 6, Section 3.2.2, p. 241, with n. 260, above).

classification with which it was associated. Each main class was designated by a capital Roman letter, which, in most cases, had a mnemonic value (i.e., “B” = “Books and pamphlets”, “C” = “Correspondence”; “D” = “Drawings”; “E” = “Extracts and cuttings”; “G” = “Graphical records and charts”; “P” = “Periodicals”; “R” = “Reports”); subdivisions, where they existed, were represented by an Arabic numeral from 1 to 9; and individual documents were assigned a numeral, preceded by a decimal point, in accord with Kaiser’s earlier precepts and practice (Kaiser 1908, § 75; see Chapter 5, Section 4; Chapter 6, Section 3.1, above). Thus, for example, the call number “B1.33” represented the thirty-third book pertaining to the general subject area of Science acquired and cataloged by the library; “B3.256”, the two-hundred fifty-sixth book on Explosives Technology brought into the collection; “P22.63”, the sixty-third issue of the twenty-second periodical title to which the library had subscribed and of which it had processed at least one issue; “A2.54”, the fifty-fourth patent originating from one of the British colonies to have entered into the series of patents; “E1412”, the fourteen-hundred-and-twelfth extract, or paper cutting, to be collected; and so on (Barbour 1921, 166–170). Apart from the introduction of a new, and somewhat problematic, way of indicating the different editions of a single work and the different volumes of a multivolume work within the class of books and pamphlets,⁵⁵² the

⁵⁵² In *The Card System*, Kaiser (1908, §§ 250, 255) had not set out any special rules for how to deal with different editions of a single work. He had noted that publications that were not newspapers or magazines but were issued with some regularity, such as United States Consular Reports, could be treated as if they were periodicals and, in fact, advised that it was best to class them—and, indeed, any publication that appeared with regularity more than once a year—as such. He also outlined a plan for indicating multiple copies of a single book, either by prefixing an Arabic numeral to the initial capital letter of the call number (e.g., “1B24” would indicate the first copy of the book assigned the call number “B24”; “2B24” would indicate a duplicate copy of that title; “3B24”, the triplicate copy; and so on) or writing that number immediately underneath the call number. At Ardeer, on the other hand, multiple editions were indicated by an extension suffixed to the call number of the title in question with the aid of a forward slash: if the first edition of a book had the call number “B2.1”, then the second edition would be designated as “B2.1/1”; the third edition thereof as “B2.1/2”, and so on: if one had multiple copies of such works, then the number of the copy was written directly under the initial capital letter (Barbour 1919, 37R; 1921, 168). According to Barbour, the same notational convention was used to indicate the multiple volumes of a single, multivolume work: for example, “B1.251/1” could indicate the first volume of a multivolume title designated as “B1.251”; “B1.251/2”, the second volume, and so on. The use of a single notational form—the use of the forward slash followed by an Arabic numeral—to indicate two different aspects of a work—multiplicity of editions and multiplicity of physical volumes—brought a measure of ambiguity to the notational scheme, since a call number such as “B4.24/1” could, in principle, either mean the second edition of the work to which the number “B4.24” had been assigned *or* denote the first volume of a multivolume work designated by that number. In such cases, only additional contextual data, such as the presence in the collection of a book bearing the call number “B4/24” without an extension would indicate that the call number “B4/24/1” indicated the second edition of a work: needless to say, conflicts would arise in the (admittedly rare) case of a multivolume work that had gone through more than one edition.

method of forming class numbers was identical to the one that Kaiser (1908, §§ 10–11, 81) had outlined in *The Card Index* (See Chapter 6, Section 3.1, above).

The call number of a document, which was typically inscribed on the upper right hand corner either of its “outside page” (sci., the first, or cover page of a manuscript), its title page, or both (Barbour 1919, 37R; 1921, 171), served both as a means of identifying the document in question and indicating its location within the collection (See Chapter 6, Section 3.1). In terms of physical storage, all of the document types were housed in the library, save for correspondence, which was kept at the offices of the plant’s commercial department, and drawings, which were housed in the drawing office (Barbour 1919, 37R; 1921, 169). Within the library, “[t]he various classes of documents [we]re arranged in alphabetical order on the shelves”, save for the externally derived and internally generated reports, which were kept in vertical files (Barbour 1919, 37R; 1921, 171). The patents, or Class A, were kept in cardboard cases in a separate room devoted exclusively to that particular class of literature; books and pamphlets, or Class B, filled up seven sections of shelving; after them came shelves for extracts and cuttings, or Class E, which had been bound together into scrapbooks, and these were followed by shelves for periodicals, or Class P, including both bound volumes and current issues, which were kept in pamphlet boxes. As for the typescripts of external and internal reports stored in the vertical files, these were kept in separate files and distinguished by a color coding scheme: externally derived reports, or Class Q, were bound in red covers, while internally generated reports were bound in green ones (Barbour 1919, 37R; 1921, 171). The general pattern of conforming the order of document types on the shelves and in the files of the library to the alphabetical order of the initial capital letters composing the first element of the call numbers followed a suggestion that Kaiser (1908) had made in *The Card System* (§ 14), as did the use of differently colored folders or binders to distinguish different classes of documents kept in the library’s vertical files (§§ 32, 152). In this way, the physical organization of the documentary materials at the library of the Ardeer factory was coordinated, as much as possible, with the alphanumeric sequence of notational system expressed in the call numbers and so facilitated the location of documents within the library (cf. Chapter 6, Section 3.1, above).

Inasmuch as this notational innovation gave rise to such ambiguities, it ran the risk of infringing, at a purely formal level, upon Kaiser’s (1908, § 86) general *dictum* that “[n]o call number must be used so as to designate more than one thing”: one may well wonder if it was his idea or whether it was an extension of his system introduced by the librarians at Ardeer.

A “descriptive index” composed of “two card reference systems” served as the key for locating and retrieving the (documentary sources of) information kept in the library’s collection (Barbour 1918, 37R; 1921, 171; Rintoul 1925, 166; cf. Miles 1955, 70). One of the reference systems, the *dictionary catalogue*, was pertained only to books and pamphlets. Each book or pamphlet in the collection was entered under headings for its author, its title, and “such of its subjects as [were] of interest” (Barbour 1918, 37R; 1921, 172; Rintoul 1925, 166). Author, title, and subject entries were made on cards of different colors to distinguish them from one another: author cards were blue; title cards, pink; and subject cards, white (Barbour 1918, 37R; 1921, 172; Rintoul 1925, 166). The information on these cards appears to have been minimal. As Barbour (1919, 37R; 1921, 172) described them, all three kinds of cards

bear in their top right hand corners the call numbers of the documents to which reference is made. The author cards contain the names of the authors in the top left hand corners. These are the terms which determine their position. Lower down on the author cards is given the title of the document. The title cards bear the titles in the top left hand corners. ... Lower down on the title cards is given the name of the author. The subject cards bear the subject term in the top left hand corner; lower down on the subject cards are given the title and author of the document.

Both the format and content of these cards generally followed Kaiser’s (1908, §§ 253, 256, Step 5) prescriptions in *The Card System* for making cards for an alphabetical register of books and pamphlets, albeit with one notable change. In his earlier manual, Kaiser had stated that the title card for a book should serve as its “main card” and that the indexer should enumerate the subjects under which it was entered on its back as well (See Chapter 6, Section 3.4, esp. p. 268, above): at Ardeer, author, title, and subject cards seem to have been accorded equal status in the dictionary catalogue and no mention was made of listing subjects on the back of title cards. All three types of cards were interfiled into a single alphabetical sequence, with cross-references established among the index terms denoting the subjects (Barbour 1918, 37R–38R; 1921, 172): the latter feature, again, appears to have been an innovation since Kaiser seems not have envisaged the use of cross-references between subject terms in an alphabetical register for books and pamphlets in his earlier writings. All in all, the file structure of the dictionary catalogue at Ardeer represented an elaborated version of the model of the alphabetical card register for books presented by Kaiser in *The Card System*: indeed, as its name implied, it followed the classical form of what, in Cutter’s parlance, would have constituted a triple syndetic dictionary catalogue (cf. Cutter 1876a, 562, Table II). One may also note that the use of colored cards to indicate

different kinds of entries not only constituted an adaptation of one of Kaiser's (1908, §§ 75, 149, 153–155) own suggestions for card index design but also found comparable, if not exact, parallels in contemporary recommendations for the construction of card catalogs in public libraries (Sayers & Stewart 1913, 19 & 62).

The second, and more important, card reference system was the Central Index, the purpose of which was “to bring[] together, by means of cards, all useful information from whatever source” (Barbour 1918, 38R; 1921, 172). Unlike the dictionary catalogue, it covered the full range of documents kept in the library. As defined by Barbour (1918, 38R; 1921, 173) and Rintoul (1925, 166), the Central Index was partitioned into two sections: a “numerical section”, which contained so-called “main cards”, and the “index proper”, which was comprised of so-called “index cards”. Main cards in the *numerical section* were prepared for all documents except for those belonging to the classes of correspondence, periodicals, and extracts and cuttings.⁵⁵³ The front face of each card contained the call number of the document in question, inscribed in its right-hand corner, as well as bibliographical information pertaining to the document, including its author, title, number of pages and illustrations, publisher, price, and dimensions; on the back of the card were listed, in alphabetical order, all of the subject terms under which the document had been indexed and catalogued (Barbour 1919, 38R; 1921, 173; Rintoul 1925, 166). The main cards were arranged in accordance with the classificatory structure encoded in the call numbers of the documents to which they referred. Insofar as the order of the call numbers reflected the physical arrangement of the documents (Barbour 1919, 37R; 1921, 171), the numerical section of the descriptive index functioned, in effect, as a shelf list of patents, books and pamphlets, drawings, graphical records, and internal and external reports: as Rintoul (1925, 166) noted, it was used to “serve as a check on the contents of the library and [to] facilitate stocktaking”. Strictly speaking, however, the numerical section did not constitute a “central register” of documents in Kaiser's (1908, §§ 95–96) sense of the term, since he held that

⁵⁵³ It should be noted that, although extracts and cuttings did not have main cards in the strict sense of the term, Barbour (1919, 38R; 1921, 169) reported that there was a special file of cards containing information on individual articles from which cuttings had been made: “In the case of Extracts, cards bearing in the top left hand corner the names of the various documents obtained for cutting purposes at various times are filed alphabetically and on these are given the call numbers and titles of the articles indexed with date of appearance”. This special file, which corresponded to what Kaiser (1908, § 228) had called a “register of papers” for press cuttings, served as an indicator of how frequently cuttings were taken from newspapers or journals to which the library did not have a regular subscription: if a given periodical yielded a large number of cuttings, that was a sign that the library was well-advised to take out a subscription to it (Barbour 1919, 38R; cf. Chapter 6, Section 3.4, esp. pp. 267–268, above).

such registers were always alphabetical in nature (See Chapter 6, Section 3.4, above): rather, it constituted an integrated series of numerical registers brought together into one large numerical “super-register”, so to speak.

The other section of the central index was the *index proper*, which was composed of index cards. Figure 45 offers an illustration of such a card, which, in all respects, mirrored the template for the formulation and recording of an index item set out by Kaiser in *Systematic Indexing* (See Chapter 7, Sections 3, 4.3–4.4, above). At the top left-hand corner of the card stands the filing term, which is a term for a concrete (*in casu*, GRENADE). The middle portion of the upper side of this card is blank: if there had been a “geographical” or “country” term serving as a subdivision of the filing term, it would have occupied this position at a visual level slightly below that of the initial filing term (Barbour 1919, 38R; 1921, 173; Rintoul 1918, 67a; 1925, 167). On the right-hand side of the card, and at a visual level below that of the filing term stands a “subsidiary filing term” designating a process (*in*

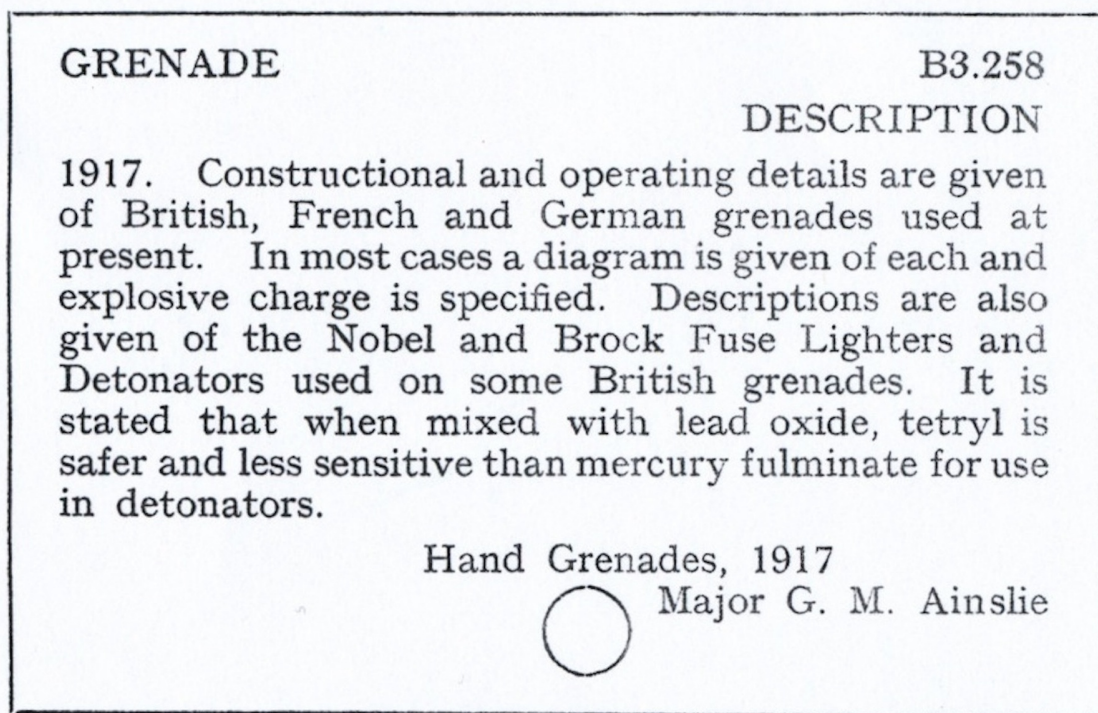


Figure 46: An index card from the files of the Index Proper of the Central Index at Ardeer (Source: Barbour 1921, 174).

casu, DESCRIPTION), which functions as a subdivision of the main filing term at top (Barbour 1919, 38R; 1921, 173): above it, in the right-hand corner of the card, is inscribed

the call number indicating the document to which the card pertains: as the form of this number to the left of the decimal point indicates (i.e., “B3”), the document in question is a book belonging to the subject class of explosives technology. Below the index terms and call number is inscribed a brief prose text containing “a digest of the information” culled from book “in so far as it is of interest in connection with the filing term” (Barbour 1919, 38R; 1921, 173; Rintoul 1925, 167). This “digest”, “epitome”, or “abstract” of the information was preceded by a year date which, stated Barbour (1919, 38R; 1921, 173) and Rintoul (1925, 167), indicated the “date on which the information was first known”—what Kaiser (1911, § 351) had termed the “date of the information” and characterized as the date on which the action to which the process term referred had taken place (Cf. Chapter 7, Section 4.3, esp. p. 531, above). Finally, below the digest and above, and to the side of, the circular perforation near the bottom of the card were given the “name”, or title, of the document or publication in question (*in casu*, *Hand Grenades*), its date of publication (*in casu*, “1917”), and the name of the author (*in casu*, Major G. M. Ainslie) (Barbour 1919, 38R; 1921, 173; Rintoul 1925, 167): the precise configuration of these bibliographical elements varied with the kind of document to which reference was being made.

Whereas the general form of the index card at Ardeer perfectly reflected Kaiser’s protocols for the formulation of an index item, Barbour’s and Rintoul’s published discussions of its key elements—the index terms—indicate that the underlying conceptualizations of categories and statements alike had undergone changes. As regards the categories, neither Rintoul (1918, 67R; 1925, 167) nor Barbour (Barbour 1919, 38a; 1921, 173) had anything to say about the definition of what they respectively called “geographical” or “country” terms: however, they did offer brief definitions of concretes and processes. With respect to the former category, Barbour (1919, 38R; 1921, 173) wrote that “a fairly good definition of a “concrete” for indexing purposes is to the effect that it is a term denoting something marketable or capable of being marketed. Light and electric energy are concretes”; Rintoul’s (1925, 167) formulation was substantially the same. This characterization of concretes reflected both continuity and change *vis-à-vis* Kaiser’s definitions. The stipulation that a concrete was something marketable clearly derived from Kaiser’s (1908, § 366, s.v. “Concretes”; 1911, § 299) statements that a concrete was “any saleable commodity” or a “commodit[y] having an exchange value”. By contrast, the statement that light and electric energy were also concretes—Rintoul (1925, 167), significantly, spoke of them as being “treated as “concretes” within [Kaiser’s] system”—marked a shift in emphasis. To be

sure, in *Systematic Indexing*, Kaiser (1911, § 55) had cited electricity as an example of a concrete, albeit in order to make a point about the epistemological importance of processes (See Chapter 7, Section 2.1, esp. pp. 306–307, above). However, he had not spoken of forms of energy as a distinct subclass of concretes, save for his characterization of labor—which, as was noted in an earlier chapter, he considered to be the archetypical form of the subclass of abstract concretes (See Chapter 7, Section 3.1.2)—as human energy (Kaiser 1911, § 316). Barbour and Rintoul did not elaborate on their rationale for singling out forms of energy as a distinct kind of concrete; most likely, they did so because, as industrial chemists, they did not expect that most of their readers would regard the latter as belonging to the category of concrete things in the usual sense of the term—that is to say, as directly tangible, discrete, and self-subsistent objects (cf. Barbour, in Kaiser 1926, 39–40). At any rate, whereas Kaiser had subdivided concretes *qua* commodities into movable, immovable, and abstract concretes, Barbour and Rintoul characterized them either as marketable items or as forms of energy: as we shall presently see, this latter division of the category would come to supersede the previous one in Kaiser’s own thought (See Chapter 9, Section 4.1, below).

The conceptualization of the category of processes also underwent subtle shifts in emphasis. We have already seen that Kaiser (1911) had set forth two different definitions of this category in *Systematic Indexing*, alternatively characterizing terms of processes as referring to actions associated with concretes (e.g., §§ 55, 73, 109, 301, 663, s.v. “Concrete and Process”) or as denoting conditions attaching to them (e.g., §§ 52, 56, 107, 298). His formal characterizations of terms of processes had tended to place considerable stress on the notion of processes as actions, even though the actual examples of process terms that he had actually gave encompassed not only names for actions but a host of heterogeneous properties that could be attributed to terms, including qualitative attributes and statuses, quantitative measures, quantitative relationships, and legal relationships (See Chapter 7, Section 3.2.2, above). Barbour and Rintoul, by contrast, offered a more balanced definition of processes. In their view, “process” terms denoted “action, quality, property, etc.” (Barbour 1919, 38R; 1921, 173; Rintoul 1925, 167): a latter commentator on the history of the research at Ardeer would state, slightly more restrictively, that such terms referred to “operations” or “abstract qualities” (Miles 1955, 70). As examples of process terms, Barbour (1919, 38R–39R; 1921, 173, 174, 175) cited ACCIDENT, DESCRIPTION, DETONATION VELOCITY, EXPLOSION, FIRE, PURIFICATION (or PURIFYING), SEPARATING, SOLUBILITY, STABILITY (or STABILIZING), and TOXICITY, a series that included terms for various kinds

of actions (sci., DESCRIPTION, PURIFICATION or PURIFYING, SEPARATING, STABILIZING), qualities or properties of various sorts (sci., DETONATION VELOCITY, SOLUBILITY, STABILITY, TOXICITY), and occurrences, or kinds of events (sci., ACCIDENT, EXPLOSION, FIRE). If one prescind from the inclusion of terms for occurrences, or kinds of events, which apparently was based on an interpretation of them as special kinds of action and ran counter to Kaiser's own (tacit) tendency to treat them as concretes,⁵⁵⁴ it is apparent that Barbour's examples of process terms struck a more-or-less equal balance between terms of processes *qua* actions associated with concretes and processes *qua* properties of concretes; similarly, his and Rintoul's inclusion of qualities and properties among the referents of terms of processes in their formal definition of the category served as a counterweight to a largely action-oriented view thereof. In placing greater formal attention on qualities and properties of concretes as elements of the category of processes than Kaiser had done, Barbour and Rintoul rendered explicit what had already been a latent, but largely undeveloped, feature of the category in his writings: as we shall see, Kaiser would come to express a similarly equilibrated view of the inner structure of the category (See Chapter 9, Section 4.1, below).

Although Barbour's and Rintoul's statements about concretes and processes signaled shifts in definitional emphasis, the changes in the general conceptual profiles of these categories were relatively minor. The same cannot be said for the conceptualization—or rather, “deconceptualization”—of the statement at Ardeer. In *Systematic Indexing*, Kaiser had defined the statement as a sequence of “connected terms all having reference to the same piece of information” (Kaiser 1911, § 302). Composed of a restricted number of terms from different categories brought into combination in accordance with a determinate set of syntactic rules and forming an integrated representation of the semantic content of a given item of information, a statement constituted a distinct semantic and syntactic unit in its own right, akin to a sentence in natural language or a proposition in logic (See Chapter 7, Section

⁵⁵⁴ See, e.g., Kaiser 1911, §§ 452, where FLOODS [*sic*] is included in a list of immovable concretes, & 540, where STRIKE is given as a related term to the term for concrete LABOUR, an indication that it denotes a concrete in its own right (cf. Chapter 7, Section 5.2.2, end): it goes without saying that floods and strikes would be generally viewed as kinds of events. Whereas Kaiser presumably assigned floods to the subclass of immovable concretes because floods are geographically bound, natural events, it is wholly unclear whether he would have classified strikes in the same way or whether he would have considered them to have been abstract concretes because of their association with labor (cf. Chapter 7, Section 3.1.2, esp. pp. 406–407, above). In any case, these isolated cases of kinds of events *qua* concretes ran counter to his formal characterizations of concretes as things and commodities.

3, esp. p. 376, above). Alongside the rather abstract image of statements as unified semantico-syntactic structures, Kaiser set another, more practically oriented one, according to which a statement consisted of three filing terms that determined the sequence of index items in a card file. On this view, the first term—prototypically, a term denoting a concrete—was the main filing term (Kaiser 1911, §§ 302, 313), while the two following terms represented subdivisions of the set of cards entered under the first term, the second, or middle, term typically being the name of a country associated with the concrete in question and the third, and final term, invariably being one referring to a process involving the concrete (§§ 390, 393). This notion of statements as main terms followed by successive subdivisions found expression not only in the different positions that the component terms of a statement occupied in the statement field of the unit cards on which index items were recorded (§ 376; see Chapter 7, Section 4.4) but also in the different positions assigned to the first, second, and third terms within the system of five-position guide cards (§ 400; see Chapter 7, Section 5.2.1). In short, Kaiser had conceptualized the statement both as a semantico-syntactic unit defining the informational contents of a given piece of information and as a main filing term accompanied by subsidiary terms that subdivided the cards entered under it: the first of these conceptualizations stressed the unity of the statement, whereas the second foregrounded the distinct functional rôles of its component terms in the structuring of a card file.

Of the two complementary conceptualizations of the statement propounded by Kaiser in *Systematic Indexing*, Barbour and Rintoul adopted only the second, practically oriented one in their descriptions of the index system at Ardeer. Both men characterized concrete terms as “filing terms” and process terms as “subsidiary filing terms” (Barbour 1919, 38R; 1921, 173; Rintoul 1925, 167); furthermore, Rintoul (1925, 167, 169) also gave a concise account of how these filing terms were used to subdivide sets of cards and both he and Barbour (1919, 39R; 1921, 178) briefly indicated how the categories of terms underlay the system of guides used in their index. Yet, strikingly, nowhere in their published writings about the index system at Ardeer did Barbour or Rintoul speak of the concatenations of terms for concretes, for countries, and for processes on index cards as statements nor did they identify statements as the structural basis for the system of guides. The significance of this terminological omission should not be minimized. Kaiser had used the term “statement” to refer to the combinations of terms from different categories as semantico-syntactic units based on an abstract structural template (See Chapter 7, Section 3). In dispensing with this

technical term, Barbour and Rintoul in effect downplayed the notion of these combinations of terms as units rooted in certain abstract structural forms in favor of presenting them in a concrete manner as filing terms and subdivisions thereof within the framework of a card index. Why they did not employ the concept of the statement in their descriptions of their indexing system is unknown: perhaps the explanation is to be sought in the fact that they wanted to describe to their readers in brief compass how their scheme worked in practice and the notion of the statement was pitched at too theoretical a level for such a purpose. However that may have been, the effect was that, although Barbour and Rintoul tacitly based the combination of filing terms on the structural form of the statement, the notion of the statement had no explicit rôle in their descriptions of these term combinations, which were purely practical in tenor. This occultation of the statement in the exposition of SI was a sign of things to come (See Chapter 9, Section 4.1, below).

One of the great theoretical tensions in Kaiser's account of SI in *Systematic Indexing* was precipitated by his oscillation between two different versions of the category system underpinning the formation of statements: a dyadic version, consisting of concretes and processes alone, and a triadic one, comprising concretes, countries, and processes (See Chapter 7, Section 3.4, above). Whereas Kaiser's (1911) epistemologico-ontological (§§ 52, 55–56) and logico-linguistic (§ 298) rationales for the choice of categories provided theoretical justification for the dyadic system of concretes and processes, practical considerations closely bound up with the influence of the categories of index terms used at the PCM's Bureau of Information upon SI led him to adopt the triadic system of concretes, countries, and processes: as we saw in a previous chapter, he sought to harmonize the two through an ingenious, though theoretically highly problematic, move—taking the category of countries to be a special subclass of concretes and promoting it by *fiat* to full categorial status on a par with that of concretes and processes (§ 300; see Chapter 7, Sections 3.2 & Sections 3.4, above). Now neither Barbour nor Rintoul dealt with the theoretical arguments for the choice of categories in their respective expositions of the implementation of Kaiser's system at Ardeer. Nevertheless, if one compares their accounts of the use of filing terms one can discern traces of the tension between the dyadic and the triadic versions of the category system of SI.

For his part, Rintoul tended to favor the triadic version. In his earliest published description of SI, he characterized it as

a card system in which concrete terms are used as the main guides, followed by sub-guides relating to geographical position and to process. These three items appear at the top of each card, the concrete term being in the left-hand, the geographical term in the middle and the process term at the right (Rintoul 1918, 67R-68R).

Similarly, in a later account of how the categories of terms were deployed in the filing of index cards, he wrote that

[t]he cards are filed, first of all, in alphabetical order under the “concrete” term. All groups of cards under one “concrete” are arranged alphabetically according to the geographical term and the groups under one “concrete” and under one geographical term are filed alphabetically under the “process term” (Rintoul 1925, 167).

In both of these passages, the tripartite category sequence of [CONCRETE] [COUNTRY] [PROCESS] is presented as the norm for structuring both the combinations of filing terms on index cards and for the articulation of the system of guide cards. Barbour’s (1919, 38R; 1921, 173) description of the placement of filing terms upon index cards sounded a somewhat different tone:

The index cards are arranged alphabetically, the filing term being placed in the top left hand corner. The filing term in the central index is substantial and must be confined to “concretes”. ... At the top right hand corner of the card is the call number. Below this is the “process” term. ... The cards filed under the concrete “guncotton” are arranged in alphabetical order of “processes,” and so for any group of cards filed under the same concrete. If cards contain a country term this occupies a midway position between the concrete and the process terms at the top of the card. The country term, when it is present, is the term which ranks next to the concrete for filing, the process term being that used last.

This passage envisages two different possible sequences of filing terms upon an index card: a dyadic one comprising the categories [CONCRETE] [PROCESS] and a triadic one consisting of the categories [CONCRETE] [COUNTRY] [PROCESS]. Kaiser (1911, §§ 302-303; see Chapter 7, Sections 3.5 & 5.1, esp. pp. 483-489, 579-580, above) had considered the tripartite form of statement to be the prototypical one and the bipartite form to constitute a reduced version thereof. Although this argument seems to have formed the basis for Barbour’s description, he reversed its polarity in his presentation, treating the dyadic sequence [CONCRETE] [PROCESS] as if it were the norm and the triadic version as one that augmented the dyadic form by intercalating [COUNTRY] between the two original terms. It is not entirely clear why he opted to do so. The exigencies of exposition may well have provided a motivation, for the image of a sample index card accompanying the passage in question featured only concrete and process filing terms (See p. 715, Figure 46, above) and

this may well have led him to slant the discussion toward the dyadic form.⁵⁵⁵ At the same time, it should be noted that, when Rintoul (1925, 167) adapted the foregoing passage in a later article, he reformulated it in a fashion that reinstated the triadic form as primary, even as he admitted that the [COUNTRY] term might not always occur on an index card:

The filing term, which is placed in the top left-hand corner, must be a “concrete”. ... The “concrete” term then is placed in the top left-hand corner of the card. The centre of the card at the top is occupied by a geographical term if such exists in connection with the matter being dealt with. At the top of the right-hand corner is the call number of the document indexed and immediately below this is the “process” term.

This difference in presentation is striking and one cannot exclude the possibility that Barbour’s choice of example and his description thereof may have reflected a tacit preference for the dyadic form on his part. However this may have been, the net effect was to present [CONCRETE] and [PROCESS] terms as obligatory filing terms and [COUNTRY] terms as facultative: this foregrounded the dyadic version of Kaiser’s category system without denying the triadic one. Interestingly, Kaiser would adopt a comparable strategy in his final published exposition of SI (See Chapter 9, Section 4.1, below).

Although Barbour and Rintoul differed in the relative weight that they gave to the dyadic and triadic versions of Kaiser’s category system, they both agreed that, in a sequence of filing terms, whether these appeared on an index card or were distributed across a series of guide cards, the first filing term always denoted a concrete; the middle term, if present, always named a country; and the final term invariably referred to a term for a process (Barbour 1919, 1921, 173, 178; Rintoul 1919, 67R–68R; 1925, 167, 169). In other words, the only sequences that they acknowledged in their writings were [CONCRETE] [COUNTRY] [PROCESS] and [CONCRETE] [PROCESS]. This represented a reduction in the number of statement forms that Kaiser had set forth in *Systematic Indexing*. There, he had stipulated that, with regard to statements, terms of concretes and terms of concretes were positionally intersubstitutable, thus allowing for no fewer than four statement forms—namely, [CONCRETE]–[COUNTRY]–[PROCESS] and its variant, [COUNTRY]–[CONCRETE]–[PROCESS]; and [COUNTRY]–[PROCESS] (See Chapter 7, Sections 3, esp. Statement Forms [7.1]–[7.3], & 3.5, above). Now it is unknown why Barbour and Rintoul mentioned only those sequences in which [CONCRETE] was the main term and not those in which [COUNTRY]

⁵⁵⁵ Supporting this supposition is the fact that, in another passage of the same article, where Barbour (1919, 39a; 1921, 178) made a brief general allusion to the categories underpinning the system of guides, he assumed the full complement of [CONCRETE], [COUNTRY], and [PROCESS].

assumed that rôle. One can envisage two possible explanations on this score. First, it may have been the case that all four sequences of categories were permitted at Ardeer and that Barbour and Rintoul chose to mention only those in which a term for a concrete appeared as the main filing term in order to simplify the exposition of their indexing system. However, one cannot exclude the possibility that they were not simplifying their presentations with regard to this matter and that the only allowable sequences of terms in the Ardeer index were those in which the main filing term was one denoting a concrete. In the absence of collateral evidence from the card files themselves, it is impossible to decide which of these alternative scenarios was, indeed, the case. At any rate, it is clear that Barbour's and Rintoul's descriptions of the sequences of filing terms served to reinforce and consolidate the image of concretes as the main terms *par excellence* in SI.

Although Barbour's and Rintoul's accounts of the combinations of filing terms used in the index proper at Ardeer abandoned Kaiser's notion of the statement as an explicit theoretical underpinning for the combination of terms, manifested a propensity to de-emphasize the rôle of terms of countries in indexing, and, concomitantly, reflected a tendency to foreground terms of concretes as main filing terms, it does not appear that, apart from the apparent restriction of term combinations to [CONCRETE] [COUNTRY] [PROCESS] and [CONCRETE] [PROCESS], these conceptual changes materially altered the protocols for forming index items. Otherwise, the practical constitution of the card files of the index proper at Ardeer hewed closely to the format outlined by Kaiser in *The Card Index* and *Systematic Indexing*. Index cards were arranged in the alphabetical order of the main filing terms and subarranged, under each main filing term, in the alphabetical order of the subsidiary terms serving as successive subdivisions (Rintoul 1925, 167; see Chapter 7, Section 5.1, above). Because the index included index cards from all documentary classes, a color-coding scheme was used to indicate the different documentary classes: index cards for patents were white; those for books and pamphlets were pink; those bearing information drawn from correspondence were salmon-colored; drawings and illustrations were represented by blue cards; index cards for extracts and cuttings were brown; those for periodicals were pink; items of information from typescripts of external reports were set down on yellow cards; and those extracted from internal reports were transcribed upon buff cards (Barbour 1919, 38R; 1921, 172; Rintoul 1925, 168; see Chapter 7, Section 5, esp. pp. 552–553, above). Five-position guide cards were employed to “indicate the alphabetical position of the term on the tab” in relation to other terms in the files (Barbour 1919, 38R;

1921, 174; Rintoul 1925, 167; see Chapter 7, Section 5.2.1, above). Kaiser's (1911, § 405) *dictum* that every main filing term in an index should have its own guide card, while subdivisions thereof could be gradually introduced as the number of index items entered under it accumulated, governed the distribution of guide cards within the file; as Barbour (1919, 39R; 1921, 177) and Rintoul (1925, 169) put it,

[e]very card or set of cards filed under a given "concrete" term is preceded by a buff guide card having that "concrete" term typed on its projecting tab, which in this case occupies the top left-hand corner position. When the number of cards filed under that "concrete" term increases and cards bearing names of countries appear, a guide card having a tab in the middle position is inserted before each sub-group of cards for the various countries and bears on the projecting tab the name of the country. When the cards under a given "concrete" term become numerous other guide cards may be inserted at intervals. These guide cards have projecting tabs on the top right-hand corner bearing the "process" term of the card which they precede.

On this view, the guide cards for terms of concretes were the "main guides", while "country guides" and "process guides" had the function of "facilitat[ing] scrutiny of the groups in which they themselves appear"—that is to say, to indicate the subdivisions of the set of cards entered under the concrete represented on the tab of the main guide (Barbour 1919, 39R; 1921, 178).

In addition to marking the locations within the index files where (sets of) cards pertaining to concretes began, main guide cards had a another important function to fulfill: they were the *loci* for recording cross-references binding each term for a concrete to semantically related main filing terms. In Barbour's and Rintoul's view, the primary purpose of cross-references was to assure that, if the need arose, searches for information regarding a given concrete could be as comprehensive as possible; as the latter author explained with reference to the main guides,

[i]t is by means of these cards that anyone consulting the index, having exhausted the possibilities of the group filed under any given "concrete," without obtaining the information required, proceeds to other terms in the index related to that first consulted (Rintoul 1925, 169; cf. Barbour 1919 39R: 1921, 178).

This rationale for the presence of cross-references was consonant with Kaiser's (1911, §§ 47, 230, 417, 434–436) understanding of the practical utility of what he called related terms. Although neither of Kaiser's colleagues at Ardeer invoked his more theoretically oriented characterization of related terms as a "logical key", or a substitute for a "logical classification", within the framework of an alphabetical index (§§ 389, 414, 416), they were hardly unaware of the classificatory dimension of these terms. Barbour, for one, suggested

that a scheme of classification could usefully serve as the basis for cross-references in a card index. Adverting to the case of Nobel's Explosives Company, he observed that

[i]f explosives are the main subjects of interest in an index, it is advisable to draw up as sound a scheme of classification of explosives as is possible and to allocate the name of each explosive to its appropriate position in that scheme, the position being indicated on the main guide card (Barbour 1919, 40R; 1921, 178).

Interestingly, the notion of constructing a classification as an aid in the making of cross-references for certain kinds of concretes appears to have been an innovation on his part, for he reported that just such a scheme was "now being introduced into the index at Ardeer Factory" (1919, 40R) in 1919, long after Kaiser had ceased working there.

Barbour's conceptualization of related terms was, for the most part, consonant with that of Kaiser. He identified four different kinds of relationships that related terms could contract with a tab term: they could be (1) synonyms of the tab term; (2) multiword terms in which the tab term served as the initial word; (3) "higher collective terms"—that is to say, terms standing as superordinate terms to the tab term in a hierarchical relationship; and (4) "lower, more specific terms"—that is to say, terms standing as subordinate terms to the tab term in a hierarchical relationship (Barbour 1919, 40R; 1921, 178). Three of these kinds of relationships—namely, those obtaining between a term and its synonyms, its hierarchical superordinates, and its hierarchical subordinates—corresponded exactly to those that Kaiser (1911, § 423, nos. 1, 2, & 4) had singled out in his discussion of "related terms of concretes" in *Systematic Indexing*. As for the fourth, Barbour's identification of multiword terms in which the tab term served as the initial word as a distinct category of related terms did not match Kaiser's (1911, § 423, no. 3) notion of concretes related by an associative relationship in which one concrete was applied to another (See Chapter 7, Section 5.2.2.2, esp. pp. 619–620, above). Yet, even here, Barbour was following a path staked out by Kaiser. To be sure, there is no indication that the associative relationship of application, as defined by Kaiser, formed part of the corpus of relationships represented by cross-references at Ardeer. However, Kaiser (1911, § 431) had briefly alluded to multiword related terms in which the first word was identical to the tab term, noting that in such cases, the related term represented a subdivision of the tab term: accordingly, I shall call this relationship a verbal subdivisionary relationship. Moreover, we have already had occasion to see that Kaiser built up quite an elaborate method of formulating the first guides of multiword terms so as to express verbal subdivisionary relationships within the framework of a five-position guide system (See Chapter 7, Section 5.2.2.2, esp. pp. 627–628, above).

Thus, Barbour's fourth category of relationships among related terms can ultimately be traced back to Kaiser. It is also worth noting that Barbour placed what would today be recognized primarily as different varieties of linguistic relationships (i.e., synonymy and the relationship between a tab term and the multiword term of which it was the initial element) on a par with what would be recognized as conceptual relationships mediated by language (i.e., hierarchical relationships of superordination and subordination). Insofar as he treated all of these relationships as ones obtaining between terms *qua* verbal units, he appears to have adopted Kaiser's term-oriented approach to indexing (Chapter 7, Section 2.2.3, above).

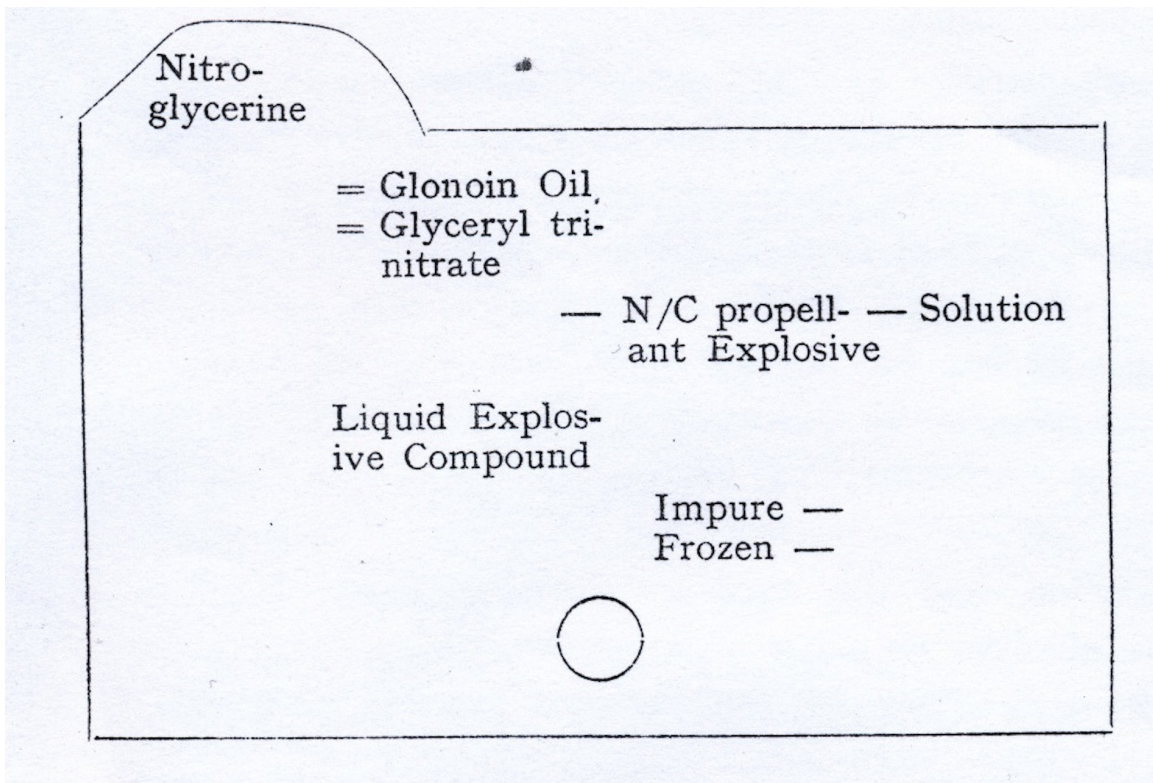


Figure 47: A main guide card from the files of the Index Proper of the Central Index at Ardeer (Source: Barbour 1921, 177).

The formulation of cross-references on the main guide cards at Ardeer appears to have followed the general lines set down by Kaiser in *Systematic Indexing*, albeit not without introducing some changes. Figure 47, a guide for the concrete term NITROGLYCERIN reproduced by Barbour (1919, 39R; 1921, 177), may serve to illustrate this. The body of the guide contains four clusters of terms, each of which represents a different kind of relationship. In the upper left center of the body, we encounter the terms GLONOIN OIL and GLYCERYL TRINITRATE, both of which are synonyms of the tab term NITROGLYCERINE

(1919, 40R; 1921, 178). An equal sign (=) is prefixed to each of these terms to indicate its status as a synonym. Absent from Kaiser's (1911, § 431) earlier notational system for guide cards, which did not offer the indexer any visual means for distinguishing synonyms from other related terms, this symbol marked a definite improvement in the representation of this class of related terms in SI. To the lower right of these synonyms are inscribed two terms aligned horizontally to one another: —N/C PROPELLANT EXPLOSIVE and —SOLUTION. In accordance with notational conventions established by Kaiser, the dash at the front of each term serves as a graphic substitute for the tab term (§ 431), while N/C represents a local abbreviation for the technical term "nitrocellulose": accordingly, these terms are to be read as NITROGLYCERINE NITROCELLULOSE PROPELLANT EXPLOSIVE and NITROGLYCERINE SOLUTION, respectively (Barbour 1919, 40R; 1921, 178). The position of the dash indicates that they are multiword terms of which the first word is the tab term NITROGLYCERINE: as such, they stand in a verbal subdivisionary relationship to it. To the lower left of these two terms and under the synonyms is located the term LIQUID EXPLOSIVE COMPOUND, which, in this context, refers to the kind of substance that nitroglycerine is and so represents an example of a higher collective, or hierarchically superordinate, term (1919, 40R; 1921, 178). Unlike its fellows on the body of the card, this term is unaccompanied by any symbol to indicate the nature of its relationship to the tab term with which it is associated. Such lack of marking, which was not infrequent in earlier versions of SI (See, e.g., Figure 36, at Chapter 7, Section 5.2.2.2, p. 629, above), meant that one could not immediately identify the kind of relationship in which it stood to NITROGLYCERINE. To be sure, the lack of a visible mark served to distinguish the term from consistently marked categories of terms and so reduced the field of alternatives somewhat: for example, it could not be a synonym of NITROGLYCERINE nor could it be a multiword term of which the first element was equivalent to the latter, since it did not possess the diagnostic mark of either of these kinds of related term. Nevertheless, a measure of uncertainty remained, for the term in question could, in principle, be either hierarchically superordinate or subordinate to the tab term:⁵⁵⁶ it thus fell to the user of the card index and his knowledge of the relevant terminology to divine the nature of the hierarchical relationship between LIQUID EXPLOSIVE COMPOUND and NITROGLYCERINE. Finally, in the

⁵⁵⁶ For an example of an unmarked term as a superordinate term to a tab term, see IRON in relation to BAR IRON in Figure 37b at Chapter 7, Section 5.2.2.2, p. 634, above; for unmarked terms as subordinate terms to a tab term, see, e.g., DOOR HINGE, DOOR KNOB, HOOK, and RASP in relation to HARWARE in Figure 36, in Chapter 7, Section 5.2.2.2, p. 629, above.

lower right sector of the card, we find the two terms IMPURE— and FROZEN—, which, in accordance to Kaiser's (1911, § 431) conventions, are to be read as IMPURE NITROGLYCERINE and FROZEN NITROGLYCERINE. By virtue of their grammatical form, in which a modifier (*in casu*, the adjectives IMPURE and FROZEN) preceded the head noun serving as tab term (*in casu*, NITROGLYCERINE), these terms denoted subtypes of the kind of substance denoted by the latter (See Chapter 7, Section 5.1, pp. 571, n. 481, & 576, n. 487, above); they thus stood in a hierarchically subordinate relationship to NITROGLYCERINE as lower specific terms (Barbour 1919, 40R; 1921, 178). In this case, the position of the dash indicating the tab term at the end of the related term provided a clue to the nature of the relationship.⁵⁵⁷

From the preceding examples, it is evident that, whereas there was considerable continuity between the conventions for recording cross-references established by Kaiser in his earlier writings and those used for this purpose in the Ardeer index, both the restriction of related terms to those standing in relations of synonymy, verbal subdivision, or hierarchical super- or subordination to a given tab term and the introduction of a symbol to distinguish synonyms from higher collectives and lower specifics increased the level of precision in the representation of different kinds of cross-reference relationships on guide cards in the latter index. Also worth noting is the disposition of the terms on the main guide represented in Figure 47, which likewise seems to reflect elements of change within a general atmosphere of continuity. In *Systematic Indexing*, Kaiser had recommended that related terms be listed in alphabetical order and that, ideally, the list be partitioned into four vertical columns, the first of which was to contain terms beginning with initial letters A through F; the second, those with initial letters G through L; the third, terms beginning with letters M through R; and the fourth, those with initial letters S through Z (Kaiser 1911, § 430; see Chapter 7, Section 5.2.2.2, esp. p. 626, above). Now, Barbour (1919, 40R, 1921, 178) and Rintoul (1925, 169–170) reported that, in the index at Ardeer, related terms were listed in alphabetical order and the arrangement of the terms on our sample guide generally conforms to Kaiser's stipulations: it is apparent that the body of the card has been

⁵⁵⁷ It should be noted that there were limitations to this. Generally speaking, all terms taking the form of [NOUN or ADJECTIVE] —, in which the dash represents the noun occurring as a tab term, represent lower specifics of the tab term in question; however, not all terms standing in relation to a tab term as lower specific necessarily have the form [NOUN or ADJECTIVE] — (cf. the examples from Figure 36 cited in the previous footnote). In other words, the form [NOUN or ADJECTIVE] — serves as an indicator of only a certain, morphologically distinct subset of lower specific terms, not all terms that might take on the rôle of lower specific terms.

partitioned into four columns and that, for the most part, the terms have been arranged in alphabetical order and distributed into the column appropriate to each. The positions of the terms FROZEN NITROGLYCERINE and IMPURE NITROGLYCERINE, however, break the pattern. One would expect the former term, which begins with “F”, to have a place near the bottom of the otherwise empty first column of the card and the latter, which begins with an “I”, to be located between =GLYCERYLTRINITRATE and LIQUID EXPLOSIVE COMPOUND. Yet both are huddled, well out of alphabetical order, near the bottom of the third column between —NITROCELLULOSE PROPELLANT EXPLOSIVE in the third column and —SOLUTION in the fourth;⁵⁵⁸ what is more, IMPURE NITROGLYCERINE precedes FROZEN NITROGLYCERINE.

In his articles, Barbour did not discuss these deviations from normal alphabetical order and so the reason for them is unknown. Nevertheless, one may venture a hypothesis to explain them. IMPURE NITROGLYCERINE and FROZEN NITROGLYCERINE are terms representing different kinds of nitroglycerine defined by physical state. Barring clerical error, it may well be that the person preparing the guide in question sought to indicate that they designated subtypes of nitroglycerine by entering them in a position under that which NITROGLYCERINE would have occupied if it could occur in a list of its own related terms. Supporting this notion is the fact that both IMPURE NITROGLYCERINE and FROZEN NITROGLYCERINE seem to be indented in relation to the immediately preceding term — NITROCELLULOSE PROPELLANT EXPLOSIVE, which is, significantly, the first term in the list to begin with the element NITROGLYCERINE. The rationale for such a move would have been the collocation of all related terms referring to kinds of nitroglycerine in one place on the guide card; the general effect would have been the creation of pockets of classified sequences of terms within an otherwise alphabetically ordered list.⁵⁵⁹ Of course, this hypothesis does not account for all the puzzling features surrounding our two terms: for one thing, it remains unclear why IMPURE NITROGLYCERINE should have been given ordinal precedence over FROZEN NITROGLYCERINE. Furthermore, given the lack of

⁵⁵⁸ As a glance at Figures 36 & 44 at Chapter 7, Section 5.2.2.2, pp. 629 & 642, above, indicates, neither the dash nor any other symbol of this type had any ordinal value in the alphabetical arrangement of terms in SI,

⁵⁵⁹ Such a rationale is identical to the one underlying inversion, for forms such as *NITROGLYCERINE, IMPURE and *NITROGLYCERINE, FROZEN would collocate under the catchword NITRO-GLYCERINE. Kaiser (1911, §§ 318, 340, 348, Point 5) strictly forbade inversion of terms of concrete within SI and the librarians at Ardeer seem to have followed this morphological rule: thus, if the explanation given here should be correct, they would have achieved the effects of inverting the terms in question without carrying through the inversion itself.

collateral examples of main guides from the Ardeer index, it is impossible to say how widespread the practice of collocation posited above may have been: indeed, one cannot exclude the possibility that the position of these two terms had been specially altered in the published illustration of the guide card in order to ensure that the four different kinds of related terms might appear as visually distinct clusters. However this may have been, it is apparent that, while maintaining general fidelity to Kaiser's rules of arrangement of related terms on guide cards, the persons involved in indexing at Ardeer were willing to make alterations to these, if it appeared necessary to do so.

Thus far, we have seen that the basic structural features of the index proper at Ardeer, from the format of individual index cards to the arrangement of card files and the representation of cross-references on main guides, conformed, by and large, to the protocols of SI that Kaiser had laid down in his books, with modifications thereto tending to involve relatively minor matters of detail. However, the Ardeer index diverged from Kaiser's standard structural template for a systematic card index in two significant ways. First, it included a special section composed of index cards in which a term for a process, rather than a term for a concrete, was the primary point of reference. Second, provisions were made for dealing with changes over time by breaking up the index into distinct, chronologically defined sections, or volumes. Let us briefly consider, in turn, these two innovative features of the index.

The ideas underlying the inclusion of a process section, as the librarians at Ardeer called it, within the framework of a systematic card index were not entirely new. In *Systematic Indexing*, Kaiser (1911, §§ 446, 653–655) had recognized that, in certain circumstances, it might be desirable, or even necessary, to index by processes rather than, or in addition to, indexing by concretes or countries. As we noted at the end of Chapter 7, Section 3.5, he had recommended that, in such cases, an indexer might pursue one of two courses of action. First, the indexer could prepare index items for process terms in the usual manner, making sure to keep strict control over them either by keeping a list of process terms so treated or, even better, by using unit cards of a distinct color to differentiate them from other cards (Kaiser 1911, § 654; cf. Barbour, *apud* Kaiser 1926, 39). Alternatively, and, in Kaiser's view, preferably, the indexer could make special guide cards for process terms, which enumerated the various terms of concretes with which each was associated. In either case, Kaiser considered such measures to be exceptional within the framework of SI, since he

took it as axiomatic that, as a rule, businessmen would seek information about concretes and countries rather than about processes *per se* (cf. Kaiser 1911, § 384).

Given the nature of the industrial-chemical research on explosive materials carried on at Ardeer, it was perhaps inevitable that information pertaining to certain processes—in the sense defined earlier in this section—was deemed to be of sufficient interest to researchers to merit indexing. Accordingly, Kaiser and the committee established protocols for doing so. Indexing by processes at Ardeer struck a *via media* between the two alternative approaches outlined by Kaiser. Entries for process terms were entered on ordinary index cards, which, however, had their own distinct format: a card for a given process term did not contain an epitome or abstract of information drawn from a particular textual source (Barbour, *apud* Kaiser 1926, 39), but rather gave several references to concrete terms with which the process term in question had been brought into relation, as well as the call numbers of the documents in which the process had been discussed in relation to those concretes. Partial reproductions of such process cards, given in Figure 48a and 48b, illustrate the basic pattern. The process term (*in casu*, ACCIDENT and SENSITIVENESS TO SHOCK) was entered in the upper right-hand corner of the card, while listed on the body of the card, in alphabetical order, were the various concrete terms in relation to which it was discussed, each of which was associated with a call number. A striking feature of these lists was the use of prepositions, otherwise largely absent from SI, to specify the nature of the relationship between concrete and process: for example, in the process card for ACCIDENT depicted in Figure 48a, the preposition “to” seems to signaled that the following concrete had been treated as the object of damage or injury resulting from an accident in the original document, while “with” appears to have signaled that the concrete in question had been an apparatus involved in an accident. Cards such as these were gathered and arranged, apparently in alphabetical order, in a separate card file, which segregated them from the main body of the index, in which the main filing terms, of course, were terms of concretes (Barbour, *apud* Kaiser 1926, 39)—a policy that Kaiser had not envisaged in his earlier writings. Thus, both the formatting of these process cards, which combined elements from Kaiser’s two approaches, and the establishment of a separate file for them marked innovations in the implementation of SI.

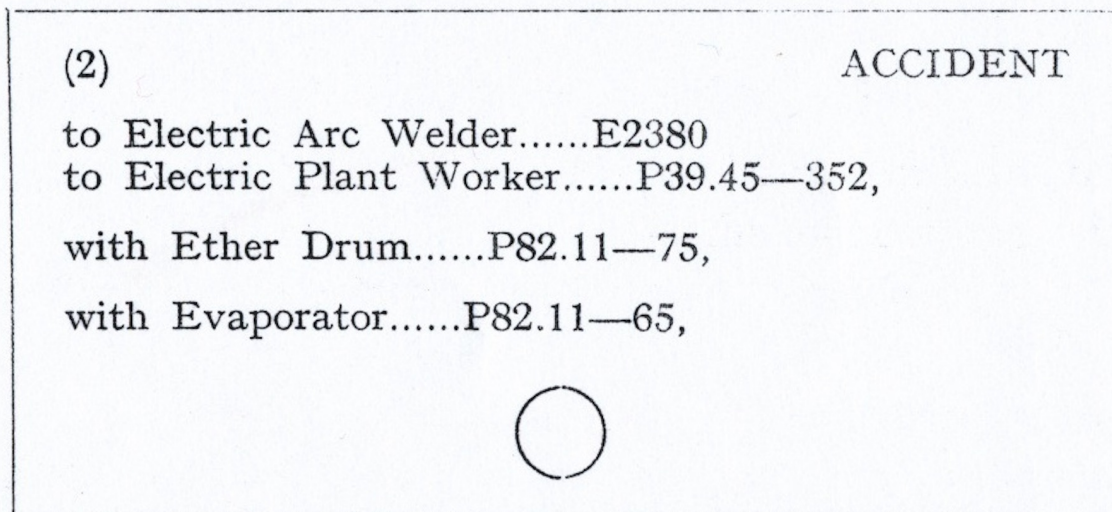


Figure 48a: A process section card from the files of the Index Proper of the Central Index at Ardeer (Source: Barbour 1921, 177).⁵⁶⁰

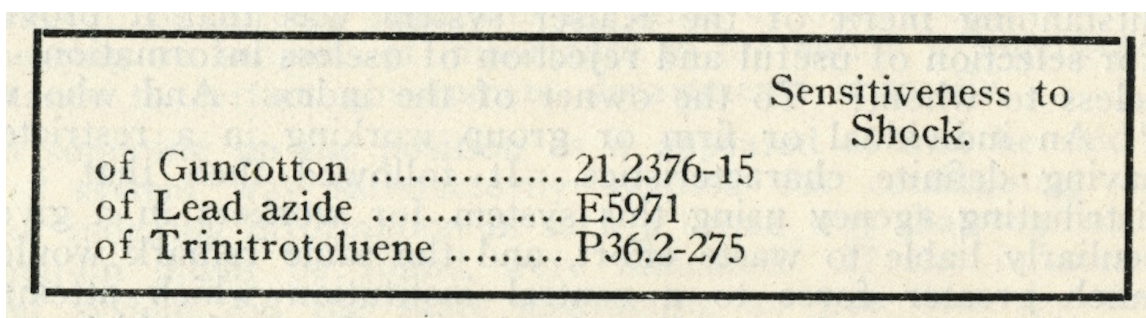


Figure 48b: Portion of a process section card from the files of the Index Proper of the Central Index at Ardeer (Source: Barbour, in Kaiser 1926, 39; reproduction courtesy of ASLIB and Emerald).

Highlighting the distinctiveness of the process section within the index proper at Ardeer was the selectivity that it involved. It was not intended to account for all the terms of processes that occurred as subsidiary filing terms in the regular index cards in the main body of the index; rather, it was restricted to “a definite relatively small number of “process” terms” (Barbour, *apud* Kaiser 1926, 39) that referred to actions, kinds of occurrences, or qualities of especial interest to the chemists and engineers who were the intended users of the index. According to Barbour (1919, 39R; 1921, 175), this selection had to be made at time that the index as a whole was being first implemented: “[w]hen an index is started a list of the terms of this type [sci., terms of processes—TMD] which may conceivably prove useful is compiled.” Within the framework of the process section, these

⁵⁶⁰ A variant, somewhat fuller version of this card with additional references is given in Barbour 1919, 39R.

terms formed a restricted vocabulary, entries under which were not made directly from the documentary texts being indexed but rather from the regular index cards destined for the main body of the index proper. Accordingly, Barbour (1919, 39R; 1921, 175–176) cautioned, “extreme care should be taken to make this list as exhaustive as possible from the very start”, for “[s]hould it occur that a “process” term must be added to this list after the index has been established for some time, this will involve a close scrutiny of all the cards filed in order to secure the references to this particular term”.

Typically, process cards were prepared immediately prior to the insertion of new regular index cards into a file, in accordance with a procedure of which Barbour (1919, 38–39R; 1921, 175) gave the following description:

[T]he index scans each card [sci., each regular index card—TMD] and dictates to a typist the terms in the “process” section which should be entered in connexion with that card. He does not confine himself to the single “process” term appearing at the top right hand corner of the card [sci., again, the regular index card—TMD]. Other terms may be mentioned explicitly in the text appearing on the card, or they may be involved implicitly in the text. The typist makes shorthand notes lightly in pencil on each card and when the whole of the cards have been scrutinised in this way withdraws to enter up the references

As this account makes clear, the references on process cards were not simply taken from the terms for processes forming part of the sequence of filing terms at the top of regular index cards, but the amplification, or abstract, on the body of the card was also consulted and the indexer was given considerable interpretative leeway in deciding whether this information was sufficiently relevant to a given process term to warrant a reference under it in the process section. This meant that process terms serving as subsidiary filing terms did not always govern the entries made to cards in the process file: on one hand, an indexer might well ignore a given process term if it did not refer to any of the processes or qualities denoted by the terms making up the fixed vocabulary of the process section; on the other, he might make an entry from a given card not on the basis of its process term, but on that of the contents of its amplification. In short, process cards were not mechanically derived from the filing terms of regular index cards: that is to say, they did not constitute “reverse-engineered”—and, hence, merely duplicative—reformulations of the latter. Furthermore, unlike the main section of the index, the cards of which included abstracts or summaries of information sufficiently detailed to make it “easily possible to prepare a general review of any given subject” (Rintoul 1925, 175) if need be, the process section was designed to serve a largely indicative function: it afforded the persons consulting it a compendious overview

of the different contexts with respect to which certain important processes were discussed in the indexed literature and provided direct references to the *loci* of these discussions. Insofar as it provided an additional, largely non-duplicative, and comprehensive point of access to information pertaining to a category of subjects not easily searchable in the main index files, the process section provided a “very valuable” (Barbour, *apud* Kaiser 1926, 39) complement to the latter.

The second major departure of the Ardeer index from the structural template for systematic card indexes outlined in *Systematic Indexing* was a direct response to the problem of how to deal with change over time. As we saw in Chapter 7, Section 6.1, Kaiser (1911, §§ 635–636; 1926, 33, § 42) was of the firm opinion that, in constructing an index, it was necessary to draw up a detailed plan regarding its general scope, its structure, and the procedures to be used in implementing it. Once the plan had been tested, subjected to rigorous critique, and finalized, it was to be implemented in as thoroughly consistent a manner as possible: above all, consistency entailed strict adherence to the original plan. He imparted this message to his colleagues at Ardeer, who appear to have internalized it: over a decade after Kaiser had left the service of Nobel’s Explosives Company, Rintoul (1925, 170) would state that “[w]hen an index is started it is necessary to lay down a good many definite regulations as to how it is to be constructed” and recall that “Mr. Kaiser was very emphatic that under no condition whatever could any exception to these regulations be permitted”. Yet, trying to maintain a policy of unswerving adherence to the original plan of an index was a problematic endeavor, for no plan, however carefully thought out and formulated, could account for all future contingencies and so, as a result of ulterior developments, features of the original design of the index might not correspond to ongoing requirements: as Rintoul ruminatively observed, “[i]t is impossible to foresee, at the start all the conditions that will arise; consequently, the regulations drawn up will prove more or less faulty and these faults will be perpetuated” (p. 170).

Aware of this difficulty and yet loath to adopt a policy of making incremental, piecemeal changes that would require considerable labor to integrate in a manner that did not compromise the consistency of the index (one need only think of Barbour’s concerns about the addition of new terms to the vocabulary of the process section), the library staff eventually found a solution that struck a balance between Kaiser’s insistence on maintaining fidelity to the plan on which the index was operated and the need to accommodate the plan to ongoing changes and, if need be, to correct defects in it that might

emerge in the course of practice. This solution was the brainchild of Barbour, who, as Rintoul (1925, 170) later recounted, “suggested that the index should be constructed in volumes, each volume extending over a period of five years”. On this plan,

[a] complete break occurs at the end of each volume, and this gives an opportunity for remodeling the governing regulations in any way that may be considered desirable. In this way any faulty decision, although it must stand for five years, can be rectified after that period (p. 170).

The upshot of this was that the index proper at Ardeer did not consist of a single, ever-expanding card file, but was partitioned into smaller, chronologically bounded sections, or “volumes”, each of which reflected adjustments to the rules defining scope, structure, and methods of construction made in light of reflection on prior experiences, consideration of current conditions, and expectations for the future. Each volume of the index thus constituted a distinct segment of the index, limited to collecting information falling within a given *quinquennium*. The official closure of a given volume at the end of the five-year period that it covered did not mean complete supersession, for it was left intact and kept available for consultation (Miles 1955, 70). Furthermore, it could still receive retrospective additions, if these were necessary, which would be made on the basis of the set of plan of indexing particular to it: in Rintoul’s (1925, 170) words,

[s]ometimes information still crops up that belongs to the period of one of the earlier volumes. This information is added to the particular volume to which it belongs; but still in accordance with the regulations under which that volume was constructed, so that Mr. Kaiser’s reasonable dictum on the immutability of regulations is complied with.

The division of the index into volumes appears to have been a success, for in 1925, Rintoul was able to report that “[w]e have now completed two five-yearly volumes of our index and are constructing a third ... [T]his method of dealing with it has been well tested” (p. 170): the policy was still in effect a quarter of a century later (Brown 1950, 89). The advantage of breaking up the index into chronologically defined sections was not restricted to the facilities that it afforded for introducing revisions to indexing rules at quinquennial intervals: it also served to ensure that the ever-growing index files did not become too large and unwieldy to manage (Miles 1955, 70) and, by the same token, concentrated the most recent information on subjects of interest in whatever happened to be the currently open volume. Although contemporary commentators maintained a discreet silence regarding any disadvantages that the system of volumes may have occasioned, one may well imagine that

it rendered historical surveys of information on a given subject more difficult, as the searcher would have to move from volume to volume to consult all the index cards pertaining to it.

Such, then, were the principal structural features of the central index at Ardeer. The library staff evolved a routine for the development and maintenance of this index that integrated it into other aspects of the factory's information service and, more generally, the work of its research department. Documents were indexed as they came into the library. Every day, the library's indexer either prepared initial drafts of individual cards on paper slips, the contents of which were then transcribed on a typewriter, or dictated them outright to the typist; these cards were then checked on the following day and placed into a temporary card file (Barbour 1919, 38R; 1921, 174). Once a week, the librarian examined this file, selected those index cards "which [bore] the most comprehensive digests of matters of interest", and arranged them in alphabetical order under broad headings corresponding to the subject subdivisions for books and pamphlets (Barbour 1919, 38R; 1921, 175). These cards served as copy for the preparation of a weekly newsletter entitled *Library Notes*, which was distributed to the members of the factory's staff to keep them apprised of the latest (sources of) information obtained by the library (Barbour 1919, 38R-39R; 1921, 175; Barbour, *apud* Kaiser 1926, 38; Miles 1955, 71; Rintoul 1925, 168): in this, they served the same function that the Daily Record had done at the library of the British Westinghouse Corporation, Ltd. (See Chapter 4, Section 2, esp. pp. 134-136, above). Once the factory's printer had returned the cards in question to the library, they, together with the other cards that had accumulated over the course of the preceding week, were incorporated into the index files; prior to the actual filing, cards for the process section were prepared from them and any adjustments to cross-references between main filing terms in the index proper required by the new additions were made (Barbour 1919, 40R; 1921, 178; Rintoul 1925, 168-169). This, then, was the way in which the central index grew over the course of the *lustrum* allotted to each of its "volumes".

The library contributed to the organization and dissemination of information at Ardeer in other ways as well. In addition to overseeing the upkeep of the various components of the descriptive index, the librarian and indexer were responsible for maintaining a separate index of drawings, which was housed in the factory's drawing office, as well as keeping "a complete catalogue of all the apparatus, both scientific and general, ... used in the research department", which provided a basis for administrative control of the plant's laboratory

equipment (Rintoul 1925, 171; cf. Barbour, *apud* Kaiser 1926, 38). Members of the library staff also assisted the factory's chemists and engineers in the preparation of internal research reports, editing the drafts and seeing to it that their formal presentation met the standards set by the research department: furthermore, the librarian was responsible for distributing copies of reports to the relevant personnel within the firm (Rintoul 1925, 172, 175; cf. Barbour, in Kaiser 1926, 38). Yet, amidst these other aspects of informational work, the central index designed by Kaiser was the linchpin and focus of the library's activities.

As regards use, the central index was made available to members of the staff involved in chemical or engineering research, who were given training in how to perform searches in its files and were expected to carry them out on their own (Barbour, in Kaiser 1926, 38; Rintoul 1918, 68R; 1925, 175). For its users, the central index functioned both as a mechanism for locating documents and, insofar as the index cards contained summarizations of the matter that had been indexed, as a source of information in itself (cf. Rintoul 1925, 166, 175). According to Rintoul (1918, 68R), it was this latter aspect of the central index that gave it "great value in connection with industrial research", for its contents could be used to acquire a rapid and efficient overview of current knowledge about any subject that fell within its scope. In his view, such index learning could have palpable effects on the conduct of research at the plant:

In very many cases when an investigation is under consideration, and before a definite decision to proceed with it can be arrived at, it is necessary to prepare a preliminary report on the state of present knowledge on that particular subject. In this connection, the index can play a most important part if the essential information has been recorded, because the required information is already in a concentrated form and can either be epitomized or expanded with the minimum amount of labour. It also proves useful in many unforeseen ways. It allows of a rapid review of any particular field in which the industry may be interested, it possesses a marked value as a source of suggestions for future development and research and assists in the control of the policy underlying the selection of subjects for research (Rintoul 1918, 68R; cf. 1925, 171).

For reasons such as these, the administrators of the research department at Ardeer viewed the central index as a singularly good investment of the considerable time, money, and labor expended in maintaining it:⁵⁶¹ as Rintoul (1918, 68R) wrote with unbridled enthusiasm

⁵⁶¹ By the mid-1920s, the annual cost of maintaining the central index, drawing index, dictionary catalog, and equipment catalog came to approximately £ 1,380, or 26 % of the entire library budget, according to Barbour (*apud* Kaiser 1926, 38); Rintoul (1925, 170) estimated a slightly lower yearly expenditure "of the order of £ 1200". As for labor, although the number of persons on the library staff increased from 11 in 1919 to 17 in 1926, the members of the staff involved in indexing tended to

some six years after Kaiser had laid the groundwork for it, “[i]t is not too much to say that an index of this nature constitutes one of the most important instruments of research available at the present time”.

8.3. Afterglow: Ardeer and the Diffusion of Systematic Indexing in British Industrial Libraries, 1914–1926

In the years following its inception, the central index which Kaiser had designed for Nobel’s Ardeer factory grew to large size—by early 1918, it numbered about 150,000 cards (Rintoul 1918, 68R)⁵⁶²—and “proved thoroughly successful in enabling information to be supplied quickly and accurately” to the researchers working there (Barbour 1921, 166). This success had notable consequences for the public profile of SI. The persons who had oversight over the index looked upon it with commingled satisfaction and pride, and sought to broadcast knowledge of the system on which it was based to their colleagues in British industry on the grounds that “wider knowledge of it is sure to result in wider application and in considerable benefit to the community” (p. 166). Proselytization on behalf of what came to be called the “Kaiser system of indexing” (Barbour 1919, 39R; 1921, 177) or simply the “Kaiser system” (e.g., Barbour, in Kaiser 1926, 36, 38, 39, 40) took several forms. Some involved giving formal accounts of it in public fora. Rintoul and Barbour described the index and extolled its virtues in print, contributing articles to the journals *Chemistry and Industry* (Barbour 1919; Rintoul 1918), the primary audience of which was industrial chemists, and the *Library Association Record*, whose readers were librarians (Barbour 1921). They also presented lectures on it at professional meetings. Whereas Rintoul (1925) addressed his talks to gatherings of chemists, Barbour (1926) gave his presentations to persons interested in special librarianship: it was he who read a summary of Kaiser’s paper on SI to the attendees of the third annual conference of ASLIB held at Balliol College, Oxford, in 1926, when Kaiser was unable to attend the meeting, and defended the merits of the system in the ensuing discussion (Barbour, in Kaiser 1926, 36–41). Another method of diffusing knowledge about the index was to show it to visitors to the Ardeer library and demonstrate

remain constant, comprising the librarian, a full-time indexer, an assistant indexer or translator, and several typists: all save for the typists were trained chemists (Barbour 1919, 40R; 1921, 179; Barbour, in Kaiser 1926, 38; Rintoul 1925, 168, 174).

⁵⁶² By the mid-1950s, “after forty years’ growth”, the total number of cards would stand at “about 700,000” according to one observer (Miles 1955, 71) or “about 800,000” according to another (Brown 1950, 88).

its operation to them at first hand. One industrial researcher described his experience of such a visit in glowing terms:

Messrs. Nobel's, the explosives manufacturers have a really good technical library, which they keep very thoroughly up to date, and they have spent a great deal of money on it. They have also a most elaborate card-index system, which has been prepared with the very greatest care, so as to render available every detail of every paper that is published. I have tested the library myself at the firm's request, to see how good it was, and I really was very much surprised at the ready availability of the information (M. A. Adam, in Savage 1918, 174).

As we shall shortly see, he was not alone. Finally, in at least one case, a prominent member of the management at Ardeer, who had left the factory and taken on a position at another organization, served as a personal vector for the dissemination of the Kaiser system to his new surroundings. In 1920, Sir Frederick Nathan, who had departed from Ardeer in 1914 to oversee the foundation of a new plant for Nobel's Explosives near the Welsh town of Pembray, became a member of the recently formed Department of Scientific and Industrial Research (DSIR), a governmental agency charged "with co-ordinating and promoting civil and industrial science and technology" (Muddiman 2007, 59; Predeek 1933, 41, n. 2): there, he served as a Power Alcohol Investigation Officer and "was responsible for several important memoranda on this subject" (Rintoul 1934). In taking up his research duties at the DSIR, he "again adopted the Kaiser system and again", so he averred publicly, "found it satisfactory in every respect" (Nathan, in Kaiser 1926, 42; cf. Barbour 1926, 122; Robertson 1934, 55).

The efforts at evangelization radiating from Ardeer proved effective, for they brought SI to the attention of the persons charged with organizing libraries in other British industrial concerns and research organizations in the late 1910s and early 1920s, some of whom incorporated the Kaiser system into their own knowledge organization practices, adapting it to suit their particular needs. The technical library at the Rowntree and Company's cocoa works at York is an excellent case in point. Commencing operations in 1917 (Black 1994, 57; Marshall 1972, 110), this company library adopted the method of SI for its own central index on the recommendation of its chief librarian, H. Vincent Garrett (1886–1946), who had been favorably impressed by the index at Ardeer during a visit there (Ashworth 1971, 637; Marshall 1972, 115; Predeek 1933, 44). A scientific worker-turned-librarian with a flair for publicity work, Garrett, in turn, became a proselytizer for Kaiser's indexing system in his own right (Ashworth 1971, 637; Black 2007b, 178). To be sure, he did not take over Kaiser's régime of knowledge organization in all its particulars: for example, Rowntree and

Company's technical library used the DDC as a system for the shelf classification for books, alongside SI, which served as the basis for its card indexes (Garrett 1921; Marshall 1972, 115; Tilley & Alderton 1923, 157, "Technical Library" s.v. "York"). Nevertheless, he internalized, much as Rintoul and Barbour had done, Kaiser's rationale for constructing a central index on the basis of SI and communicated this effectively at conferences of public and special librarians alike (Garrett 1921, 1925). In his writings and presentations, Garrett often echoed Kaiser's verbal formulations closely, proclaiming that information was a valuable commodity;⁵⁶³ that the office of an intelligence department was to provide access to information, not books;⁵⁶⁴ that, insofar as indexing served as the means of making information accessible, it was the most important task of an intelligence department;⁵⁶⁵ and that it was important to select for indexing only that information that was immediately germane to the needs of a business;⁵⁶⁶ Although he did not discuss the techniques of SI in

⁵⁶³ Cf. Kaiser 1911, §§ 6, 5: "... information is a valuable commodity information is useful, but the degree of its usefulness is very largely dependent on our powers of turning it to account" with Garrett 1921, 371: "Information is a valuable and indeed an indispensable commodity. Its value is dependent on our powers of turning it to account"; 1925, 40–41: "I submit that information, gleaned primarily from the ever increasing mass of literature now published is a commodity just as valuable, as real and as important as are things of a tangible nature—provided that the information be well chosen, properly organised, and used by people capable of giving it proficient interpretation"; Rowntree Technical Library, Report for twelve months to 31 December 1924, Rowntree-Mackintosh Archives, Borthwick Institute, University of York, in Black 1994, 59: "The British manufacturer will have nothing to do with anything that is not of immediate tangible value. But in the complexities of the present day industrial machine, there are many functions the value of which cannot be proved in terms of pounds, shillings and pence. The value of up-to-date information, if made accessible, properly interpreted and turned to account, is very real, despite it being of an abstract nature".

⁵⁶⁴ Cf. Kaiser 1911, §§ 83 (emphasis his): "... for business purposes we must try to dissociate *information* from literature, we do not want books, we want information" & 248, Point 3 (emphases his): "A public library gives access to *books* mainly, a business library must give access to *information*, its form is of secondary importance" with Garrett, "Library bulletins and card index" (1919), Rowntree-Mackintosh Archives, Borthwick Institute, University of York, R/D/TL 9, in Black 2007b 177: "for business purposes we tend to disassociate information from literature; we do not want books, we want information"; 1921, 369 (emphases his): "I wish to emphasis the word *information*, for whereas a general library gives access mainly to *books*, our library gives access to information gleaned from divers sources: books or portions of books, pamphlets, periodicals, Government Publications Consular Reports, office memoranda, etc."; 1925, 39: "Quite ninety-five per cent. of the inquiries handled in my library are not for specific books, but for *information*". Cf. also Garrett's discussion of "technical library" as a species of "business library", discussed in Chapter 6, Section 2.2, pp. 206–207, with n. 238, above.

⁵⁶⁵ Cf. Kaiser 1911, § 51: "It will be seen that the most important part of the entire work [sci., of the intelligence department—TMD] is indexing, for through it our information is made accessible, it is made ready for use, and this information is selected by ourselves and for our special requirements" with Garrett 1921, 370: "... the indexing of information [is] the most important part of our work (in that it is the means whereby the information is made accessible) ...".

⁵⁶⁶ Cf. Kaiser 1911, § 46 (emphasis his): "What we have selected is all live material; it all has a direct bearing on our business. By the process of indexing we *boil down*, we reduce our materials to that

detail as Barbour and Rintoul did, he describe, in general terms, the form of Rowntree and Company's central index (Garrett 1925, 39) and, perhaps even more importantly, urged audiences of librarians to read acquaint themselves with Kaiser's thought and writings (1921, 370–371):

Our indexing scheme is based upon two books by J. Kaiser: *The Card System at the Office* and *Systematic Indexing*. Despite the indexing of information being the most important part of our work (in that it is the means whereby the information is made accessible), an oral description is impracticable. I may, however, commend to your notice an extremely good article on J. Kaiser's methods, published in the June issue of the Library Association Record [sci., Barbour 1921—TMD]. The author of this article states that Mr. Kaiser's system has proved thoroughly successful in enabling information to be supplied quickly and accurately; that the problem of finding rapidly the item of information of value which has appeared in an article apparently quite unconnected with the subject has been solved quite simply by the system; and that wide knowledge of it is sure to result in its wider application. With these assertions I am in entire agreement.

Should any of my patient audience desire seriously to consider the expediency of investing in a Works Library, I believe that a perusal of Kaiser's *Systematic Indexing* will prove very helpful. The pros and cons are therein discussed in a very lucid manner.

Also willing to offer advice to persons from other firms on the establishment of libraries (Ashworth 1971, 637), Garrett ranked, alongside Rintoul and Barbour, as one of the most enthusiastic proponents of SI within the ranks of British special librarianship.

The technical library at Rowntree and Company was not the only industrial library to adopt a version of Kaiser's indexing system. About 1920, SI was taken up for the purpose of "indexing and abstracting unpublished technical reports" at the plant of the alkali manufacturer Brunner, Mond, & Co., Ltd., at Norwich, where it was deemed to be "the only practicable system for the organization of technical information of that nature" (E. L. Sellars, in Kaiser 1926, 41).⁵⁶⁷ In roughly the same period, the managers of the technical library at

which is essential for our purpose, we create a nucleus of effective information, information which will be of real use to us in the pursuit of our business" with Garrett 1921, 369: "All information that is selected and indexed is live material germane to our business".

⁵⁶⁷ Our sources are not of one accord regarding the introduction of the Kaiser system at Brunner, Mond, & Co., Ltd. According to E. L. Sellars, the representative of the firm who participated in the discussion following Barbour's presentation of Kaiser's paper at the 1926 ASLIB meeting, the company's offices had had six years' experience with the system (Sellars, in Kaiser 1926, 41), whereas the chairman's report of the discussion prepared by Barbour (1926, 122) gives the period in question as ten years. The former would date the introduction to the system to 1920, whereas the latter would push it back to 1916. Of these two possibilities, the later date seems more plausible, for it would have followed the publication of Rintoul's and Barbour's initial articles in the chemical industry journals and so would fit the general pattern of influence sketched out here: I have accordingly provisionally adopted it. However, a definitive solution to the question is probably to be

another chemicals firm, the British Xylonite Company, Ltd., of Manningtree (F. Sproxton, in Rintoul 1925, 174; Sproxton, in Turner 1927, 151), inspired by Barbour's article on the Ardeer index in *Chemistry and Industry*, also instituted a Kaiser index, while the library of the British Cotton Industry Research Association at Manchester developed a modified form of SI for indexing the abstracts of literature on textile production that it prepared (Withers 1925, 169–170). Influence went beyond practical adoption alone: even those special librarians and intelligence officers who elected not to make use of SI in their own organizations studied it and invoked technical concepts associated with it in their own discussions of indexing methods (e.g., Goldsmith 1925; Potts 1925, 163–165).

By the mid-1920s, then, the Kaiser system had found a niche within the discourse and practice of British special librarianship: when one of the early leaders of the British special library movement, J. G. Pearce, addressed a convention of American colleagues to report on the “the development of special libraries in Great Britain”, he did not fail to mention that “[t]he Nobel Works in Scotland has an admirable system based on the work of Kaiser, and this has been adopted in several other centres” (Pearce 1923, 93). Yet, despite the fact that Kaiser's books had received reviews in library journals in the United Kingdom and United States alike (Brooks 1913; *Filing Systems and Indexing* 1912) and that articles highlighting Kaiser's indexing system by Barbour (1921) and Garrett (1921) appeared in the pages of the *Library Association Record*, one of the United Kingdom's leading library journals, interest in SI did not extend into the arena of public, or general, librarianship. The reasons for this are not far to seek. As Kaiser (1926, 40–41) himself acknowledged, his method of indexing had been designed for technical libraries and was not suited for public libraries; it is thus unsurprising that, as one latter-day commentator has noted, he does not seem to have made any attempt to cultivate contacts with the public library scene in Great Britain nor did his system appear to have found application in this milieu (Metcalf 1976, 179). Similarly, contemporary indexers whose interests inclined towards literary indexing tended to view Kaiser's work on systematic indexing as relevant primarily to the “commercial indexing of correspondence” and the “compilation of registers” and so paid little heed to the method of SI, even as they included his writings in their bibliographies (Brown 1920, 130; *Index* 1922). All told, the effects of the propaganda carried out by Barbour, Rintoul, Garrett, and others on behalf of the Kaiser system were circumscribed to a fairly narrow

sought in the papers of Brunner, Mond, & Co., Ltd., kept at the Cheshire and Chester Record Office (<http://www.nationalarchives.gov.uk/A2A/records.aspx?cat=017-dic&..#0>).

professional domain. Even so, one should not underestimate their significance for Kaiser and his indexing system. Later in his life, his links with Nobel's Explosives Company, Ltd., would open the doors to a new consulting opportunity, albeit one that would prove to have fateful consequences for him (see Chapter 9, Section 5, below). And, after his death, the example of the central index at the Ardeer factory and its successors would keep the Kaiser system alive in the minds of British industrial librarians and documentalists, until, at length, a broader audience came to discover its significance for KO (See Chapter 9, Section 6, below).

Chapter 9. Return to America, Death, and Aftermath

9.1. Dislocation: The Outbreak of War and Return to America, 1914

In mid-1914, as Kaiser was occupied with implementing the central index at the factory library at Ardeer, he may well have harbored the hope that his current work would, in time, lead to further engagements as an indexing consultant at other British industrial concerns. Such expectations would not have been unreasonable: as use of the Kaiser system spread to a number of British technical libraries in subsequent years (see Chapter 8, Section 3, above), there would likely have been demand for his services. Yet, if these were his ambitions, they went unfulfilled, for the force of circumstances soon induced him to forsake the land where he had so painstakingly built up his career over the previous fifteen years.

At the beginning of August of 1914, Great Britain entered into the dreadful military conflict known by contemporaries as the Great War and by later generations as the First World War. On the domestic front, this had predictably untoward consequences for persons of German origin residing in Britain. Throughout the late Victorian and Edwardian periods, the British public had felt conflicting sentiments towards Germany and her people. Compounded with admiration for the efficient organization of social and economic life in this emerging continental power was fear of the effects of its geopolitical, military, and economic rivalry upon Britain's position in the world: accordingly, the British tended to view Germany and Germans alike with a "strange mixture of envy, admiration, fear and hatred" (Anderson 1980, 203; Searle 1971, 55–56). With the outbreak of hostilities, this latent tension in British attitudes towards Germany lost all equilibrium as fear and hatred rose to the fore. Rumors rapidly went afoot that German spies had infiltrated the British isles and, abetted by their compatriots resident in the country, were at work sabotaging the country's war effort: "[b]y early September 1914, *The Times* was carrying side by side with stories of German atrocities in Belgium ones about 'The Alien Enemy' and the 'The Spy Peril' (Stevenson 1984, 55). Despite government efforts to tamp down the worst excesses of the growing anti-German hysteria, anxieties, stoked by the press, continued to mount and reached a fever pitch in mid-October 1914, when riots targeting small businesses operated by Germans broke out in South London (Panayi 1989, 186–188). Although passions subsided somewhat in the wake of these manifestations, they would soon reemerge on a much wider scale and with far greater vehemence in May of the following year, after the

sinking of the passenger liner *Lusitania* by a German submarine precipitated anti-German riots throughout the country (Panayi 1989, 189–199; Stevenson 1984, 55).

In addition to being objects of general public opprobrium, Germans quickly became the targets of repressive state actions directed towards foreign nationals, or aliens, resident on British soil. In the years prior to war, “a friendly alien in great Britain [had been] in all respects as regards his liberty on the same footing as a British subject” (Roscoe 1930, 66). This favorable state of affairs came to an abrupt end with the passage of the Aliens Restriction Act on 5 August 1914, which “enacted that when a state of war with a foreign Power existed or an occasion of imminent national danger or great emergency had arisen, restriction on aliens by an Order in Council might be imposed” (Roscoe 1930 p. 69; cf. Ehrlich 1917, 443). The new act immediately set firm limits to the freedom of Germans and other “enemy aliens” residing in the British isles. In the opening months of the war, they were required by law to register themselves at the police stations of their places of residence; they were “forbidden to travel beyond five miles of their registered address without a permit”; they had to communicate to the police any changes of address; and there were certain “prohibited areas” which they could enter only with police permissions (Ehrlich 1917, 443–444). Other, more drastic and onerous measures were also being put into place. By the end of August, the government had begun to make provisions for the institution of internment camps to house prisoners of war and enemy aliens of military age, be they civilians or prisoners of war: within a month, no fewer than 13,600 internees—of which about 10,500 from “the German civilian community in Britain”—were being held in these installations (Panayi 2005, 29–30). Over time, this number would only increase: in May 1915, after the sinking of the *Lusitania*, the British government decreed comprehensive internment of all adult male enemy aliens between the ages of seventeen and fifty-five and, by November 1915, the number of German civilian interns rose threefold to 32,440 (pp. 29–30).

The wave of anti-German sentiment unleashed by the war soon ensnared Kaiser, who, at this time, was residing in the town of Ardrossan, some five miles to the northwest of Ardeer.⁵⁶⁸ Although he had obtained British citizenship in 1906 and so was not, technically speaking, an enemy alien,⁵⁶⁹ such facts mattered little in the overheated atmosphere of

⁵⁶⁸ See USNA, Microfilm Publications T715_2388, p. 71, l. 2, col. 10; Passenger list for the S. S. St. Paul, 6 December 1914 (available at <http://www.ancestry.com>)

⁵⁶⁹ See UKNA, HO 144/832/143880, Certificate of Naturalization to an Alien for Julius Otto Kaiser, 27 September, 1906.

wartime: as one latter-day commentator has noted, “[n]aturalization, even when granted some years before the war, failed in the eyes of many to place former citizens of Germany above suspicion” (Bird 1986, 236; 245–247). Kaiser’s German origins; his name—the associations of which were, under the circumstances, quite unfortunate—; and what appears to have been a “somewhat Germanic or Prussian appearance, according to the popular image”, certainly weighed against him, while the fact that he was employed at a factory for the manufacture of explosives could not but arouse suspicions among local authorities (Metcalf 1976, 176–177). As a result, he was, according to Miles (1955, 68), subjected to “nominal internment” as if he were an enemy alien.⁵⁷⁰ It is unclear whether this involved actual confinement within an internment camp or took the somewhat less onerous form of restrictions on movement akin to house arrest. Whatever the case may have been, Kaiser evidently considered his position in Great Britain to have become untenable and so resolved to return to the United States. Having received permission to leave the country, he departed from Liverpool on 28 November 1914 aboard the American passenger liner *St. Paul*, which was bound for New York; after eight days’ journey, the ship arrived at its destination.⁵⁷¹ Kaiser was a little over three months shy of his forty-seventh birthday as he set foot on American soil again and began the process of rebuilding a dislocated life and career.⁵⁷²

⁵⁷⁰ He was not the only British citizen of German origin to suffer such consequences: as Bird (1984, 236) observes, “[a] number of naturalized subjects deemed to be suspect were interned under Regulation 14B of the Defense of the Realm regulations as persons of ‘hostile origin or association’.”

⁵⁷¹ See USNA, Microfilm Publications T715, R 2388, p. 71; Passenger list for the S. S. *St. Paul*, 6 December 1914. The date of Kaiser’s return to America has hitherto been a matter of some confusion. One of his obituarists placed it in September 1914 (Hercules Powder Company 1927), while the other situated it in 1916 (American Society of Mechanical Engineers 1928). Latter-day writers have tended to give the latter date either for his departure from Nobel’s Explosives (Miles 1955, 68) or for his return to the United States (Dousa 2007, 3; Metcalf 1959, 298; 1965, 48): their statements must be corrected in light of the document cited here.

⁵⁷² He did not come to the United States entirely destitute: according to the ship’s manifest for the *St. Paul*, for he brought with him \$ 1,400, a sum whose purchasing power, adjusted for inflation, would amount to a little over \$ 31,000 dollars in 2012; see USNA, Microfilm Publications T715, R 2388, p. 71, col. 16, row 2, Passenger list for the S. S. *St. Paul*, 6 December 1914. However, there is tangential evidence that the decision to leave Great Britain had entailed some sacrifice. In the article that he submitted to the 3rd ASLIB conference in 1926, he plaintively noted that full schedules of the UDC was unavailable to him, for his personal copy thereof was still in London (Kaiser 1926, 20, n. 1): this was problematic insofar as copies of the UDC were apparently hard to come by in the United States.

9.2. At The Engineering Societies Library, 1916–1923

Little is known of Kaiser's activities in the year following his return to America apart from the fact that he seems to have parlayed his linguistic skills and practical experience in knowledge organization into a livelihood: as one of his obituarists relates, during this time, “[h]e did consulting work, searches and translations” (Hercules Powder Company 1927), presumably operating as a freelance worker in or around New York City. It is possible that, in the course of his work, he became acquainted with the Library of the Engineering Societies—soon to be renamed the Engineering Societies Library (hereafter, ESL)—located on the twelfth and thirteenth floors of the Engineering Societies Building at 29 West 39th Street (Mount 1982, 52, 56, 58, 73–74). However this may have been, in 1916, Kaiser was hired as a research assistant at the library and, in the following year, he took on the additional position of associate editor for the American Society of Mechanical Engineers (American Society of Mechanical Engineers 1928; United Engineering Society 1917, 5). Henceforth, he would become, in the words of a contemporary, “a familiar figure around the Engineering Societies Building” as he fulfilled his various duties there (American Society of Mechanical Engineers 1928).

The ESL was only a little under a decade old when Kaiser began working there, but its roots extended back into the latter half of the 19th century, a period in which engineering in the United States was coming into its own as a profession. One manifestation of this development was the rise of professional societies of national scope promoting intellectual and social exchanges between persons working within a given area of engineering (Sinclair 1980, 26). The earliest of these was the American Society of Civil Engineers (ASCE), which began life as the American Society of Civil Engineers and Architects in 1852: it was followed by the American Institute of Mining Engineers (AIME), which was established in 1871; the American Society of Mechanical Engineers (ASME), first organized in 1880; and the American Institute of Electrical Engineers (AIEE), created in 1884 (Jones 1971, 169; Mount 1982, 19–22; Zani 2002, 13–14, n. 11). Part of the program that each of these societies set itself was to establish a library containing professional literature pertaining to its field: the ASCE instituted one in 1872; the AIME formed one in 1876 in conjunction with its exhibit at the Centennial Exposition in Philadelphia; and the AIEE and ASME both began their respective collections around 1885 (Mount 1982, 24–29). At this early period, the collections varied considerably in size and degree of development: by 1897, the ASCE's collection comprised some 22,000 items, while, three years later, that of the AIEE stood at

only “several hundred volumes” (pp. 26, 29). By 1900, all of these libraries were located at various locations in New York City, where the societies had established their headquarters.⁵⁷³

The ESL came about through the amalgamation of the different societies' libraries into one central collection housed in a building serving as a shared headquarters for the professional societies in question. The process of merger was a protracted one. The idea of establishing a joint headquarters with a common library for the engineering societies had been mooted as early as 1885 and, in the mid-1890s, overtures had been made to the industrialist and philanthropist Andrew Carnegie to help fund such a project, although these came to naught (Mount 1982, 40–43). The impetus for turning the proposal into reality came at the beginning of the new century, when an American electrical engineer, Schuyler Skaats Wheeler, purchased a major British collection of works on the electrical sciences, which he donated to the AIEE in May 1901 under the conditions that it be kept in New York City, made available to the public, and housed in a permanent location (pp. 43–44). Impressed by the generosity of this gift, Carnegie donated \$ 7,000 for the indexing of the collection and promised to provide funding for a new building in which it was to be kept (p. 44). Over the next three years, the plans for the AIEE building developed into ones for a building that would house the central offices of all the major engineering societies and unite their collections in a single central library. Although the ASCE, which had only recently constructed new headquarters of its own, declined to participate in this merger, the AIEE, the AIME, and the ASME favored such a move; no less important, Carnegie approved of the broadening of the scope of the plans, contributing \$1,500,000 to fund the project (pp. 44–48). In May of 1904, the United Engineering Societies (hereafter, the UES) were formally incorporated in New York and, fourteen months later, work began on the construction of a fifteen-story building for the organization, which was completed by the end of 1906 (pp. 50–52). In the first months of the following year, the three so-called Founder Societies had moved their library collections into their new quarters and the ESL became a reality (pp. 56, 62).

Although the ESL commenced operating in 1907, it required a number of years to achieve full organizational consolidation. Initially, each of its three component collections

⁵⁷³ The ASCE, ASME, and AIEE all had been based in New York City, the center of American engineering in the late 19th century, from their inception, whereas the headquarters of the AIME were, for many years, located in Easton, Pennsylvania and were moved to New York City only around the turn of the century (Mount 1982, 19–22, 27; Sinclair 1980, 22, 26–27).

was managed by a separate staff and the library functioned, in effect, as “a loose confederation of libraries”; it was not until the summer of 1908 that the UES appointed a librarian to oversee the collection as a whole (Mount 1982, 62). Even so, a certain degree of administrative fragmentation remained, for, whereas the librarian was answerable to a Library Committee composed of representatives from each of the Founder Societies, these representatives answered to their respective societies, which controlled the purse strings of the library (p. 64). This state of affairs obtained until the autumn of 1912, when a Library Board directly responsible to the UES’s Board of Trustees was called into being. From its first meeting in February of 1913, this body, which comprised representatives from each of the member societies and the director of the library, oversaw, and took decisions on, administrative policy; two years later, thanks to its efforts, the UES became responsible for the library’s expenditures, a development that encouraged the development of a more unified acquisitions policy (Mount 1982, 64–65; 117–118; United Engineering Society 1916, 11–14). A further, albeit welcome, organizational challenge arose in the summer of 1916, when the ACSE finally joined the UES as a fourth Founder Society and moved its offices into the Engineering Societies Building: by March of the following year, its extensive collection had been physically transferred to the ESL, doubling the holdings of the latter (Mount 1982, 69–70; United Engineering Society 1917, 11). Yet, even at that comparatively late date, almost a decade after the library had commenced operating, its collections were still not fully integrated, for there was no single unitary catalog for the collection. Librarians and patrons alike had to make do with legacy catalogs from the society libraries, which differed from one another, in various ways, in their treatment of subjects (Mount 1982, 131; United Engineering Society 1917, 14). Although these different catalogs had been combined to create a single composite catalog, users deemed the resultant hybrid, with its inconsistent treatment of subjects, to be unsatisfactory (Craver 1920, 11; Mount 1982, 131; Sorotka 1982, 3; United Engineering Society 1917, 14). However, it would not be until 1919 that the library began recataloging its collection, a project that it would take six years to complete (Mount 1982, 133–134).

The internal organization of the ESL, then, was still very much a work in progress when Kaiser became a member of its staff. Nevertheless, the main lines of its service to users had already been drawn. Although the library was intended first and foremost to serve as a resource for members of the Founder Societies, it was, from its very inception, open to any member of the public who wanted to make use of its collections (Mount 1982, 139). It

functioned almost exclusively as a reference library until 1920,⁵⁷⁴ when, in response to user demands, the Library Board decreed that loans of duplicate copies of books could be made to members of the Founder Societies—a privilege that it later extended to “members of other societies which had made financial contributions to the [l]ibrary” but not to the public at large (pp. 144, 76). Onsite visitors had at their disposal a collection of engineering literature that, according to some commentators, constituted the largest such collection in the Western hemisphere (e.g., Flinn 1919, 194) and, according to others, the largest one in the world (e.g., To Welcome American Society of Civil Engineers 1917).⁵⁷⁵ They could also make use of the library’s reference services though these were not unlimited in their scope: from 1914 on, patrons were charged a small fee for literature searches lasting longer than thirty minutes (Mount 1982, 141–142).⁵⁷⁶ Photocopy services were likewise available to patrons as early as 1913: these too required payment to defray the expenses of making the copies (p. 140).⁵⁷⁷

Many of the engineering societies’ members resided at a considerable geographical distance from New York City and so were not in a position to make regular use of the ESL in person. Nevertheless, they could derive benefit from its reference and photocopying services by making inquiries by mail and over the telephone (Cutter 1915, 150–151). Replying to such long-distance inquiries formed part of the general workflow of the library until the late spring of 1915, when the Library Board created an administratively distinct unit, the Library Service Bureau to provide services to long-distance users (Mount 1979, 142, 179; 1982, 72–73, 141; United Engineering Society 1916, 8). Overseen by a specially constituted Library Service Board and comprising a specialized staff of “expert searchers and translators”, the Bureau offered the following range of services upon request (American

⁵⁷⁴ Before 1913, patrons were allowed to borrow items from the library but only after having obtained written permission from the chairman of the Library Committee or the secretary of the society to which they belonged (Mount 1982, 140). Such bureaucratic regulations were clearly intended to discourage borrowing and so to enhance the reference function of the library.

⁵⁷⁵ Following the incorporation of the ASCE’s extensive collection in 1916, it numbered some 130,441 volumes and held subscriptions to over 1,000 periodicals (The headquarters service of the society 1918, 193; United Engineering Society [1918], 11). The collection continued to grow steadily in subsequent years; in 1923, the year in which Kaiser left the employ of the Engineering Societies Library, the total number of items held, including volumes, pamphlets, maps and plans, and manuscript bibliographies, stood at 158,700 (Engineering Societies Library 1924, 8).

⁵⁷⁶ As of 1914, the rate for literature searches extending beyond thirty minutes came to \$ 1.00 an hour for searches of English-language literature and double that amount for searches of materials written in foreign languages.

⁵⁷⁷ The preparation of photocopies had to be carried out offsite until 1915, when the library obtained its own in-house photostat machine.

Institute of Electrical Engineers 1922, 886; Library Service for the Membership 1917; Savage 1918, 177):

- Regular biweekly updates on the appearance of new literature on subjects of interest to individual clients, communicated in the form of reference cards bearing full bibliographic citations;
- Preparation of translations or abstracts of pieces of engineering literature written in foreign languages;
- Compilation of comprehensive reference lists, or bibliographies, on particular engineering subjects of interest to clients;
- Patent searches;
- Collection and collation of statistical data pertaining to engineering subjects;
- Provision of photostatic copies of articles, book chapters, and other pieces of literature from items in the library's collections.

Encompassing both the traditional reference model of responding to specific patron requests and the more proactive one of current awareness bulletins in the form of reference cards, the Bureau reached a widely dispersed audience: already by 1917, the ESL was able to report that service of one kind or another “has been rendered to correspondents in 239 localities in 45 states in the United States ... and to foreign correspondents in 70 localities in 23 foreign countries” (Library Service Bureau 1917).

The kinds of services that the ESL's Library Service Bureau offered to its patrons were, in many respects, analogous to those provided by the Bureau of Information at the PCM to its subscribers (see Chapter 3, Section 2, above), albeit much more oriented towards the provision of bibliographical information. Another feature that the Bureau had in common with its counterpart at the PCM was that it required its clients to pay fees in order “to compensate for the labor involved” in providing its services (Brigham 1921, 222).⁵⁷⁸ Insofar as money was exchanged in return for the collection and communication of bibliographic data, one can discern a move in the direction of the commoditization of information (See Chapter 4, Section 1, above). This point, however, should not be pressed too far. The charter of the UES did not permit the ESL to carry on “any work of a commercial nature” (Library Service Bureau 1915) and so, as the first chairman of the Library Service Board

⁵⁷⁸ The only exception to this policy came in the case of information work carried out at the behest of “various departments and officials of the United States Government” during the First World War, which was performed *gratis* (United Engineering Society [1918], 7 & 18; [1919], 7).

emphatically underscored, the Bureau did not exact payments from its patrons “for the sake of making a profit” (Spilsbury 1915). Rather, the service charges, which the ESL’s promotional literature characterized as “nominal” (Library Service for the Membership 1917; Spilsbury 1915),⁵⁷⁹ were intended to cover the Bureau’s operating expenses and so to render it a self-supporting part of the library (Cutter 1915, 151; Library Service Bureau of United Engineering Societies 1915).⁵⁸⁰ At any rate, the fees seem not to have deterred patrons from consulting the Bureau, for not only engineers living outside of New York City and its environs but also those living within the city and able to visit the library in person availed themselves of its services (Craver 1923, 364; Engineering Societies Library [1922], 12). For many of the ESL’s patrons, the opportunity to have experienced searchers carry out bibliographic research on their behalf was an added value of library service for which they were willing to pay.

The Library Service Bureau was the department within which Kaiser worked during his time at the ESL. The nature of his duties there can be discerned from the occupational titles that were accorded him in the rosters of staff members given in the library’s yearly reports. In 1916, when he entered into the library’s employ, he was listed as a “research assistant” (United Engineering Society 1917, 5). By the following year, he had been promoted to being “in charge of bibliographical work” (United Engineering Society [1918], 4) and, in the reports for the following two years, he was described as being “in charge of searches” and “in charge of research”, respectively (United Engineering Society [1919], 3; [1920], 4). Finally, from 1920 until 1923, when he left the service of the ESL, Kaiser held the position of “chief bibliographer” (Engineering Societies Library [1921], 4; [1922], 4; [1923], 4). As these titles suggest, he was charged with the task of conducting literature searches in response to patrons’ inquiries, an activity that typically involved compiling lists of bibliographic references (United Engineering Societies [1918] 6). Copies of such custom-made bibliographies, or “searches” in the parlance of the ESL’s staff, were not only sent to

⁵⁷⁹ The schedule of fees in 1917 ran as follows: \$ 0.10 per reference card; \$ 1.00 per 1000 words for the copying of texts in the library; \$ 1.00 per hour for “bibliographing” (*sic*); \$ 1.50 per hour for preparing abstracts of English-language sources; \$ 2.50 per hour for statistical searches; \$ 2.50 per 1000 words for translations from French or German; \$ 3.00 per hour for patent searches; and \$ 3.50 per 1000 words for translations from languages other than French or German (Library Service for the Membership 1917).

⁵⁸⁰ In this, the Library Service Bureau seems to have, on the whole, met expectations. In its first decade of operation, it managed to turn a modest net profit most years (Mount 1982, 141; Engineering Societies Library [1921], 22; [1923], 29; United Engineering Societies [1919], 7 & n. p., Table 11; [1920], 9 & 33), although it also experienced leaner years when its budget ran into the red (Engineering Societies Library [1922], 14 & 31; United Engineering Societies [1918], n. p., Table 7).

the patrons who had requested them but many were also indexed and kept for reference at the ESL (Engineering Societies Library [1921], 8; [1922], 10; Library Notes 1917, 268; United Engineering Society [1920], 5). Given Kaiser's linguistic abilities, it is quite likely that he also took part in preparing translations from, or abstracts of, articles written in foreign languages as the need arose, though documentary evidence on this score is lacking. Needless to say, he was not alone in carrying out this work but had assistants who likewise busied themselves with the tasks of searching, copying, and translating.⁵⁸¹

Some insight into Kaiser's work at the Bureau can be gleaned from a promotional piece for the library that he published in the *Journal of the American Society of Mechanical Engineers*, in March 1918. In this brief article, entitled "Making the library serve your purpose", he rehearsed the advantages of employing the ESL's searchers, gave advice to prospective patrons about how to formulate their requests to the searchers, outlined the basic procedures followed in the course of a literature search, and recounted, as an example of the pains to which the library's searchers were willing to put themselves in the hunt for information, the story of an unusually involved search that he had undertaken on behalf of a client desiring bibliographic references to the mining of sulphur in the Caribbean island of Saba (K[aiser] 1918). Of especial interest here is Kaiser's description of the standard procedure for carrying out a literature search, which he analyzed into five basic steps, in a manner reminiscent to that of his enumeration of indexing and processing operations in his books (See Chapter 7, Section 6.1, esp. 670–671, above):

- a. The inquiry is formulated exactly; if this is impossible, further information is asked of the inquirer.
- b. A bibliography is made to cover the subject exactly as stated and submitted to the inquirer.
- c. After perusal the inquirer may decide either to examine all the material or to select for further consideration such references as appear to him most suitable.

⁵⁸¹ Because the staff rosters of ESL's annual report typically identify "assistants" without specifying the aspect of the library's work in which they were engaged, it is difficult to determine how many assistants Kaiser had. Almost certainly, the number fluctuated from year to year. In 1917, when the ESL's staff numbered sixteen people in all, six were involved in Library Service Bureau work (United Engineering Societies [1918], 4 & 7): these included Kaiser, the person responsible for preparing photostats, and, most almost certainly a typist, meaning that the research assistants for that year would have numbered three. In the staff list for 1919, the only one that breaks down assistant's tasks in detail, the library staff totaled thirty-two persons in all: of these, six are listed as research assistants and presumably served as aides to Kaiser, who was "in charge of research" that year (Engineering Societies Library [1920], 4).

- d. In accordance with his decision the Library may be called upon to make photo-prints, translations, or abstracts of the material selected, as the case may be.
- e. On receipt of these the inquirer is in a position to give the final answer to the original question, or he may determine in what further directions the assistance of the Library would be desirable (p. 286).

This process, he hastened to add, could be terminated at the request of the patron “at any of the stages enumerated” and, likewise, the library staff would “tell the inquirer quite frankly when searching has reached the limits of usefulness”; “exact records” were kept of all searches so that, if one was, for whatever reasons suspended, it could be resumed at a future time “without duplication of the work” (p. 286). In Kaiser’s view, precise formulation of the inquiry by a patron at the outset of a given search—step “a” in the preceding sequence—was a necessary precondition for effective searching and, to encourage prospective patrons to take care in framing their inquiries, he offered them the following counsel:

It is ... of the greatest importance that all questions made the object of a search should be stated with the greatest accuracy, for only an intelligent question is likely to elicit an intelligent answer.⁵⁸² In the great majority of cases it is unwise to ask the Library for all information on a given subject. In almost every case it is necessary to state limitations such as: The search is to cover a stated number of years; the information is required for such and such a purpose; patents must be included or excluded, etc.; and this is the more necessary because it is generally in the more difficult questions that the assistance of the Library is required (pp. 285–286).

Such advice—which, in advocating the “limitation” of queries by such parameters as the date of the information being sought or the genre of literature to be searched, invoked a strategy comparable to the use of pre-search filters in present-day electronic information systems—was intended both to save the time of the searcher by narrowing down the scope of the search and to assure that, at its conclusion, patrons would not be presented with information superfluous to their purposes (cf. Library 1918, lxiv). Evidently, Kaiser adopted a highly systematic, analytical, and efficiency-oriented approach to his duties as searcher and chief bibliographer of the ESL that he had advocated in his earlier discussions of

⁵⁸² Interestingly, the adage “only an intelligent question is likely to elicit an intelligent answer” echoes a maxim that Kaiser (1911, § 433) had employed in *Systematic Indexing* during his discussion of how to conduct searches of a card index: “[I]f we expect an *intelligent answer* from the index, we must put an *intelligent question*” (emphases his). This parallelism is noteworthy, for it implies an analogy between a detailed card index and a human searchers: in Kaiser’s view, both functioned as means to locating specific information—provided that the person posing the query to them asked the appropriate question (cf. K[aiser] 1918, 285).

searching for information in a systematic index (cf. Kaiser 1911, §§ 433–446, with Chapter 7, Section 5.2.1, esp. pp. 597–601, above).

In the introductory section of the article, Kaiser also commented on the current state of knowledge organization at the ESL. He began by observing that although the ESL was equipped with “a complete dictionary catalogue by authors and subjects ... and in addition many published bibliographies besides those compiled in the Library”, such tools did not give “complete access to all the material” (K[aiser] 1918, 285).⁵⁸³ “Complete access”, he argued, “could only be provided by a systematic index”—manifestly one constructed on the model of SI—“covering the whole of the books and periodicals” (p. 285). Yet, he conceded, such an index was an unattainable ideal in practice, for, if it were to account for all the materials in the library in a truly comprehensive manner, it would require, by his estimate, no fewer than twenty million cards, and an index of such size and scope would be simply too costly in time and labor for “the present financial resources of the Library” to bear (p. 285). His conclusion was that, under the circumstances, the Library Service Bureau’s searchers could be considered as a kind of living proxy for a properly constituted index, for, like the latter, they gave patrons access to highly specific information that might not be adequately signaled by the library’s catalog or bibliographies (cf. p. 754, n. 582, above).

Although Kaiser held definite views on knowledge organization at the ESL and ventilated some of them in print, he does not seem to have played any significant part in shaping the library’s knowledge organization policies or practices. The determination of these fell to the men under whom he worked, William P. Cutter (1867–1935), head librarian of the ESL from 1911 to 1917, and his successor, Harrison W. Craver (1875–1951), who held the post from 1917 until 1946.⁵⁸⁴ Neither Cutter nor Craver shared Kaiser’s predilection for a systematic index designed according to the protocols of SI; their priorities

⁵⁸³ In characterizing the ESL’s catalog as a “dictionary catalogue”, Kaiser considerably oversimplified matters, for, at the time that he wrote the article, the catalog was, in fact, a hybrid construction consisting of “[a]n author catalog, formed by interfiling the catalogs of the four constituent libraries; an alphabetical classed catalog, covering three of the original collections; a classed subject catalog of the Library of the American Society of Civil Engineers; [and] an alphabetical classed catalog supplementing the preceding and acting as an index to it as well” (Craver 1920, 11). If one accepts Cutter’s (1904, 19) definition of a dictionary catalog as one in which “the headings (author, title, subject, and form are arranged, like the words in a dictionary, in alphabetical order”, it becomes obvious that the ESL’s catalog was not a dictionary catalog in the strict sense of the word. This is another telling indication that Kaiser could be rather cavalier in his adoption of library terminology (see Chapter 3, Section 3.3, esp. pp. 111–112, above).

⁵⁸⁴ For a brief biographical sketch of W. P. Cutter, who was a nephew of Charles A. Cutter, see Mount 1982, 63–70; on Craver, see Cabeen 1978; Mount 1982, 70–81.

and preferred methods lay elsewhere. Both men accorded far greater attention to issues of cataloging than did Kaiser. As noted earlier, the original catalog of the ESL amounted to little more than a *mélange* of the card catalogs inherited from the individual engineering societies' libraries: because the resultant hybrid was inconsistent in its internal structure and proved inconvenient for patrons and library staff alike to use, both men considered reformation of the catalog—and, in particular, its norms for subject cataloging—to be a matter of the highest priority (United Engineering Society 1917, 14; [1918], 14; [1919], 9). Cutter brought the problem to the attention of the UES's Library Board and conducted a preliminary study to establish the feasibility of undertaking the project of recataloging (United Engineering Society 1917, 15–17); however, his recommendations went unheeded and, at his departure from the ESL in 1917, the catalog remained largely in its original state. Craver, who enjoyed better relations with the Library Board than his predecessor, was successful in securing its support for the project and so it was under his watch and in accordance with his lights that the library catalog underwent revision.

Contrary to most of his contemporaries in the American library world, Craver was a firm believer in the virtues of the classed catalog. Prior to becoming director of the ESL, he had served as head librarian of the Carnegie Library in Pittsburgh, which boasted an extensive subcollection of books devoted to technology: with his approval, a classed card catalog was developed for this collection on the grounds that “for technical works the classified form [sci., of the card catalog—TMD] would be more satisfactory than the dictionary form” (Carnegie Library of Pittsburgh 1910, 17, cited in Mount 1982, 72). When finally given the opportunity to refashion the ESL's catalog in 1919, he again opted for the classed form, deeming the UDC to be the classification scheme most suitable for the organization of a catalog for technical subjects (Craver 1920; United Engineering Society [1920], 10–19). To undertake the actual task of recataloging, Craver recruited Margaret Mann (1873–1960), who had previously worked under him as head of cataloging at the Carnegie Library and was renowned in library circles for her skills both as a cataloger and a manager of catalogers (Grotzinger 1978, 340; Mount 1982, 81–82). Between 1919 and 1924, when she took a leave of absence to take a position as cataloging instructor at the American Ecole de Bibliothécaires in Paris, Mann oversaw the recataloging of no fewer than 87,000 volumes in the ESL's collection within the framework of a new catalog structure comprising an alphabetical author file, a classed subject file, and a detailed alphabetical

index to the latter (Mount 1982, 133–134, with Table 7; Soroka 1982, 5–6).⁵⁸⁵ The subject entries for the books and periodicals recataloged were arranged in accordance with a modified form of the UDC.⁵⁸⁶ The sole exception to this general rule was the series of bibliographies, or “searches”, compiled by the ESL’s Library Service Bureau: according to the ESL’s annual report for 1921, “most of these were indexed before recataloging was undertaken, by a special plan which has been retained, subject to future revision” (Engineering Societies Library [1922], 10).⁵⁸⁷ Given the fact that the conduct of bibliographic searches fell primarily within Kaiser’s purview, one may well wonder whether the special plan in question could have been his handiwork; unfortunately, available sources do not specify the mode of indexing used and so the question must be left open. However, there can be no question that, during the latter half of Kaiser’s tenure at the ESL, the practice of cataloging there was dominated by the use of a classification system that he considered to be “fundamentally weak” as a tool for subject access (Kaiser 1926, 30, § 31). Here, at any rate, Kaiser’s views ran counter to those of the leadership of the library.

Both Cutter and Craver also sought to involve the ESL in periodical indexing, although, again, their approaches differed substantially from that advocated by Kaiser. Cutter (1914, xii) maintained a card index of “important articles” in current periodicals as a resource for the compilation of the library’s reference lists: the manner in which it was structured is unknown. His interest in indexing, however, was fueled by much more ambitious considerations. Dissatisfied with what he took to be the unduly restricted range of contemporary indexes to engineering periodicals and impressed by ongoing indexing projects in the pure sciences, such as the Royal Society’s International Catalogue of Scientific Literature, he wanted to lay the organizational groundwork for an international index of technical literature (Cutter 1911; United Engineering Societies 1916, 18–22). In his view, an index of truly international scope could only take a classified form based on a

⁵⁸⁵ The recataloging project continued for a year after her departure, adding some 8,000 volumes to the total.

⁵⁸⁶ The basis of the subject classification scheme were the tables of the UDC as given in the *Manuel du Répertoire Bibliographique Internationale*, parts of which Craver himself translated into English for the benefit of his catalogers. However, the basic scheme was also subject to some adaptation: for example, Mann developed a new decimal classification for the subject of scientific management, which she engrafted onto the ESL’s version of the UDC tables. See Engineering Societies Library [1923], 13; Soroka 1982, 5.

⁵⁸⁷ Interestingly, the ESL seems to have ceased cataloging internally generated bibliographies after 1921, though the searches on which they were based were still being carried out by members of the Library Service Bureau (Engineering Societies Library [1923], 10 & 13; [1924], 10 & 13) and the bibliographies on file continued to be touted as a valuable research aid (e.g., Mann 1924, 188).

notation of some sort, since an alphabetical index would require the choice of single language as the basis for arranging the entry terms and this would reduce its value for users who did not read that language (Cutter 1915, 468–469, 471; United Engineering Societies 1916, 20).⁵⁸⁸ He also held that the organization and production of such an index would have to be centralized; envisioning the UES as a suitable sponsor for the undertaking, he worked out, in some detail, plans for a central office that would oversee the publication of the projected index (United Engineering Society 1916, 19–20). Cutter campaigned vigorously on behalf of the project and mustered sufficient support to convoke, in May 1915, a meeting at the UES building on technical bibliography, which was attended by delegates from “about twenty national technical and scientific societies”: out of this emerged a “Joint Committee on Classification of Technical Literature”, which took as its brief the design of a new classification of technical fields that might serve as the basis for a classified index (Classification of Technical Literature 1915, 115). The committee provided a lively forum for discussion but its deliberations brought to the fore disagreements among participants about the best way to proceed in designing a classification (e.g., Classification of Technical Literature 1916); the venture quickly lost momentum and appears to have petered out completely after Cutter left the ESL. A paper project that never got off the ground, Cutter’s idea of a classified technical index of international scope stood in stark opposition to Kaiser’s vision of the ideal index, which, as we have seen (Chapter 7, Sections 5.1 & 6.2, above) was alphabetical in its filing structure and localist in its scope.

Unlike his predecessor, Craver enjoyed greater, if limited, success in his efforts to involve the ESL in periodical indexing. Although he too dreamed of a comprehensive index to engineering literature, he adopted the practical policy of cooperating with various publishing bodies in the production of smaller-scale indexes. In the autumn of 1918, the ESL joined forces with the AIME to produce *The Mining and Metallurgical Index*, which was published serially in the AIME’s monthly *Bulletin* (Mining and Metallurgical Index 1918). The library staff provided references to newly published articles on mining and metallurgy to an editor, who was responsible for approving the references and organizing them. The result was an alphabetic-classed subject index, with individual articles entered within

⁵⁸⁸ Cutter (1911, 70) did concede, however, that the classified index would have to be accompanied by “an author and [sci., an alphabetical—TMD] subject index to each article” (cf. United Engineering Society 1916, 20). He suggested merging index terms from various languages into the latter so that it would have “in one alphabet the terms in English, French and German, and perhaps in Italian”—a proposal that was overly sanguine in its assessment of the ease of cross-lingual alphabetization. .

broad subject categories under title catchwords, each installment of which included a notice indicating that members of the AIME could procure photostatic copies of any article listed from the ESL for a nominal fee.⁵⁸⁹ In the following year, when the ASME acquired the *Engineering Index* and moved the latter's offices to the UES building (Henderson 1984, 84; Zani 2002, 7), Craver opened the doors of the ESL to the members of the *Index's* staff, allowing them to use the library's comprehensive collection of engineering journals for their work and so enabling the *Index* to increase its coverage of the engineering literature almost threefold (Hannum 1930, xii–xiii).⁵⁹⁰ Again, both the monthly installments of the *Index* published in the ASME's *Journal* and the cumulated yearly editions advertised the services of the ESL, offering readers of the *Index* the opportunity to acquire, for a fee, a photocopy of any article listed in the index (Bissell 1969, 5–6). Craver hoped, in time, to effect a merger between the *Mining and Metallurgical Index*, the *Engineering Index*, and other engineering indexes, preferably under the aegis of the ESL: however, his proposals failed to win the support of the UES's leadership and his efforts in this direction proved fruitless (Mount 1979, 186–187; 1982, 165–166).

One of the considerations that led Craver (1921a, 65) to select the UDC as the basis of the ESL's classed catalog was the expectation that it could be “applied not only to books but also to the indexing of periodicals”. In 1921, he undertook a new indexing initiative that sought to put such an application into practice. Under his tutelage, members of the library staff indexed and classified articles in an industrial management journal, *Management Engineering*, prior to their publication, using an extension of the UDC developed at the ESL (Decimal Classification Literature of Management Engineering Literature 1922); the articles were subsequently published with the UDC number and corresponding index term preceding the title, so that readers could clip the articles and file them in a classified order, if they were so inclined (Craver 1921b; How to Use the Indexing System of Management Engineering 1921). According to Craver, his use of the UDC for pre-indexing *Management*

⁵⁸⁹ In its earliest installments, the index consisted of the following main classes—“Mineral Resources”, “Mining Geology and Mining Practice”, “Ore-dressing and Preparation of Coal”, “Coal and Coke”, “Petroleum and Gas”, “Metallurgy of Iron and Steel”, and “Non-ferrous Metals”,—each of which was directly subdivided by title catchwords listed in alphabetical order (e.g., *The Mining and Metallurgical Index* 1918). It quickly underwent refinements in its classificatory structure—the main classes were refined, their number was increased, an extra layer of subdivisions was added for some of the main classes, and a geographical index was added—but continued to use catchword entries (e.g., *The Mining and Metallurgical Index* 1919).

⁵⁹⁰ Prior to coming into the ASME's control, the *Engineering Index* covered approximately 250 periodicals: after 1919, “1200 engineering and technical publications were regularly reviewed and about 700 of these were indexed” (Hannum 1930, xii).

Engineering was the first American attempt to take up a practice that had already found some adhesion among European publishers of technical journals (Craver 1921, 50; Engineering Societies Library [1922], 14):⁵⁹¹ it did not, however, find imitators among other engineering journals in the United States.

As the foregoing examples show, Craver actively promoted the indexing of engineering periodicals as a task for the ESL during the first years of his directorship: indeed, he would continue doing so into the mid-1930s (Mount 1982, 165–168). It is evident that he was willing to experiment with different kinds of indexing systems, for the collaborative projects into which he drew the library during the first years of his directorship used various indexing structures such as the alphabetic-classified title-catchword form of the *Mining and Metallurgical Index* and the classified form of the UDC employed for characterizing the subjects of the *Management Engineering's* articles. All the more striking, then, is the fact that SI was not among the indexing options that Craver and his collaborators chose to utilize, despite the fact that its creator was a member of the library staff during the years that the aforementioned projects were launched and so was certainly available for consultation on the matter. Extant sources do not tell us why SI fell *hors de considération*. One may well suspect that Craver's enthusiasm for classified approaches would hardly have predisposed him to adopt a complex alphabetically-organized method of indexing such as that prescribed by Kaiser. Furthermore, SI had been designed for use with card indexes of particular organizations, not as the basis of printed indexes destined for general circulation (Kaiser 1911, §§ 6–7) and had not been envisioned as a system for the indexing of whole periodical articles, though Kaiser had allowed for the possibility that it could be utilized for this purpose (§ 305): it thus might not have been viewed as appropriate for printed indexes of periodical articles. Whatever factors may have been in play, the result was manifest: despite Kaiser's previous experience of, and expertise in, technical indexing, he had little, if any, substantive influence on indexing practices at the library where he worked.

9.3. At the American Society of Mechanical Engineers, 1917–1926

We have seen that Kaiser's work at the ESL consisted primarily in carrying out literature searches and compiling reference lists, as well as, most probably, some translation work (See Section 2 of the current chapter). These library duties, however, did

⁵⁹¹ For a list of European and British journals indexed in this way, dating from the mid-1920s, see Matthews 1926, 118–119.

not exhaust his professional activities at the UES building, for, about a year after commencing his employment at the ESL, he took an additional job with the ASME as an associate editor. Now, editorship can cover a wide range of functions and available sources do not mention the precise nature of the tasks allotted to Kaiser in his new position: thus, we do not know whether his editorial duties were comparable to those he carried out at the Tariff Commission (See Chapter 5, Section 3, esp. p. 179, above) or whether they differed in scope and substance. Neither do our sources indicate on which of the various publications issued under the aegis of the ASME's Publications and Papers Committee he was initially assigned to work.⁵⁹² Whatever the original scope of Kaiser's editorial responsibilities may have been, they appear to have provided an *entrée* into indexing work, for, in time, he came to serve as a reviewer of foreign journals and an indexer (American Society of Mechanical Engineers 1928; Hercules Powder Company 1927). It is possible that he carried out these functions for *Mechanical Engineering*, the ASME's monthly journal that included, *inter multa alia*, translations and digests of papers originally published in foreign languages (Hutton 1915, 35–36): he certainly did so for one of the ASME's recent acquisitions, the *Engineering Index* (Metcalf 1957, 76; 1959, 298), monthly installments of which were published serially in the pages of *Mechanical Engineering* and annual cumulations of which were issued as separate volumes.

In 1919, when the ASME took over publication of the *Engineering Index*, this storied bibliographical tool had already been in existence for some thirty-five years. It had commenced life in 1883 as a personal *index rerum* kept by John B. Johnson (1850–1902), a newly appointed professor of Civil Engineering at Washington University who wanted to acquaint himself better with the professional literature (Henderson 1984, 83; Johnson 1901, [iii]). In October of the following year, he began publishing the fruits of his labors as the “Index Department” in the *Journal of the Association of Engineering Societies*.⁵⁹³ There, it

⁵⁹² In the early and mid-1920s, the ASME's publications included the annual *Transactions*, the monthly journal *Mechanical Engineering* (formerly the *Journal of the American Society of Mechanical Engineers*), the bimonthly bulletin *A.S.M.E. News*, the annual *Year Book*; the annual *Condensed Catalogues of Mechanical Equipment*, and the *Engineering Index*, as well as various committee codes and irregularly issued biographies of eminent engineers (American Society of Mechanical Engineers 1925, 9–11).

⁵⁹³ Formed in 1880, the Association of Engineering Societies was a federation of regional engineering societies that banded together for the purpose of creating a journal that would jointly publish the transactions of the component societies and papers authored by their members. In 1884, it included the following societies: The Boston Society of Civil Engineers, the Engineers' Club of St. Louis, The Western Society of Engineers (based in Chicago), the Civil Engineer's Club of Cleveland, the Engineers' Club of Minnesota: it would gain and lose numerous member societies from the later

would appear in monthly installments under his editorship through 1895, with a cumulation of the first seven years appearing in 1891 under the title *Descriptive Index of Current Engineering Literature* (Bissell 1969, 4; Hannum 1930, xi). According to Johnson, the principles underlying his compilation of the index were, “from the start”, twofold (Johnson 1901, [iv], cited in Bissell 1969, 2–3; Zani 2002, 7):

- (1). To index only articles of permanent value.
- (2). To give such a short and concise, but adequate description of the article as would enable one seeking information on the given subject to determine whether or not it would be worth his while to obtain or consult the article.

The index structure he chose was the dictionary form, with index headings arranged in alphabetical order (Hannum 1930, xi): the headings themselves were, for the most part, title-derived catchwords, which were subdivided where appropriate (cf. Suplee & Cuntz 1901, [v]). In 1896, the *Engineering Magazine* of New York took over publication of the index, which it rebaptized as *The Engineering Index*: over the next decade, it kept Johnson’s format both in the monthly bibliographies appearing in its pages and in the three volumes of 5-year cumulations that it put out in 1896, 1901, and 1906 (Hannum 1930, xii; Henderson 1984, 84). In 1906, the editors of the *Index* began publishing annual cumulations of the index and, in the following year, introduced a major change in format: “[i]nstead of an alphabetical arrangement by specific subjects as had heretofore been maintained, the contents were separated into eight main divisions and the entries were grouped in several sections under each division” (Hannum 1930, xii). The new format, which was, strictly speaking, alphabetico-classed in arrangement,⁵⁹⁴ continued in force until 1920, the year after the ASME had purchased the *Engineering Index*: then, as a result of consultations with “engineers, librarians, and others who have given attention to the matter”, the Publications and Papers Committee decided to revert back to “a simple dictionary arrangement of the items” (*Engineering Index Issued in New Form* 1920). The ASME’s acquisition of the *Index* had other consequences as well. As already noted, cooperative arrangements with the ESL allowed the *Index*’s staff to use the library’s ample collection of technical periodicals (See

1880s until it disbanded in 1915. See Ferguson 1964, 429. Johnson had good reason to choose the *Journal* as the venue for the publication of his indexing project: he was a member of the Engineers’ Club of St. Louis and an officer of the Association itself.

⁵⁹⁴ The eight main divisions were “Civil Engineering”, “Electrical Engineering”, “Industrial Economy”, “Marine and Naval Engineering”, “Mechanical Engineering”, “Mining and Metallurgy”, “Railway Engineering”, and “Street and Electric Railways”: these and their respective subdivisions were, listed in alphabetical order, save for the subdivisions labeled “Miscellany”, which, whenever they occurred, came at the end of a subdivision list. See *Engineering Magazine* 1907, “Classification of the Index”.

Section 2 of the current chapter). This greatly increased the range of the engineering literature covered, especially that published abroad: indeed, by 1922, no fewer than 25 % of all entries in the Index were derived from journals issued in Great Britain and her colonies, while 30 % came from periodicals from foreign countries (Hannum 1930, xiii).

Such, then, was the publication for which Kaiser served as a reviewer of foreign periodicals and indexer. Within the workflow of the *Engineering Index*, reviewing and indexing constituted two consecutive stages of a single process. Reviewing consisted in inspecting technical periodicals published abroad and selecting from them articles that fell within the scope of the *Index*, while indexing involved constructing a bibliographic entry for each article, characterizing the subject whereof it treated by assigning it an index heading, and preparing a brief abstract of, or annotation about, its contents (American Society of Mechanical Engineers 1922a, v).⁵⁹⁵ Both stages of the process were continuous, to a considerable degree, with the kind of work that Kaiser performed at the ESL: his duties as reviewer of foreign journals were clearly predicated on his knowledge of foreign languages, as was the case with his translation activity at the ESL, and the preparation of annotated entries for individual articles for the *Index* mirrored the formulation of comparable entries for the reference lists compiled in response to patrons' queries at the ESL. Yet his work on the *Index* and that at the library also differed in important respects: the former focused on culling references in current literature on a host of different topics for inclusion in a serially published index appearing at regular intervals and intended for a broad audience of professional users, whereas the latter required tracking down all relevant references—not necessarily current ones only—pertaining to a single topic as determined by a specific query made for a particular purpose by a single patron (See Section 2 of the current chapter). In short, Kaiser's work for the ASME complemented his activities as chief bibliographer for the ESL until he left the employ of the library in 1923, apparently to devote his energies fully to reviewing and indexing.

⁵⁹⁵ The close connection between reviewing and indexing within the framework of the Engineering Index, can be inferred from the following statement from the introduction to the annual addition of the *Engineering Index* for 1922: "Some 1300 periodicals, reports, and other publications regularly received during the year by the Engineering Societies Library (New York) have been *reviewed*, and from over 600 of these ... the articles *to be indexed have been selected*" (American Society of Mechanical Engineers 1923, v [emphases mine—TMD]). Note also Hannum's description of the original arrangements between the ESL and the *Engineering Index* in 1919: "[t]hrough cooperative arrangement with the Engineering Societies Library, the 1200 engineering and technical publications were regularly *reviewed* and about 700 of these were *indexed* ..." (Hannum 1930, xii [emphases mine—TMD]).

Although Kaiser's routine duties as reviewer and indexer followed, to a large degree, protocols set out by editors of the *Engineering Index*, there is also some indication that the editors of the ASME were willing to consult with him on matters of indexing policy. The clearest evidence for this is found in an addendum at the end of Kaiser's final article on SI, in which he briefly revisited the issue of the suitability of the DDC and UDC to indexing. In relation to this theme, he reported that, in 1925,

at his suggestion, a set of questions had been addressed to subscribers to the *Engineering Index*, which included the following:—

In view of the use you have been making of the *Engineering Index*, would the addition of the Dewey numbers or the Brussels numbers to each item indexed be of help to you?

Would the arrangement of the entire *Engineering Index* by these numbers appeal to you?

About 50 per cent. replied. Of these replies 8 per cent. were in favour of Dewey or Brussels, 27 per cent. were non-committal, and 65 per cent. were against. Some in the last group explained that for their own indexes they had given up Dewey or Brussels, reverting to the alphabetical arrangement (Kaiser 1926, 44).

Three points are worth noting with regard to this brief report. First, Kaiser's counsel carried sufficient weight with the editors of the *Engineering Index* that they undertook a survey of their subscribers "at his suggestion" and apparently enlisted his aid in formulating the questions to be included in the questionnaire circulated. Second, Kaiser's advice to solicit the opinions of the *Index's* subscribers regarding various features of the index was evidently rooted in the methodological premise that one should base decisions about index design on empirical evidence about the preferences of its users. Congruent with the ASME's own past policy of canvassing its members for suggestions on how to improve the index (*Engineering Index Issued in a New Form 1920*), this empirically-based approach was also consistent with Kaiser's previous *modus operandi* at Ardeer, where he had consulted with the intended users as part of the process of constructing the central index (see Chapter 8, Section 2, above). Finally, the findings of the survey, which revealed a much greater preference for an alphabetical format than one based on decimal notation, not only buttressed the earlier decision of the ASME's Publications and Papers Committee to move from an alphabeticoclassed to a dictionary index: they also stood in sharp opposition to Craver's views regarding the desirability of using UDC as a tool for indexing technical periodicals and provided support for Kaiser's own firmly held belief that alphabetically arranged indexes, such as those prescribed by the protocols of SI, were preferable to ones that used classified

filing structures (see Chapter 6, Section 3.2.2 & Chapter 7, Section 5.1, above). Little wonder, then, that Kaiser (1926, 44) secured the permission of the ASME to cite them in his article.⁵⁹⁶

Clearly, in the aforementioned case, the editors of the *Engineering Index* paid heed to Kaiser's advice and the resultant investigation had consequences for their decision to retain the alphabetical arrangement of the *Index*. More difficult to ascertain is whether Kaiser's ideas had any influence on other aspects of the *Index's* design. Latter-day commentators have mooted this very question with regard to certain structural features of its indexing terms (Metcalf 1943, 255–266; 1957, 76; 1965, 48; Weinberg 1982, 30). In 1931, about half a decade after Kaiser had ceased working for the *Index* and four years after it had undergone changes in editorial leadership, its then current editor, Joshua E. Hannum (1890–1960),⁵⁹⁷ gave an account of its system of index terms, or, as he called them, subject headings (Hannum 1931), which, throughout the latter part of the 1920s, had been developed under his guidance into an extensive controlled vocabulary (pp. 354–355). In the course of his exposition, he discussed, *inter alia*, the principles on which complex index terms, which he called compound headings, were formed. Hannum began by observing that “technical literature deals primarily with a great variety of things and of processes affecting things” and, accordingly, he divided index terms into two broad categories: terms denoting “things” and those referring to “processes” (p. 358). *Things* he defined “in the broadest sense” as comprising “tangible things as men, materials, machinery, equipment, apparatus, supplies, products, goods, structures and projects” (p. 358). *Processes*, on the other hand, he understood to include whatever was “designated by nouns or verbs of action, usually ending with the suffixes “tion” or “ing””: examples included “operation, inspection, design, manufacture, maintenance, lighting, heating, refrigeration, selling, accounting, management, education, materials handling, analysis, testing, mining, refining, treatment, transportation, accident prevention[,] machining, and many others” (p. 358).

⁵⁹⁶ If Kaiser had hoped that publication of these findings would strengthen the cause of alphabetical indexing, he would have been disappointed to learn that they appear to have had only a minimal impact on subsequent discourse on indexing. To my knowledge, the only echo that they left in the professional literature was in an article on libraries and technology written by a German librarian, who cited them as *comparanda* to his own observation that, in the German context, few technical libraries seemed to be making use of decimal classifications, such as the DDC and UDC, for indexing purposes (Predeek 1927, 475). However, influence cannot always be gauged by citation counts alone.

⁵⁹⁷ Hannum, an industrial and mechanical engineer by training and work experience, served as editor of the *Engineering Index* between 1927 and 1936. He later became a faculty member at the School of Engineering at the Alabama Polytechnic Institute (today, Auburn University); see Ullrich 2003.

Having posited this division, Hannum went on to consider how terms for things and terms for processes were to be combined with one another. He stipulated that, in the formation of any compound, the component terms should follow a fixed sequence, in which a term for a thing should always be followed by that for a process. His rationale for this was the following:

Since the majority of articles in periodical literature deal with one or more things and one or more processes affecting these things, and since it is costly to make multiple entries for the same article, a choice must be made between “things” and “processes” for the main headings. Those engaged in engineering and industrial activities deal with things, and are quite likely to think of things first rather than processes.

Consequently, in the compound headings of things and processes for the Engineering Index, things are placed first and processes second, i.e., the thing is used for the main heading and the process is used for the subheading. This is a fundamental principle that is used almost throughout the whole complex subject heading structure (Hannum 1931, 358; cf. 363, Point 20).

On this view, the structural pattern [THING]–[PROCESS] constituted the “fundamental principle” animating the structure of complex subject terms. To be sure, the *Index* did not limit itself to this schema alone but made use of other patterns for structuring composite index terms: for example, it included headings in which the whole of a thing was subdivided by its parts (e.g., LATHES–SPINDLES)—what Hannum called “part-under-whole headings”—and utilized various kinds of “conjunctive headings” according to the pattern [X] AND [Y], including conjunctions of things (e.g., IRON AND STEEL), conjunctions of processes (e.g., HEATING AND VENTILATION), and mixed conjunctions (e.g., BELTS AND BELTING; MINES AND MINING) (p. 359). Nevertheless, it was the [THING]–[PROCESS] pattern, or “the thing-process breakdown” as it came to be called, that was foregrounded by the *Index*’s editors and that would subsequently come to be viewed as the structural hallmark of its subject indexing system (e.g., Engineering Index 1937, 1; Guthrie 1948, 193, with n. 1; Metcalfe 1959, 91; Wylie 1948, 134, 141).

Certain elements of Hannum’s account of the principles governing the formation of compound headings in the *Engineering Index* have close parallels in SI. First of all, his contention that the subjects treated in technical literature can be reduced to things and processes is reminiscent of Kaiser’s (1911, §§ 52, 298) claim that the subject content of literature—in particular, business literature—can ultimately be resolved into concretes and processes. Second, it is noteworthy that there was partial terminological overlap between the two: Hannum and Kaiser (1911, § 301; 1926, 22, §§ 6–7) employed the same term—

“process”—to designate the referents of what they characterized as words or terms signifying action of some sort. Finally, both men stipulated that, in the formulation of a composite index term, the component term naming a (kind of) thing or object—Kaiser’s (1911, § 52) “concrete” in the broadest sense of the term (see Chapter 7, Sections 3.1 & 3.1.2, beginning)—should always precede the one designating a process. Now Kaiser had originally applied this tenet to a series of four statement forms that added the category of [COUNTRY] and included two tripartite (i.e., [CONCRETE]–[COUNTRY]–[PROCESS]; [COUNTRY]–[CONCRETE]–[PROCESS]) and two bipartite (i.e., [CONCRETE]–[PROCESS]; [COUNTRY]–[PROCESS]) forms, with the tripartite form [CONCRETE]–[COUNTRY]–[PROCESS] understood to be the ideal type (See Chapter 7, Sections 3 & 3.5, above). However, the published descriptions of the version of SI applied at Ardeer mentioned only two of these forms or rather, sequences of terms based on these forms—one, tripartite ([CONCRETE] [COUNTRY] [PROCESS]) and the other, bipartite ([CONCRETE] [PROCESS]) (See Chapter 8, Section 2.1, above)—and, as we shall see in the following section, in his final published account of SI, Kaiser (1926, 23, § 12) foregrounded the bipartite form [CONCRETE]–[PROCESS], presenting it as the ideal type of statement form. By the mid-1920s, then, [CONCRETE]–[PROCESS] had become the signature form of composite index terms in SI, thus providing a direct parallel to the [THING]–[PROCESS] pattern that, according to Hannum, underpinned the subject heading system of the *Engineering Index*.

The foregoing parallels, particularly the structural similarity between Kaiser’s [CONCRETE]–[PROCESS] schema and the *Engineering Index*’s [THING]–[PROCESS] pattern, are certainly striking. If one also takes into account Kaiser’s close association with the *Index* in the mid-1920s and the willingness of its editors to act on his suggestions in other matters, the notion that his rules for structuring complex index terms served as a source of inspiration for the *Index*’s thing-process breakdown takes on a strong air of plausibility: indeed, at least one modern commentator has assumed that bipartite schema of SI influenced the thing-process form breakdown of the *Index* (Weinberg 1982, 30).⁵⁹⁸ There are, however, good reasons, both technical and circumstantial, to exercise interpretative prudence on this score.

⁵⁹⁸ The one other latter-day scholar to comment on the resemblance between the two schemata, who, it may be added, was well aware of Kaiser’s association with the *Engineering Index*, was more circumspect on this score, noting that the similarity between the two either reflected the influence of Kaiser upon the editors of the *Index* or was the result of convergence between two independently developed schemes (Metcalf 1943, 255; 1957, 67; 1965, 48).

One of the hallmarks of Kaiser's rules for formulating statements in SI was his insistence on maintaining an absolute syntactic distinction between terms of concretes and terms of processes. With regard to the preparation of index items, he stipulated that the term for concrete and term for process of a statement should occupy distinct positions on the card surface (See Chapter 7, Section 4.4, esp. p. 541, Figure 21, Fields 1 & 3) and, in his publications, he always represented this separation by inserting an em-dash (e.g., WOOL-SCOURING [Kaiser 1911, § 302] or ellipses (e.g., COAL...COMBUSTION [Kaiser 1926, 22, § 12]) between the kinds of terms (See p. 375, n. 327, above). We have also seen that he was willing to go so far as to split up compound words analyzable into a concrete term and a process term into two different words and recombine them into a bipartite statement: by means of such semantic factoring, terms such as AGRICULTURE and BIBLIOGRAPHY became FIELD-CULTIVATION and BOOK-DESCRIPTION, respectively (Kaiser 1911, § 184; see Chapter 7, Section 3.5, esp. pp. 492-495, above). The editors of the *Engineering Index*, on the other hand, were decidedly less thoroughgoing in their method of combining headings for things with those for processes. According to Hannum, there were two methods for effecting such combinations. "The usual procedure", he wrote, "is to separate the "thing" main heading from the "process" subheading by a dash" (Hannum 1931, 358): an example of such a heading was GASOLINE ENGINES-MANUFACTURE. Such a mode of syntactic separation was perfectly consonant with that stipulated by Kaiser in SI. The second method for combining things and processes was much less so. It entailed "eliminat[ing] the dash by using the noun for the thing as an adjective defining the process", a maneuver that yielded such terms as BOILER OPERATION, BRIDGE CONSTRUCTION, CARGO HANDLING, COAL CARBONIZATION, MATERIALS HANDLING, and METALS CORROSION (p. 358). Collocations of this sort treated the word denoting a thing and the one signifying a process as if they were a single, multiword term. Needless to say, this mode of expressing the thing-process breakdown represented an inversion of Kaiser's practice of semantic factoring, for it fused two categorially disparate "simple" terms into one multiword term, whereas the latter split a single bicategorical word into two "simple", categorially disparate terms. Hannum's fused terms manifestly ran counter to the conventions of SI, where they could have appeared only as *BOILER-OPERATION, *BRIDGE-CONSTRUCTION, *CARGO-HANDLING, *COAL-CARBONIZATION, and so on.

Hannum's rationale for allowing fused terms into an index brings to light further cleavages between the subject heading system of the *Engineering Index* and the protocols

for statement formulation in SI. Noting that such terms were “used extensively in technical terminology”, he went on to add that their use constituted “a convenient way to design a subject heading structure, particularly where there are a great many items to be included under a heading” (Hannum 1931, 359). By this, he meant that the fusion of two (or more) simpler terms into a single multiword term gave the indexer the opportunity to add further subdivisions to the latter. An example may serve to illustrate this. A term such as AUTOMOBILES–ENGINES, which was formulated according to the “part-under-whole” pattern and so formed a compound “thing” heading, could be fused into a single multiword term AUTOMOBILE ENGINES, which, of course, was a “thing” heading in its own right. This heading, in turn, might then be subdivided by a process term such as MANUFACTURE to form the compound heading AUTOMOBILE ENGINES–MANUFACTURE, which followed the usual, hyphenated form of the thing-process breakdown. However, as Hannum, went on to note, main headings ending in MANUFACTURE could themselves be further subdivided by subheadings specifying the particular “[t]echnical processes” involved in manufacture (p. 360). Now, if one were to subdivide AUTOMOBILE ENGINES–MANUFACTURE by the term CASTING, this would result in an unwieldy form such as *AUTOMOBILE ENGINES–MANUFACTURE–CASTING. In such a case, the fusion of the hyphenated thing-process term AUTOMOBILE ENGINES–MANUFACTURE into a single, multiword term AUTOMOBILE ENGINE MANUFACTURE allowed the indexer to create the form AUTOMOBILE ENGINE MANUFACTURE–CASTING. Whereas Hannum considered such a subject heading to be a perfectly legitimate application—or, perhaps better, transformation—of the [THING]–[PROCESS] model, it is apparent that the multiword term serving as the initial element of the compound heading had, in effect, become a process term—let us call it [PROCESS₁]—with the underlying form [[[THING₁] [THING₂]] [PROCESS]], so that the full compound term was one in which a multiword process term was subdivided by another process term—that is to say, [PROCESS₁]–[PROCESS₂]. To be sure, such a form nominally followed the rule that terms for things precede those for processes, for substituting [[[THING₁] [THING₂]] [PROCESS]] for [PROCESS₁] yields the underlying form [[[THING₁] [THING₂]] [PROCESS]]–[PROCESS₂], in which the words for things come before the words for processes: it may well be this consideration convinced Hannum that terms of this sort respected the basic parameters of the thing-process breakdown.⁵⁹⁹ However, insofar as the initial term fused

⁵⁹⁹ Lending credence to this supposition is Hannum’s (1931, 359) statement that “[t]he complex and awkward heading “Automobiles–Engines–Manufacture–Casting” consisting of two things and two

words denoting things and one naming a process, it created a categorial hybrid that would have been anathema to Kaiser. He would certainly have insisted on a strict separation between the term for concrete AUTOMOBILE ENGINE and the process term MANUFACTURE: by the same token, the protocols of SI would have only permitted the construction of statements such as *AUTOMOBILE ENGINE–MANUFACTURE or *AUTOMOBILE ENGINE–WELDING. In short, it is apparent that Kaiser expected that the underlying categorial distinction between [CONCRETE] and [PROCESS] in a bipartite statement would be strictly observed in the syntactic articulation of its elements, whereas Hannum operated with a much more relaxed notion of the degree of fit between the categories of [THING] and [PROCESS] and the syntax of a subject heading constructed in accordance with the thing-process breakdown.

Another point of difference between the structure of statements in SI and that of compound headings in the Engineering Index lay in the position assigned to geographical terms within the complex index term. One of the constant structural features of statement forms in SI, whether they were bipartite or tripartite in structure, was that a term for a country, if present, always preceded the term for a process (See Chapter 7, Sections 3 & 3.5, above). By contrast, in the subject heading system of the *Engineering Index*, geographical headings—which included names of cities, the states and provinces of the United States and Canada, countries, and, occasionally, “the Grand Divisions of the World”—always occupied “a position secondary to ... a “thing-process” heading” (Hannum 1931, 360, 359): that is to say, they always followed process terms in the heading. Underlying this difference in the treatment of geographical terms appear to have been different evaluations of the relative importance thereof as subjects. Kaiser, who, as we have seen, sought to derive his category of countries from that of concretes (See Chapter 7, Section 3.2, above), considered countries to be a subject likely to interest businessmen, whom he envisaged, at least in *The Card System* and *Systematic Indexing*, as the primary users of systematic card indexes created in accordance with SI, because they represented markets that were both sources of goods and targets for trade, whereas, to his mind, processes were of interest only in relation to concretes or countries (cf. Chapter 7, Section 3.5, esp. p. 481, above): it is unsurprising, then, that terms for countries were to precede terms for processes within the statement. Hannum (1931, 359) and his colleagues, on the other hand, who envisioned technical men as the

processes can be greatly simplified by using the heading “Automobile Engine Manufacture–Casting”: he was manifestly aware of the categorial composition underlying both the hyphenated and “de-hyphenated” forms of this heading.

primary users of the *Engineering Index*, seem to have assumed that information focused on countries would be of secondary importance to the latter, for they stipulated that it was “never” to be “placed first in compound headings” and always to occur at the end not only of “thing–process” headings, but “part-under whole” and “conjunctive” headings as well.

Although the comparison of Kaiser’s and Hannum’s treatments of the [CONCRETE]–[PROCESS] and [THING]–[PROCESS] index term structures could be pressed further, the foregoing discussion should suffice to indicate that behind the basic analogy between the two structures lurked significant differences as to how they were to be realized syntactically in complex index terms. Needless to say, these differences do not lend support to the thesis that Kaiser’s bipartite [CONCRETE]–[PROCESS] was the source of inspiration for the [THING]–[PROCESS] headings of *Engineering Index*. However, neither do they undermine it, for influence can manifest itself in the form of a creative adaptation of a schema as well as in a direct and slavish imitation thereof: thus one cannot entirely discount the possibility that Hannum’s account of the thing-process breakdown represents a considerably transformed version of a structural pattern ultimately derived from Kaiser. There is, however, one final piece of circumstantial evidence that tends to weaken this supposition. A number of years after Kaiser’s death, Metcalfe (1957, 76; 1965, 48) had the opportunity to communicate with one of Kaiser’s former co-workers at the ASME and apparently inquired about Kaiser’s work for the *Index*: his source had told him that, whereas Kaiser had been “ahead of his time” in his ideas about indexing, he “did not influence the indexing methods of the *Engineering Index*, especially what it called ‘the thing-process breakdown’”. Regrettably, Metcalfe did not identify his interlocutor by name or specify the position that he or she held at the ASME: thus, it is not possible to consider the assertion in context or to assess his informant’s credibility. Despite these lacunae regarding its provenance and context, the statement does possess evidentiary value, for it indicates that at least some of Kaiser’s colleagues at the ASME did not consider SI to be the source of the principles of index term construction articulated by the editors of the *Index*.

Ultimately, it is not possible to give a definitive answer to the question whether the [THING]–[PROCESS] pattern invoked as the basis for forming compound subject headings in the *Engineering Index* was tributary to Kaiser’s [CONCRETE]–[PROCESS] formula for forming bipartite statements in SI. The structural and partial terminological parallels between the two are suggestive, as is the fact that the usual form of formulating [THING]–[PROCESS]-based subject headings in the *Index* was comparable to that of framing bipartite

statements of the form [CONCRETE]–[PROCESS] in SI: this, however, is offset the fact that certain syntactic realizations of the former diverged significantly from the norms consistently applied in the latter. Furthermore, structural parallels, of themselves, are no proof of influence. This would require either an explicit acknowledgement of influence by the Hannum in his published statements about the principles underlying the articulation of its subject heading system or archival documentation indicating that he, or his editorial predecessors at the *Index*, were aware of the principles of SI and took them into account in drawing up their indexing guidelines. Such positive indicators, however, are wholly lacking. To be sure, one cannot discount the fact that Kaiser’s affiliation with the *Index* placed him in a position to advise its editors with regard to matters of indexing policy and that, on occasion, he did so; however, this consideration is counterbalanced by evidence, albeit of a circumstantial and weakly documented sort, that at least some of his colleagues at the ASME did not believe him to have been the source of inspiration for the *Index*’s thing-process breakdown. In short, the exiguous evidence at our disposal is simply too equivocal in its import to permit either an affirmation, or denial, of the thesis of influence.

Yet, even if one were to consider the thesis to be plausible, it is apparent that the *practical* effects of any influence—if such there was—were slight. As we have shown, whereas some of the syntactic realizations of the [THING]–[PROCESS] pattern in the *Engineering Index* overlapped with those of the [CONCRETE]–[PROCESS] schema by for SI, others palpably departed from Kaiser’s norms for applying the latter: the syntactic form of subject headings in the *Index* was much less regimented than was that of statements in SI the latter and the forms they took sometimes blurred the syntactic distinction between things and processes, which the latter sought to maintain with far greater rigor and consistency. Furthermore, whereas, in Kaiser’s (1926) final formulation of SI, the [CONCRETE]–[PROCESS] schema was presented as being, in principle, the only major structural pattern in the indexing scheme, the *Index* embedded its [THING]–[PROCESS] schema within a wider spectrum of patterns, such as the “part-under-whole” and “conjunctive” patterns mentioned earlier. In short, whatever the relationship between Kaiser’s ideas on the formation of index terms and the *Index*’s thing-process breakdown may have been, the practical applications of the latter were developed in a manner quite different from that of SI. If, indeed, Kaiser’s [CONCRETE]–[PROCESS] statement form was the ultimate source of inspiration for Hannum’s conceptualization of the [THING]–[PROCESS] template for compound subject headings, it would appear that it soon became

overlaid and, for all practical purposes, effaced by the syntactic variations that Hannum and his colleagues admitted into the construction of *Index's* subject headings.⁶⁰⁰

9.4. Systematic Indexing Revisited: Kaiser's Paper for the ASLIB Conference of 1926

By 1926, Kaiser had spent nine years in the service of the ASME as an associate editor, reviewer of foreign journals, and indexer. His close professional ties to the engineering society had not gone unrecognized—in the previous year, he had become a member of the ASME at the grade of Associate (American Society of Mechanical Engineers 1926, 488; 1928)⁶⁰¹—and he was by now a fixture at the UES Building in New York, where he worked (American Society of Mechanical Engineers 1928). While his reviewing and indexing work for the *Engineering Index* continued apace, it did not prevent him from undertaking another project—the preparation of a paper on SI to be delivered at the third annual conference of the Association of Special Libraries and Information Bureaux (ASLIB), to be held at Balliol College, Oxford, in September of 1926 (cf. Chapter 1, Section 5.2.2, above).

It is not entirely clear what moved Kaiser to take up his pen to explicate his indexing system anew. The venue for his paper, though, may provide a clue. Given that Kaiser had struck roots in the United States sufficiently deep to apply for citizenship there,⁶⁰² it may

⁶⁰⁰ As a coda, it may be noted that, by 1937, further modifications were being introduced to the [THING]-[PROCESS] form in the indexing vocabulary of the *Engineering Index*. The instructions to the annual volume of the *Index* for 1936 stated that, while “[i]t has been the practice of THE ENGINEERING INDEX to employ the thing-process breakdown”, “[t]his arrangement has been reversed in certain cases where the process seems of greater importance than the thing” (Engineering Index 1937, 1). The “process-thing arrangement” was used for subjects such as AIR CONDITIONING, HEATING AND VENTILATION, LIGHTING, BEARINGS AND LUBRICATION, REFRIGERATION, as MATERIALS HANDLING: for example, the form AIR CONDITIONING–HOSPITALS was used in preference to *HOSPITALS–AIR CONDITIONING.

⁶⁰¹ According to the constitution of the ASME, to qualify for membership at Associate level, a person had to be thirty years of age or older: as for qualifications, it was stipulated that “[h]e need not be an Engineer, but must have been so connected with some branch of Engineering or Science or the Arts, or Industries, that the Council will consider him qualified to cooperate with Engineers in the advancement of professional knowledge” (American Society of Mechanical Engineers 1922b, xl). According to Hutton (1915, 27), persons eligible to this grade tended to be businessmen associated with engineering, attorneys, patent experts, and editors: Kaiser clearly fit into the later category.

⁶⁰² The entry for Kaiser in the 1920 United States census returns gives his citizenship status as “Pe”, a designation meaning that he had filed a declaration of intent to become a citizen—the first step in naturalization process (USNA T625, Roll 1203, Page 9a; Enumeration District 760). It is not clear whether he proceeded to the next stage of submitting a petition for naturalization. A search under the name “Julius Otto Kaiser” (and variants) in the Master Index of immigrants maintained by the U. S. Citizenship and Immigration Services carried out by a searcher on my behalf under auspices of the Genealogy Program of the U.S. Citizenship and Immigration Services did not turn up any references to naturalization documents (Lynda K. Spencer, Chief, Genealogy Section, Private Communication in re Case Number: GEN-10103922, 31 August 2011): *prima facie*, this would suggest that he did not file

initially seem curious that he should have elected to address an audience of British special librarians on the topic of SI: if his aim was to spur more widespread interest in his indexing system and to burnish his profile as an indexing expert, it would surely have been more advantageous for him to direct his paper to an audience closer to home. His choice of ASLIB as a forum for a new exposition of SI is perhaps an indication that the impetus for the paper came from elsewhere.

Now, in the late 1920s, ASLIB conferences served, within the British context, as “a central forum for the discussion of strategic and theoretical aspects of the emerging ‘universe’ of information”, the published proceedings of which became points of reference for persons interested in the techniques of special librarianship and documentation (Muddiman 2007b, 91, 83). Among the topics that consistently came up for discussion were subject indexing and classification, as participants debated the suitability, and relative merits, of different techniques of knowledge organization for the special library and information bureau. Within these debates, a number of voices supported the deployment of standard classification schemes for shelf arrangement and subject indexing. Perhaps the most influential of these were A. F. C. Pollard (1877–1948), Professor of Optical Engineering at Imperial College, and S. C. Bradford (1878–1948), then Deputy Keeper of the Science Museum Library: associates of Otlet who strongly believed that the UDC was *the* ideal mechanism for the cooperative indexing of scientific literature, they strove mightily to raise its profile among their fellows and forcefully pressed the case for its use (e.g., Bradford 1928; Pollard 1926b; see Chapter 1, Section 5.2.3, esp. p. 46, with n. 27, above). Other, somewhat less prominent but no less fervent advocates of such classifications were R. Borlase Matthews (1876–1943), a consulting electrical engineer with strong interests in documentation and regular attendee at ASLIB, who likewise enthusiastically endorsed the UDC as a method of subject indexing (Matthews 1926a, 113–120; 1926b, 76–77), and P. K. Turner (1888–1942), a radio engineer, corporate research department manager, and, for several years, member of the executive council of ASLIB, who recommended that special

a petition. However, the index to the correspondence of the British Foreign Office reveals that, in 1926, the Office received correspondence regarding Kaiser, the subject of which was “naturalisation” (T11960/11960/378, in Great Britain, Foreign Office 1969, 883, s.v. “Kaeser, Julius Otto”). Unfortunately, I have been unable to trace this correspondence further and so cannot say whether it involved a notification that Kaiser had obtained United States citizenship, an inquiry from United States authorities about Kaiser’s status as a British citizen, a declaration of renunciation of his British citizenship, or some other matter pertaining to Kaiser and naturalization. At any rate, the existence of this correspondence gives some credence to the supposition that Kaiser did go on to file a petition for citizenship, though what the outcome may have been remains unknown.

libraries use the schedules of the DDC and/or the UDC as the basis for extensions of their own (Turner 1927). W. E. B. Sayers (1881–1960), chief librarian at the Croyden Public Library and an acknowledged authority on library classification, held a position close to that of Turner, opining that extensions of the DDC were the most suitable form of classification for a special library (Sayers 1926b): another prominent public librarian a strong interest in commercial and technical libraries, L. S. Jast (1868–1944), then chief librarian of the Manchester Public Library, likewise favored the DDC with extensions (Jast, in Barbour 1926, 123).⁶⁰³ Thus, many of speakers at the earliest ASLIB conferences argued in favor of the use of decimal classification of one sort or another, favoring modified forms of the DDC for shelf classification and the UDC for subject indexing.

Although Pollard, Bradford, and fellow advocates of decimal classifications—in particular, the UDC—exerted a palpable influence on the discourse of knowledge organization among British special librarians and documentalists, not all persons affiliated with ASLIB shared their views. Among the latter were William Barbour of Nobel’s Explosives Company, who had collaborated with Kaiser in the design and implementation of SI at Ardeer between 1912 and 1914 and had thereafter sought to broadcast the virtues of the Kaiser system to librarians and industrial chemists alike in print and in person (See Chapter 8, Sections 2–3, above), and H. Vincent Garrett, the librarian at Rowntree and Company, who likewise was an articulate proponent of SI (See Chapter 8, Section 3, above). Both Barbour and Garrett had ties with ASLIB from its beginnings. Barbour attended the initial “conference on special libraries and information bureaux” held at Hoddesdon, Hertfordshire, in early September of 1924, at which he chaired a session on the theme of “the special library: its functions, scope and future development” (Information Bureaux and Special Libraries 1925, 18 & 4) and, more significantly, was appointed a member of the 16-person “Standing Committee of the First Conference on Special Libraries”, which was charged with the task of “considering in what way the interests of Special Libraries may be fostered” and which would, within three years, shepherd ASLIB into existence as a formal organization (Election of the Standing Committee 1925; First Special Libraries Conference 1925).⁶⁰⁴ Although he soon resigned this position in favor of a colleague from the London-

⁶⁰³ For a brief biographical sketch of Matthews, see Mr. R. Borlase Matthews 1943; for one of Turner, see H. A. H. 1942. For a biographical study of Sayers, see Ollé 1981. On Jast, see Black 2008, esp. pp. 174–176; Fry & Munford 1966.

⁶⁰⁴ For brief accounts of the work of this committee, see Hutton 1945, 8–10; Muddiman 2007b, 81–82.

based Nobel Industries, Ltd., he continued to take an interest in the fledgling association, attending subsequent conferences and serving as chairman of the section of the third conference in which papers on indexing and classification—including Kaiser’s—were read (Association of Special Libraries and Information Bureaux 1926b, xi–xii, s.v. “Sectional Meetings, Section 1”; Barbour 1926). Garrett’s links with ASLIB were even more intensive than those of Barbour. Like the latter, he was member of the original Standing Committee but, unlike the librarian from Ardeer, he retained his position on the steering council of the association throughout the 1920s (Association of Special Libraries and Information Bureaux 1926a, [ix], 1926b, ix; 1927, 2; 1928, [6]): he was thus in a good position to have a voice in the setting of agendas for conferences. Given Barbour’s and Garrett’s associations with ASLIB, their awareness of the propaganda being conducted on behalf of the UDC and its congeners at the association’s conferences, and their own commitment to the Kaiser system of indexing as a form of knowledge organization, it may well be that one or the other encouraged ASLIB to invite Kaiser to contribute a paper on SI to the conference at which Barbour acted as sectional chair. If this hypothesis is correct, the initial impulse for Kaiser’s paper would have come not from him but from admirers of his indexing system within ASLIB, whose aim was to bring to the attention of British special librarians and fellow travelers the utility and value of SI as a method of indexing. At all events, Kaiser prepared an article-length paper for the conference but was unable to attend in person; Barbour, as chairman of the section for which the paper was scheduled, read a shortened version of thereof in his stead (Barbour 1926; British Special Libraries 1926, 335; Kaiser 1926, 33). Both the article, entitled “Systematic Indexing”, accompanied by an account of the animated, if somewhat meandering, discussion that followed it, were published in the conference proceedings (Barbour 1926; Kaiser 1926; cf. M. 1926, 264).

Writing the paper gave Kaiser an opportunity to revisit his indexing system in light of his professional experiences with it since the publication of *Systematic Indexing* in 1911. The intervening years had brought one significant change on this score: most of his work as librarian and indexer had been carried out at institutions that had subject orientations different from those of the organizations at which he had initially created and developed SI. The primary focus of the Bureau of Information at the PCM and the Commercial Intelligence Bureau had been on commercial information for businessmen interested in foreign trade (See Chapter 3, Section 2, & Chapter 4, Section 1, above); that of the Publishing Department of British Westinghouse was commercial and technical information relating to electrical

machinery and appliances of the sort that the company manufactured (See Chapter 4, Section 2, above); while the Tariff Commission sought to gather commercial and economic information relating to various sectors of British industry and international trade (Chapter 5, Sections 2–3, above). While Kaiser (1911) claimed, in *Systematic Indexing*, that he had elaborated SI on the basis of “commercial and technical literature” (§ 21) alike and applied it to “three different indexes, all more or less technical” in nature (§ 20),⁶⁰⁵ it is evident that, with the possible exception of British Westinghouse, the general domain orientation of the milieu in which he did so tended strongly towards commercial subjects. This circumstance, coupled with the fact that Kaiser wrote his books primarily for a businessmen (A Mere Librarian 1912, § 3, ii; Kaiser 1908, §§ 1–2), led him to stress commercial subjects and contexts in his exposition of SI (Metcalf 1976, 176; Rintoul 1924, 166). At the Nobel’s Explosives Company, however, the interests of the organization were directed towards the development and manufacture of explosives technology (Barbour, *apud* Kaiser 1926, 37): inevitably, then, the index covered primarily technical and applied-scientific subjects. Kaiser’s colleagues at Nobel’s recognized that this represented a shift from the kinds of subject domains with which he had worked previously. Barbour (*apud* Pollard & Bradford 1930, 53), for one, would later assert that, in designing and implementing the central index at Ardeer, Kaiser had “appl[ied] his system for the first time to scientific and technical information”. This statement probably exaggerated matters somewhat, for it is likely that the index at British Westinghouse contained a goodly amount of technical information and that, insofar as such information often has commercial implications (See Chapter 6, Section 2.3, esp. p. 206, above), it also found a place, albeit to a more limited degree, within the indexes of the PCM and the CIB.⁶⁰⁶ Nevertheless, Barbour’s basic point was well taken: the index at Ardeer appears to have been the first designed by Kaiser in which *primary* emphasis was placed squarely on technical information. Kaiser’s subsequent work as chief

⁶⁰⁵ As a rule, when Kaiser used the adjective “technical” to characterize an index, it bore the meaning of “very specialized” as opposed to “general” (Kaiser 1911, §§ 408, 410, 429): a technical index was one that dealt with highly specialized subject matter and “[went] into minute distinctions” (§§ 546, 548). Thus, whereas the term “technical index” could obviously be used to denote one containing information on technological subjects (cf. §§ 546, 548), it could, in principle, be applied to *any* highly specialized subject domain.

⁶⁰⁶ If, as discussed at p. 119, n. 109, 131, n. 128, & 137, n. 135 above, the examples of index items given in *Systematic Indexing* are derived from these earlier indexes, then it would appear that technical information—in the sense of information having to do with the design, development, and manufacture of industrial products (cf. Chapter 6, Section 2.3, above)—did find its way into them. See, e.g., Kaiser 1911, §§ 462 [PCM?], 463–464 [British Westinghouse?], 475 [PCM?], 480–481 [PCM?], 483 [PCM?], 510 [CIB?], 514 [PCM? or CIB?], 518 [CIB?], 531 [CIB?].

bibliographer and searcher at the ESL and his activities as assistant editor, reviewer, and indexer with the ASME did not give him the occasion to design further systematic card indexes; however, they did require that he deal intensively with published sources of information on engineering and other technical subjects (See Sections 2 & 3 of the present chapter). Thus, long before he came to draft his article for ASLIB, Kaiser had made the transition from working primarily with commercial information pertaining to international trade to handling chiefly technical information relating to engineering and ancillary domains.

Kaiser's occupational turn towards greater engagement with technical information and the subject interests of industrial scientists and engineers did not result in major changes to his overall understanding of SI. The outline of the system that he gave in "Systematic Indexing" manifested, in many respects, a profound continuity with the account that he had set forth in *The Card System* and *Systematic Indexing*. The underlying structural framework of, and practical rationale for, SI remained essentially the same; moreover, Kaiser did not abandon the business-oriented perspective that had permeated the ethos of his earlier work nor did he moderate his generally critical attitude towards alternative systems of bibliographical classification and indexing, such as the DDC and the UDC. However, neither did he simply reiterate what he had written some fifteen years earlier. His experiences at Ardeer reinforced by his intensive involvement with technical literature and its subjects at the ESL and the *Engineering Index*, seem to have afforded him the opportunity to reflect on, and reconsider, some of the central theoretical notions that underlay the elements of SI—most significantly, the definition of the categories—and to introduce some small but suggestive practical modifications to the system—most notably, in the representation of related terms on guide cards. At the same time, the constraints imposed by the format of a conference paper compelled him to present his indexing system in a highly condensed manner that foregrounded only its most essential elements. The consequence of all this was that, in "Systematic Indexing", Kaiser set forth a streamlined exposition of SI that reaffirmed its primary structural features but also reflected a partial reconceptualization of some of its theoretical aspects and presented a simplified, highly reduced version of the system as a whole. Let us take a closer look at some of the main points thereof.

9.4.1. Systematic Indexing: Continuity and Change

We begin with the central feature of the system, the categories of index terms. Kaiser introduced these in a discussion of the circumstances that had motivated him to develop SI in the first place. As he had done in *Systematic Indexing*, he took it as axiomatic that terms form the elementary units of an index (Kaiser 1926, 23, § 12 & 25, §§ 16–18; See Chapter 7, Section 2.2.3), where they might serve as headings or as subdivisions of a heading. He recounted that, when he was working at the PCM, he had found its card index to be unsatisfactory because it was designed “on the catchword plan” (20, § 2)—that is to say, all of the terms in the index were treated as undivided headings (cf. 1911, § 649). In Kaiser’s view, such a manner of indexing was flawed because it meant that, depending upon an indexer’s judgment, a single piece of information might be filed under several headings—a phenomenon that he called “duplication” (See Chapter 3, Section 3.3, esp. pp. 113–117, above). As an illustration of this, he cited the case of information pertaining to the natural substance coal. “[C]ertain information may be filed under Coal”, he noted, but, insofar as it might give an account of the combustion of coal, present a chemical analysis thereof, or discuss some other aspect of the substance, “with equal reason it may also be filed under Combustion, Analysis, etc.” (Kaiser 1926, 22 § 6). However, not all indexers were likely to make the same decision about whether to index a given piece of information under only one or under multiple headings. Thus, if a person consulting a card index constructed on the catchword plan wanted to ensure that he had garnered all the information on coal available in the index, he would have to extend his search beyond the cards filed under the heading COAL alone: as Kaiser (1926, 22, § 6) put it,

[w]hen information is wanted on Coal, every one of such likely headings would have to be searched each time in addition to Coal, which not only involves a good deal of extra time, but also considerable uncertainty as to what headings should be searched or disregarded.

Yet in the best-case scenario in which indexers would uniformly file a given piece of information under all relevant headings, another problematic feature of the catchword method would emerge:

Assume that there are 1000 cards on Combustion of Coal: we may file 1000 cards under Coal, and another 1000 under Combustion. It is readily seen that the second thousand gives really no new information, but does make extra work in writing, handling, consulting, searching, etc. (22, § 6).

The catchword method thus created problems for indexers as well as for users. For those striving consistently to enter a given item of information under all the different terms that, in their judgment, were appropriate to its content, indexing on the catchword plan entailed onerous and duplicative work that would rapidly load up a card index with largely redundant information.⁶⁰⁷

According to Kaiser, it was the recognition of categorial distinctions among the terms serving as catchwords that led him to find a solution to the problem of duplication that had troubled him. “Maximum duplication occurred in the index with just such terms of commodities as Coal and terms implying an action or verb, like Combustion, etc.” (Kaiser 1926, 22, § 6).⁶⁰⁸ However, he observed, “I found that this duplication can be stopped almost entirely by limiting main headings to terms of commodities and using terms of action or verbs for divisions” (22, § 7). On his plan, a term for a commodity such as COAL would be subdivided by terms like COMBUSTION, ANALYSIS, and so on, so that only one card need be made for any given piece of information, the subject contents of which would be characterized by the combination of the term for a commodity serving as a main heading and a term of action as a subdivision thereof. Needless to say, this form of systematically applied subdivision would form the basis of the statement, a point to which we shall presently return. Of interest in the present context are the two categories of “terms of commodities” and “terms of actions and verbs” identified by Kaiser, which formed the nuclei for terms of concretes and terms of processes, respectively.

With regards to concretes, we have already seen that, in *Systematic Indexing*, Kaiser (1911, §§ 52, 299) defined them both expansively as “things in general” and narrowly in a business sense as “commodities having an exchange value”, with the latter definition dominating his characterization of the category within his system (See Chapter 7, Section 3.1.2, above). The notion of concretes *qua* commodities served as the basis for his articulation of the category into movable, immovable, and abstract concretes (Kaiser 1911,

⁶⁰⁷ Curiously, Kaiser did not, in this context, mention cross-references, the use of which would certainly serve to reduce uncertainty for the user and labor for the indexer. It is uncertain whether this reflects historical circumstances at the PCM’s index or represents a strategic omission on his part to give his theoretical argument greater point, but the limited contemporary testimony regarding the presence of “manifold cross-references” in the index, albeit from a period shortly after Kaiser had left the Bureau of Information at the PCM (Betts 1900, 226) suggests that the latter may have been the case. For a general discussion of what is known about the index, see Chapter 3, Section 3.3, above.

⁶⁰⁸ The former category of terms probably refers to those found in the index of goods, or products, at the PCM, while the latter perhaps had its prototype in terms from the affiliated index of special subjects. On this point, see Chapter 7, Section 3.4, esp. pp. 469–471, above.

§§ 299, 316), which had further theoretical consequences, of which the most notable were the justification for treating such abstract terms as LABOUR and INFORMATION as terms of concretes and, less convincingly, the derivation of the category of countries from the subclass of immovable concretes *qua* commodities (See Chapter 7, Sections 3.1.2 & 3.2, above). Yet, if the notion of commodities had been the Archimedean point around which Kaiser had originally constructed the category of concretes, he reconfigured the inner architecture of the latter in “Systematic Indexing”. There he opened his discussion of the category by stating that “[c]ommodities unfortunately do not exhaust the list of possible terms for main headings”, for “[t]here are others just as important” (Kaiser 1926, 23 § 10). These latter terms he identified as ones that “generally express Energy of some kind, as in Labour, Power, Light, etc.” Such terms, he observed, could also take terms of action as subdivisions: “[t]hus for main heading Labour we may have as divisions such terms as Education, Organizing, Testing, Training etc.”. Given their shared syntactic capacity to serve as main headings and to undergo subdivision by terms of action, stipulated Kaiser, “terms of commodities and terms of energies may be put into one class; I have called them CONCRETES, in the sense of concrete existences” (23, § 10). And yet, he was manifestly not at ease with the semantic unity of the category, for he immediately added the parenthetical coda that “[i]nclusion of energy is forced, because commodities comprise latent energy”.

Kaiser’s rearticulation of the category of concretes into one comprising terms of commodities and terms of energies drew in part upon concepts already present in his treatment of the category in *Systematic Indexing*. In discussing the subclass of abstract concretes, for which he gave as primary examples the term LABOUR as well as occupational designations such as COMMERCIAL TRAVELLER and DESIGNER, he had characterized it as being “mainly concerned with the various forms of human energy” (Kaiser 1911, § 316; see Chapter 7, Section 3.1.2, above): it is thus unsurprising that LABOUR should have stood at the head of terms for energies in “Systematic Indexing” (1926, 23, § 10). Nevertheless, the fact remains that the notion of human energy there was subsumed under the broader class of terms denoting abstract concretes rather than collocated with other forms of energy under a distinct class of terms of energies. The distinction between concretes *qua* commodities and concretes *qua* energies appears to have emerged at Ardeer. As we have already seen, Kaiser’s collaborators in implementing the index followed up their definition of a concrete term as one “denoting something marketable or capable of being marketed” with the rider that “[l]ight and electric energy are concretes” (Barbour 1919, 38R; 1921,

173; see Chapter 8, Section 2.1, above). In this case, light and electrical energy seem to have been viewed as commodities: the specification of them as concretes was presumably felt necessary because the standard contemporary image of a commodity was that of something materially tangible—a “concrete article” or a “substance”, as Kaiser (1911, § 299) had put it—and energy did not quite fit this profile.⁶⁰⁹Kaiser’s distinction between “terms of commodities” and “terms of energies” was evidently a stronger reformulation of the definition of concretes used at Ardeer, its most conspicuous novelty being a straightforward formal division between commodities and energies instead of a subsumption of the latter under the former. As the tone of his description of the category indicates, he accepted terms of energies into the category of concretes only with great reluctance: he found it “unfortunate[]” that the category could not be confined to commodities alone and characterized the inclusion of energies as “forced”. And yet, if he felt compelled to include terms of energies, it was “because commodities comprise latent energy” (Kaiser 1926, 22 § 10). In making this statement, he shifted the conceptual center of gravity of the category of concretes from commodities to energy, for a conceptualization of commodities as carriers of latent energy tended toward a subsumption of the former by the latter: energy became, so to speak, an ontological substrate behind commodities—a notion that surely would have found ready assent at an explosives factory. Although Kaiser did not develop the point further, it is difficult to escape the impression that the relentlessly commercially-oriented conceptualization of concretes that he had presented in his earlier writings had undergone a shift in emphasis to accommodate a concept—energy—that had especial salience in industrial-technical and applied-scientific contexts.

The category of concretes, then, was subdivided into terms of commodities and terms of energies. Kaiser (1926, 23, § 11) likewise articulated the category of processes into two classes of terms, which he characterized as follows:

[T]he terms of actions or verbs may be supplemented very conveniently by adding those implying a state or condition generally, which terms can also be used for divisions of concretes. Such terms are: Condition, State, Property, Qualification, Industry, Science, Service, Yield, Demand, etc. The two classes of terms, i.e., those of

⁶⁰⁹ Note, in this regard, the formulation of Rintoul 1925, 167 (emphases his): “A fairly good definition of a “concrete” for indexing purposes might describe it as a term denoting *something capable of being marketed*. Light and electrical energy, for example, are treated as “concretes” in this system [sci., SI—TMD]”. The description of these two forms of energy as being “treated as “concretes”” suggests that Rintoul, the research chemist, considered energy to fall outside of the usual circle of concrete things.

actions and those of states, I have called collectively PROCESSES in the sense of dynamic or static conditions of concretes.

Although this passage presented the process of category formation as the supplementation of a primordial set of terms consisting of “terms of actions and verbs” by an additional one consisting of terms “implying a state or condition generally”, it involved, in fact, a formal coordination of two different concepts of process that had already been present in the account of SI that Kaiser (1911) had given in *Systematic Indexing*. There, as we saw in earlier chapters, he had defined processes alternately as actions performed on or by concretes (e.g., § 55) or as conditions attaching to them (e.g., § 52) (See Chapter 7, Section 3.3.2; Chapter 8, Section 2.1, above). Whereas Kaiser’s formal statements about terms of processes had foregrounded the notion of processes *qua* actions (Kaiser 1911, §§ 73, 302; cf. Chapter 7, Section 3.3.2, esp. p. 429, above), examples of process terms from his books and from the files of the card index of the Tariff Commission reveal that, in practice, he did not restrict such terms to those naming actions alone but included many that denoted a wide variety of qualitative and quantitative attributes applicable in some way to concretes (See Chapter 7, Section 3.3.2, esp. pp. 442–445, above). It is thus apparent that both the concept of processes *qua* actions and the broader one of processes *qua* conditions governed his assignment of terms to the category of processes. Yet, if these two concepts of processes had served to define the category for Kaiser, he had made no attempt to relate them to one another within a single, integrated definition of the category: rather, they had remained unconnected and he had invoked one or the other at various points in his exposition without any explicit coordination between them. At Ardeer, process terms had been defined simply as ones naming “action[s]”, “qualit[ies]”, and “propert[ies]” without any reference to conditions (Barbour 1919, 38R 1921, 173; Rintoul 1925, 167; see Chapter 8, Section 2.1, esp. pp. 717–718, above): nevertheless, it did bring together the notion of actions and those of qualities and properties into a single series. Kaiser’s definition in “Systematic Indexing” built on this by formally identifying “terms of actions” and “terms of states”—the latter obviously covering qualities and properties not covered by the notion of activity—as coordinate subclasses of the category of processes. At the same time, the new definition betokened a surreptitious shift in the semantic emphasis of the category. In redescribing actions as “dynamic ... conditions of concretes” and setting them in opposition to the “static conditions of concretes”, Kaiser (1926, 23, § 11; 27–28, § 24) subordinated them to a more general notion of condition that encompassed actions and states alike: that is to say, with

the aid of vocabulary redolent of technical, or applied-scientific, discourse (“dynamic” vs. “static”), he framed processes primarily as conditions associated with concretes, of which actions formed only a part, albeit an important one. The definitional structure of the category of processes was thus no less immune to change than that of the category of concretes.

Concretes, then, encompassed “commodities plus energies” and processes comprised “static plus dynamic conditions of concretes” (Kaiser 1926, 27–28, § 24). Yet Kaiser was not entirely content with this characterization of the two categories, for he went on to propose an alternative way of conceptualizing them, stating that “we may take Space, Time, Matter, Motion and Force in Herbert Spencer’s *First Principles*, in which case concrete comprises Space, Matter and Force, and process comprises Time and Motion”. To understand this proposal to map the categories of SI upon those of Spencer, it is necessary briefly to consider the original context of the latter. Herbert Spencer (1820–1903) was an English engineer and essayist turned philosopher, who, in a ten-volume series of books published between 1862 and 1896, expounded what he collectively titled *A System of Synthetic Philosophy* (Copleston 1994, 122–123; Seth 1912, 286). As the title of the series implies, Spencer’s (1897, 136 [emphasis his]) aim was to set forth a comprehensive philosophical system that would afford a “*completely-unified knowledge*” of the world. The centerpiece of this system was “the principle of evolution which held that everything progresses from the simple to the complex, from lesser to greater heterogeneity, and from lesser to greater individuation” (Taylor 2007, 20): this principle he applied to explain the development and nature of “the solar system, animal organisms, living species, the human mind, society, and the products of human thought and activity, including language, religion and morality”.

Spencer worked out his evolutionary account of the world within a philosophical framework predicated on a platform of epistemological phenomenalism. In accordance with the tenets of empiricism, he accepted that human beings come to know of the world by means of sense experiences that are caused by existences in the external world (Taylor 2007, 131). Yet he also held that, while such experiences and the cognitions arising from them allow human beings to come to know the world as it appears to them, one cannot be certain that these appearances correspond, in fact, to the existences causing them (p. 133): at best, one can develop an indefinite consciousness that there is an external substrate that causes the experiences on the basis of which one knows of the world. As a consequence, Spencer subscribed to the view that “[s]cientifically accessible phenomena can be treated only as phenomena, i.e., as manifestations of something else: the known world will always

appear to us as the manifestation of a world about which we know nothing” (Kolakowski 1972, 114–115). Thus, human beings could build up knowledge about the world but only in relation to the data about things in the world as they appeared to them, not in direct relation to the things to which the data pertained. To be sure, Spencer did not deny that there must be some “systematic connection between what occurs within consciousness and what occurs in the physical world” (Taylor 2007, 134); indeed, he went so far to claim that “persistent impressions being the persistent results of a persistent cause, are for practical purposes the same to us as the cause itself; and may be habitually dealt with as its equivalents” (Spencer 1897, 165). Nevertheless, he argued that the knowledge generated from such impressions only had to do with “relative realities”—that is to say, phenomena—rather than the absolute realities—external existences as they were in themselves. This conviction lay at the root of his doctrine of “Transfigured Realism”, which he characterized in the following vein:

[It] simply asserts objective existence as separate from and independent of subjective existence. But it affirms neither that any one mode of this objective existence is in reality that which it seems, nor that the connexions among its modes are objectively what they seem (Spencer 1872, 494, quoted in Taylor 2007, 134).

In short, all human knowledge of the external world was knowledge of the phenomena presented to the consciousness by the senses and represented by the concepts of things in the world generated from the cognitive working out of perceptions: that is to say, it was knowledge of the contents of subjective existence. The true nature of the causal substrate underlying these phenomena—objective existence— was, in the final analysis, unknowable.

Although Spencer held that human beings could not know the world as it was in itself, he was no less insistent they could come to know it as it manifested itself to them, both individually and collectively, and that it was possible to give a scientific account of the “relative realities” presented to the mind as phenomena. In *First Principles*, the inaugural volume of the *System of Synthetic Philosophy* in which, as its title implies, he outlined the general framework of his system, he undertook to give an account of the genesis of the “ultimate scientific ideas” upon which the superstructure of his principle of evolution was based (Spencer 1897, 165). He began with the premise that all thinking is relational: “We think in relations. This is truly the form of all thought; and if there are any other forms, they must be derived from this” (p. 165). Two relations, in his view, ultimately formed the basis of thought: “relations of sequence” and “relations of co-existence” (p. 166). Of these, the relation of sequence was primordial, for it was “given in every change of consciousness”,

while the relation of co-existence arose secondarily, from the recognition that “certain relations of sequence have their terms presented in consciousness in either order with equal facility”. “Endless experiences”, wrote Spencer, “which from moment to moment present both orders of these relations, render the distinction between them perfectly definite; and at the same time generate an abstract conception of each” (p. 167). The abstract conception derived from experience of the relations of sequence was Time and the one arising from the experience of co-existence was Space. Consciousness of Space arose from an abstraction from the experience of force—in the sense of perceived resistance to one’s body—in different co-existent positions, and that of Time presumably had analogous origins in the experience of force in sequential positions, though Spencer didn’t spell this out (pp. 168–169): in both cases, abstraction occurred when resistance ceased but consciousness of different positions, be they co-existent or sequential, continued. Space and Time were each correlated with conceptions likewise associated with the experience of Force *qua* resistance: Matter and Motion, respectively. “Our conception of Matter”, stated Spencer, “is that of co-existent positions that offer resistance” (p. 169). The genesis of the conception of Motion was more complex, in that it “involve[d] the conceptions of Space, of Time, and of Matter” (p. 171). Spencer delineated it thus:

A something that moves; a series of positions occupied in succession; and a group of co-existent positions united in thought with the successive ones—these are the constituents of the idea. And since ... these are severally elaborated from experiences of *force* as given in certain correlations, it follows that from a further synthesis of such experiences, the idea of Motion is also elaborated (p. 171 [emphasis his]).

Underlying the consciousness, and conceptions, of the foregoing four “ultimate scientific ideas” was that of Force, which Spencer characterized as “the ultimate of ultimates” (p. 172): “All other modes of consciousness are derivable from experiences of Force”, he averred, “but experiences of Force are not derivable from anything else” (p. 173). Amplifying this point, he wrote that

[t]hough Space, Time, Matter, and Motion, are apparently all necessary data of intelligence, yet a psychological analysis ... shows us that these are either built up of, or abstracted from, experiences of Force. Matter and Motion, as we know them, are differently conditioned manifestations of Force. Space and Time, as we know them, are disclosed along these different manifestations of Force as the conditions under which they are presented. Matter and Motion are concretes built up from the *contents* of various mental relations; while Space and Time are abstracts of the *forms* of these various relations. Deeper down than these, however, are the primordial experiences of Force, which, as occurring in consciousness in different

combinations, supply at once the materials whence the forms of relations are generalized (p. 172 [emphases his]).

The various epistemic dependencies between the five “ultimate scientific ideas” and their relationship to the relations of sequence and co-existence are illustrated, in simplified and schematic form, in Figure 49.

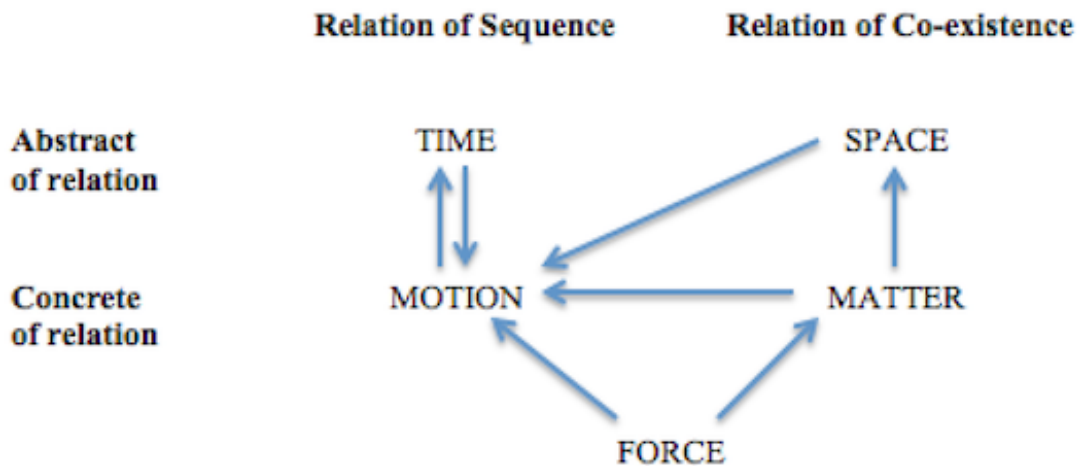


Figure 49: The five “ultimate scientific ideas” and two orders of relation in Herbert Spencer’s *First Principles* (After Spencer 1897, 165–174).

Such, then, was the schema that Kaiser invoked as the basis for an alternative conceptualization of the categories of concrete and process. He did not discuss in any detail the mapping between his categories and Spencer’s “ultimate scientific ideas” that he proposed; nevertheless, it is not difficult to reconstruct the underlying rationale. Kaiser’s correlation of Force, Matter, and Space with concretes appears to have been based primarily on parallels between Force and terms of energies and Matter and terms of commodities: the location of Force—Spencer’s “ultimate of ultimates”—in the category of concretes was also consistent with Kaiser’s inclination to give that category ontological primacy *vis-à-vis* the category of processes (See Chapter 7, Section 2.1, beginning, above). Given that there was no immediate point of conceptual contact between the notion of Space and the subclasses of concretes presented in “Systematic Indexing”, it is probable that Space was apportioned to the category of concretes primarily because of its association with Matter in Spencer’s system; yet if one recalls the close connection between the categories of concretes and of countries in *Systematic Indexing*, it is apparent that its inclusion did not violate the spirit of Kaiser’s system. The correlation of Time and Motion to processes also had its logic. The idea of

Motion aligned well with the idea of actions, or dynamic conditions, while that of Time foregrounded an aspect of actions—their temporality—that Kaiser’s definitions of the category acknowledged only implicitly: within the context of the index item, the notion of time relating to the action was generally treated separately as the date of the information, which could be treated, for filing purposes, as a separate “virtual” category (See Chapter 7, Sections 4.3–4.4, 5.2.1, esp. pp. 531, 544, 582–583, above). Insofar as the notion of a static condition often implies an absence of Motion and always involves endurance through Time, the latter two concepts were applicable to it as well.

On the whole, Kaiser’s proposed mapping of concretes and processes to Spencer’s fundamental scientific concepts can be said to have been a reasonable one. Yet, one may well wonder why Kaiser should have gone to the trouble of correlating his categories with Spencer’s “ultimate scientific ideas” in the first place. One possible reason may have been that he expected that Spencer’s ideas would be well known to members of his audience and so help to clarify his characterization of concretes and processes: furthermore, he may well have felt that Spencer—whose epistemological phenomenalism he seems to have shared (cf. Chapter 7, Section 2.1, esp. pp. 305, n. 293, above)—possessed a philosophical authoritativeness that would lend a greater intellectual cachet to his own categories. If such were his expectations, they were largely misplaced. Insofar as its scientific orientation, positivist assumptions, progressivist-evolutionist doctrines, and (religiously) agnostic conclusions held strong resonance for many late-Victorian readers, Spencer’s synthetic philosophy had enjoyed widespread diffusion and immense popularity among members of the educated public in Great Britain and, especially, the United States in the final quarter of the 19th century (Taylor 2007, 1–8). However, already by the time of his death in 1903, his reputation was starting to fade and it plummeted rapidly in the first decades of the 20th century: as the American historian Crane Brinton pointedly asked in 1933, “Who now reads Spencer?” (p. 147). To be sure, Spencer could still be invoked as an authority in some quarters, including those of librarianship. For example, the author of an unsigned article on “the value of a knowledge of classification in general education” (1921, 215) published in the *Library Association Record* in 1921 opened his disquisition with the words, “Herbert Spencer in his *Principles of Biology*⁶¹⁰ states that “Classification has two purposes. It may be employed to facilitate identification; or it may be employed to organise our knowledge”: for

⁶¹⁰ The *Principles of Biology* comprised the second and third volumes of *The System of Synthetic Philosophy*.

this librarian-writer, the name of Spencer was one that could still be conjured with. Yet, by the mid-1920s, when Kaiser wrote, one could no longer presuppose familiarity with the details of writings on the part of educated reading public as one could have some thirty or forty years earlier. If his intent was to anchor the meaning of his categories with reference to a widely held philosophical position or to impress upon his audience at ASLIB the intellectual respectability of his scheme, it seems unlikely that the citation of Spencer would have fulfilled its purpose.

More likely, however, Kaiser's correlation of his categories with those of Spencer was bound up with the fact that he was not entirely satisfied with his own definitions of the categories. As he pointed out with commendable frankness, he considered the design of SI to suffer from two "weak points" (Kaiser 1926, 27, § 22). One of these was the fact that his requirement of maintaining a strict separation between terms for concretes and terms for processes required the semantic factoring of bicategorical terms such as AGRICULTURE into LAND-CULTIVATION or BACTERIOLOGY into BACTERIUM-SCIENCE or BACTERIUM-STUDY, for such a procedure ran counter to his preference to take terms as he found them (1926, 27, §§ 22-23; see Chapter 7, Section 3.6, above). Yet, if he expressed misgivings about the refashioning of compound words in this manner, he deemed it to be a *felix culpa*, since it removed what he considered to be overly broad, indefinite, and hence, useless terms from the card index. More problematic, in his view, was the definition of the categories themselves, for he admitted that "the terms concrete and process are not entirely free from objection" (Kaiser 1926, 28, § 24). The most pressing difficulty, to his mind, was the accommodation of certain classes of abstract subjects within his categories. To be sure, as a rule, Kaiser seems to have been fairly sanguine about the capacity of the categories of concretes and processes to cover the full range of terms in an index vocabulary regardless of the subject domain from which the latter stemmed. For example, in the discussion following the presentation of Kaiser's paper at ASLIB, Barbour (*apud* Kaiser 1926, 39) reported that, in response to an epistolary query he had made to Kaiser regarding the applicability of his system, which had "given splendid results when applied to business, technology and science", to "the more abstract subjects such as religion and philosophy", his erstwhile colleague had asserted that "[my] system can certainly be applied to religion, drama [*sic*], philosophy or any other branch of knowledge. There may be some difficulty at first to locate the 'concretes' and 'processes' but this would only be temporary". Yet there were limits to his optimism. In his article, Kaiser (1926, 28, § 24) noted that, even if the

decomposition of bicategorical terms took care of “-ologies”, or abstract terms denoting the sciences, “there still remain certain terms which are neither concrete nor process”: these he identified as “mainly mathematical terms such as Coefficient, Constant, Factor, Ratio, etc.”⁶¹¹To his mind, the inability of his categories to account for such terms weakened the coherence of his scheme as a whole and indicated that the definition of the categories required reformulation: thus, he admitted, “I am still hoping that some way may be found to incorporate the few mathematical terms and at the same time make the definitions of concrete and process more precise” (1926, 28, § 24). Given Kaiser’s dissatisfaction with the current definitions of his categories, it may well be that his mapping of them upon Spencer’s scientific ideas represented what had been an early essay at redefinition, one that did not resolve the problems that he had identified but that he nevertheless thought worth citing. A more promising approach was that of Barbour (*apud* Kaiser 1926, 39), who, in suggesting that “[t]he term “concrete” might ... prove to be replaceable by some other term”, acknowledged that Kaiser’s linguistic labels for his categories might well be overly limiting and so constitute obstacles to a fully satisfactory definition thereof.

Despite his reservations regarding the theoretical delineation of his categories, Kaiser accepted his current definitions of them as sufficient for the practical purposes of indexing.⁶¹² Once terms had been assigned to one or the other of these categories, they could be combined into more complex index terms. A systematic card index, Kaiser (1926, 23, § 12) declared, “contains terms of concretes as main headings and main filing terms, and terms of processes as divisions or subsidiary filing terms, each card bearing a concrete and a process term”: his examples of such collocations of concrete and process were:

AIR-CIRCULATION

COAL-COMBUSTION

⁶¹¹ It is interesting to note that, during his time at the Tariff Commission, Kaiser had assigned comparable terms denoting quantitative relationships, such as DIFFERENTIAL RATES, PROPORTION OF COST, or EMPLOYMENT RATIO, to the category of processes (See Chapter 7, Section 3.3.2, esp. pp. 442–444, above). Presumably, the rationale for treating the terms in this manner then would have been that they could be counted among the conditions attaching to concretes. Although it may, at first blush, seem curious that he didn’t apply such reasoning to the treatment of COEFFICIENT, CONSTANT, FACTOR, and RATIO in “Systematic Indexing”, it may well be that his subsequent work with technical and scientific literature—or his conversations with scientists and engineers at Ardeer and the UES building—sensitized him to the definitional problems involved in subsuming abstract mathematical relationships under the rubric of processes.

⁶¹² With regard to dealing with the mathematical terms that he found so problematic, Kaiser (1926, 28 § 25) wrote that they “can be treated separately”, presumably in a special file akin to a process file, such as the one at Ardeer (See Chapter 8, Section 2.1, esp. pp. 730–732, above).

COAL-CONSUMPTION
COAL-TRANSPORTING
FACTORY-VENTILATING
GAS-ABSORBING
LAND-DRAINING
PETROLEUM-ANALYSIS
WATER-FILTRATION.⁶¹³

Kaiser argued that [CONCRETE]-[PROCESS] combinations of this type had two advantages. First, he averred, they put “an effective stop to the mixing up of concrete and process terms” (p. 26, § 12) that occurred in an index constructed on the catchword plan and so eliminated a root cause of duplication (p. 22, § 7). Second, he stated, “concrete and process together form a short phrase, something like a unit piece of knowledge, which gives much more definite information than a subject by itself, and helps to make the information on the cards also more definite” (p. 23, § 12). With these words, he evoked in lapidary fashion the central point of the characterization of the statement that he had laid out in *Systematic Indexing* some fifteen years before. The collocation of terms from different categories into a single structural unity created a semantic unit—“a phrase”—that represented in summary form the contents of a given piece of information: it was in this sense that one could speak of it as a “unit piece of knowledge” (See Chapter 7, Section 3, above).⁶¹⁴ To this, Kaiser added the observation that that the phrase so engendered indicated more about the contents of the piece of information that it characterized than a catchword term—“a subject by itself”—would: for example, COAL-COMBUSTION specifies a piece of information about the combustion of coal more precisely than the catchword heading COAL would. Finally, in stating that this phrase helped make the information on the card more definite, he adverted to a function of the statement already well known from his previous writings: the demarcation of the thematic limits of the information entered upon a card (Kaiser 1911, § 304; see Chapter 7, Section 3, above). Yet, if Kaiser encapsulated the primary features of the

⁶¹³ In “Systematic Indexing”, Kaiser used the following graphic convention for representing such collocations: “[CONCRETE]...[process]”. Thus, for example, “AIR-VENTILATION” originally appeared as “AIR...ventilation”. He had already employed ellipses for this purpose in *Systematic Indexing*, whereas the practice of contrasting the names of concretes with those of processes by writing the former in uppercase letters and the latter in lowercase ones was an innovation. For reasons of consistency, I retain the conventions for the writing of statements outlined at 375, n. 327, above.

⁶¹⁴ *Pace* Svenonius (1978, 138), the phrase “unit piece of knowledge” in this passage refers only to the statement, not to the index item—i.e., the statement and amplification—as a whole.

statement in his description of the semantic unit created by combining a term for a concrete with one for a process upon a card, he did not make the statement a prominent feature of his exposition in "Systematic Indexing". For one thing, he did not use the technical term "statement" to refer to the semantic unit in question. More tellingly, he did not mention it elsewhere in the article, preferring to speak of "main terms" and "divisions" (Kaiser 1926, 22, § 7; 25, § 16) or of "concrete term(s)" standing in relation to "process term(s)" (pp. 24–25, § (a) & (d)). In this, he followed an approach comparable to that of Barbour and Rintoul at Ardeer (See Chapter 8, Section 2.1, esp. pp. 718–720, above), de-emphasizing the statement as a whole and placing greater stress upon its individual component elements.

Kaiser's treatment of categories and statements in "Systematic Indexing" resembled that of his former collaborators at Ardeer in another important respect: its minimization of the place for terms for countries within the category system and its concomitant reduction of the number of statement forms. As the observant reader will have doubtless already noted, in his paper for ASLIB, Kaiser confined his discussion of the origin and definition of the categories entirely to terms of concretes and those of processes, without breathing a word about terms of countries. By the same token, he limited his presentation of statements to the single form [CONCRETE]–[PROCESS], in which the initial main filing term was invariably a term for a concrete (Kaiser 1926, 26 § 19). Thus, the version of SI that he propounded seemed, at first blush, to be based on a dyadic category system and to allow for only one bipartite statement form. This, however, was not actually the case, for, as a diagram accompanying the text of his article indicated, Kaiser still admitted terms of countries into an index vocabulary and accepted the tripartite form [CONCRETE]–[COUNTRY]–[PROCESS] as a valid statement form (See Figure 50 below, especially the guide card marked "c" and the raised card at the back). Why, then, did he keep silent about them? Kaiser explained that he did not mention countries in his discussion of categories and statements because "they do not lead to any difficulties" (Kaiser 1926, 24, § 15 (c)). Within the theoretically stripped-down form of SI that he was setting forth, this statement was true. The category of countries was not as difficult to define as those of concretes or processes; furthermore, given the stipulation that only concretes were to serve as main filing terms within an index, the position of the country term within a statement was restricted to that of the subsidiary term immediately following the main term. In light of the relatively unproblematic nature of terms of countries, Kaiser may well have thought it sensible not to complicate what, after all, was to be a simplified exposition of his system by discussing them: the diagram alone

would convey the fact of their existence and indicate their place within the statement. And yet, as a latter-day commentator has justly observed, the virtual omission of countries was significant (Svenonius 1978, 137). In largely excluding them from his late account of SI, Kaiser intimated that they were a facultative, not a core, feature of the system, much as Barbour (1919, 1921) had done in his published presentations of the index at Ardeer (cf. Chapter 8, Section 2.1, esp. p. 721, above). Such a view was congruent with the theoretical accounts for the origin of the categories that Kaiser had given in *Systematic Indexing*, in which only concretes and processes were primordial categories, while countries were secondarily derived from concretes (See Chapter 7, Sections 3.2 & 3.4): given the derivative nature of the category of countries, he may well have felt that it could be treated as less fundamental than the others. This, however, had consequences for his account of statement forms as well, for he joined Barbour in inverting his earlier formulation of the relationship between tripartite and bipartite statements: whereas he had originally taken the tripartite statement form [CONCRETE]–[COUNTRY]–[PROCESS] to be canonical and the bipartite forms [CONCRETE]–[PROCESS] and [COUNTRY]–[PROCESS] to be reduced versions thereof (See Chapter 7, Section 3.5, esp. pp. 485–487, above), he now presented the bipartite form [CONCRETE]–[PROCESS] as if it were the basic form and the tripartite one [CONCRETE]–[COUNTRY]–[PROCESS] as if it were an expansion thereof. Thus, in the ever-present tension regarding primacy between the dyadic and triadic versions of the category scheme of SI and the bipartite and tripartite forms of statements, the dyadic version of the former and the bipartite form of the latter were given the upper hand, so to speak. It was this image of Kaiser’s indexing system that would come to dominate the published discussions of it in the following decades (See Section 6 of this chapter, below).

As we have already noted, Kaiser argued that statements set thematic limits on the information inscribed upon cards. Insofar as this information was intended to “serve[] the individual requirements of [the] business” using them, it was to be derived only from “those parts of documents which bear on the business” (Kaiser 1926, 31–32, § 37): here the notion of the selection of information in accordance with organizational interest that had played such a major rôle in the characterization of SI in *Systematic Indexing* made its appearance (See Chapter 7, Sections 1 & 4.1–4.2, above). Furthermore, Kaiser argued, whatever information contained in a given document was relevant to a given business must be made available on the card in such a way that the user of the index would have “[d]irect access” to it. In his view, this meant “giving the actual technical information under each concrete and

process" (1926, 32, § 37): that is to say, the documents kept in the collection of a business library "must be read and the information of interest must be abstracted at least sufficiently to enable those using the index to judge directly from the cards whether or not the information warrants reference to the original". The information thus made "available on the cards ... in the form of annotations" was, of course, nothing other than the amplification of a statement that, together with the latter, created an index item (See Chapter 7, Sections 3 & 4.3-4.4, above), though Kaiser elected not to use these technical terms in "Systematic Indexing". Interestingly, the kind of amplification that he emphasized was the descriptive annotation, which indicated the nature of the information given in the original document rather than the informative condense that gave a synopsis of the information itself (See Chapter 7, Section 4.3, above): this was presumably because he considered annotations to constitute the minimal and, hence, baseline, form for amplifications. At any rate, Kaiser claimed that the close analysis of documents in a business library by indexers having "adequate technical training" and "a good knowledge of the business of the firm" for which they worked would help assure that "[w]ithin the range of literature indexed the information in the index" would be "reliably complete": that is to say, all relevant pieces of information contained within a given document would be identified, isolated, and recorded on a card. In this sense, Kaiser (1926, 32 § 37) averred, "[s]ystematic indexing is like a very fine comb".

In "Systematic Indexing", Kaiser invoked the imperatives of direct access as a rationale not only for the presence of amplifications upon cards but also for the form, nature, and arrangement of the terms chosen to serve as the main headings in the index—that is to say, the terms of concretes in the statements accompanying amplifications. "In systematic indexing direct access requires that we concentrate on specific terms rather than on collectives" (Kaiser 1926, 30, § 31), he asserted, amplifying this with the further declaration that "[d]irect access ... means filing under specific subjects rather than collectives" (22, § 9): in this way, he recapitulated his long-held conviction that "specific information"—that is to say, information about specific subjects—was the most useful kind of information in a business context and that, accordingly, index terms should be as specific as the subjects of the pieces of information being indexed (22, § 8; see Chapter 7, Section 2.2.5, above). By the same token, he proclaimed, "[d]irect access ... requires that all terms be used in the singular where there is a singular; further that inversions of terms be absolutely ruled out, for these inversions are merely a clumsy attempt at classification" (Kaiser 1926, 22, § 9), thus reaffirming morphological criteria for the formulation of terms—criteria that he had

originally stipulated largely to facilitate the arrangement of headings within an alphabetically arranged index (See Chapter 7, Sections 4.2 & 5.1, esp. pp. 513, 574–577, above). And, last but not least, Kaiser (1926, 22, § 9) insisted that “direct and rapid access is only possible on the basis of the alphabet, i.e., by the physical structure of the terms, a fixed place alphabetically, not a fixed place or places within a given scheme of classification”. Although he did not expatiate further on this point, it is likely that underlying his correlation between direct access and alphabetical arrangement was the assumption that alphabetical order would be common knowledge among the persons using a card index, a circumstance that would render it easier for users to locate a given term within an alphabetically arranged file than within one organized in accordance to some form of subject classification (cf. Kaiser 1911, §§ 130–131; Chapter 7, Section 5.1, esp. p. 556–557, above).

Within an alphabetically arranged card index file, each main filing term served as a point of “concentration”—that is to say, collocation—for all the cards bearing information on the concrete that it denoted (Kaiser 1926, 24, § 15). To illustrate this, Kaiser gave a pictorial reproduction of a bloc of cards filed under the term BOILER (See Figure 50), which,

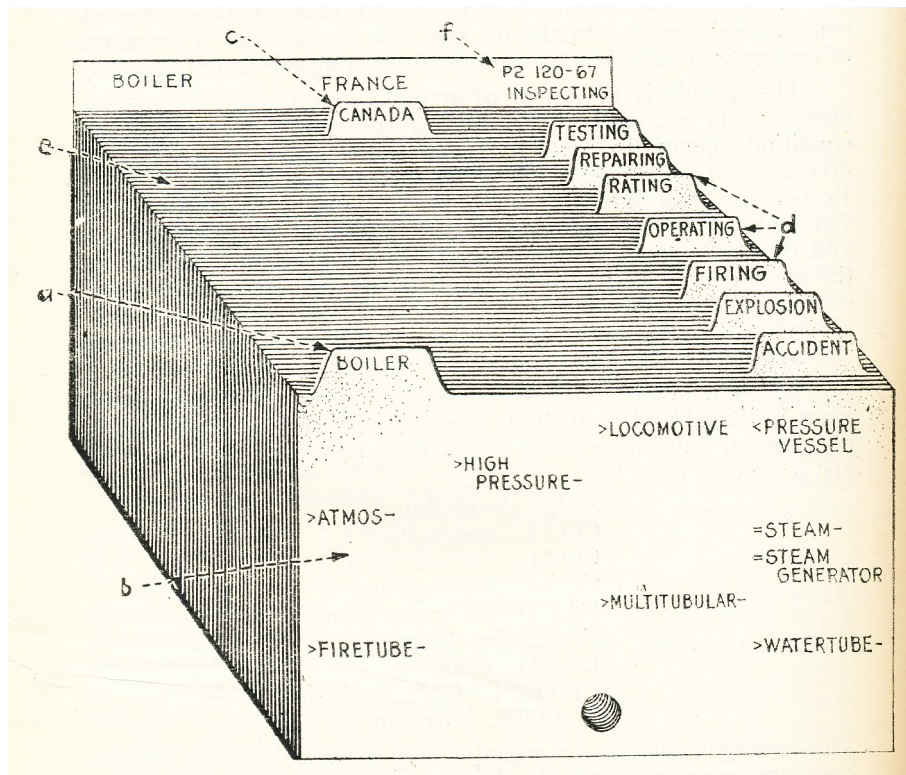


Figure 50: Sample “Central Index Unit” with guide card for BOILER (Source: Kaiser 1926, 24, § 14; Reproduction courtesy of ASLIB and Emerald).

he asked his readers to imagine, came from a Central Index (Kaiser 1926, 24, § 14, & 25, § 15 (e))—i.e., an index incorporating information from different kinds of documents and so including cards of different colors, each of which designated a different class of documentary materials (See, Chapter 7, Section 5; Chapter 8, Section 2.1, esp. pp. 552–553, 723, above). As the illustration indicates, the various cards bearing information relating to the referent of the term BOILER were not only “concentrated” into a single *locus* within the card index behind the guide card for that term (Figure 50, Point a), but were further organized by subdivisions according to country (Figure 50, Point c) and process (Figure 50, Point d). The apparatus used to mark off the set of index cards for BOILER and indicate its subdivisions was the standard one recommended by Kaiser in *Systematic Indexing*: a system of five-position guide cards, in which the main term was entered on the tab of the guide card in first position from the left; the country term, if present, beginning on the tab of the third guide from the left; and the process term, on the fifth guide therefrom (Figure 50, Points a, c, & d; cf. Kaiser 1911, § 400; see Chapter 7, Section 5.2.1, above):⁶¹⁵ these corresponded to the positions of the terms inscribed on the cards, as shown by the raised index card bearing the statement BOILER–FRANCE–INSPECTING at the back of Figure 50 (Kaiser 1926, 25, § 15 (e)). Otherwise, the sequence of the guide cards marking the country and process subdivisions likewise mirrored Kaiser’s customary mode of alphabetically ordering bipartite and tripartite statements headed by the same term of concrete, the former preceding the latter (See Chapter 7, Section 5.2.1, esp. pp. 578–579, above). Such, then, was the inner articulation of the central index for the purpose of ensuring direct access to information about concretes. Needless to say, such an arrangement entailed only indirect access to information about processes, a point to which we shall return in due course.

Once a term for a concrete had been admitted into a card index, assigned its proper place in the alphabetical sequence, and been allotted a guide card, it was necessary “to connect [it] up” with other, semantically related terms under which one might find pieces of information bearing upon the concrete in question (Kaiser 1926, 23, § 13)—that is to say, to create cross-references. As he had already done in *Systematic Indexing*, Kaiser, who preferred to speak not of cross-references but of related terms, took the distinguishing feature

⁶¹⁵ Although Kaiser limited the examples of guides in his illustration to single-word terms—presumably for the purpose of simplifying his presentation—and so showed only first-position, third-position, and fifth-position guides, it is apparent that if a term for a concrete were a long multiword term, a second-position guide would be used, if necessary, and that if a term for a country required subdivision by state or city, a fourth guide would be employed; See Chapter 7, Section 5.2.1, p. 590, Figure 31, above.

of such terms to be the indication of significant relationships between terms belonging to a single category: as he put it, “commodities are connected among themselves and energies are connected among themselves. All our main headings are either commodities or energies; the connecting up is therefore strictly limited to comparable terms” (1926, 23, § 13; cf. 1911, § 416). The kinds of relationships that terms might form among themselves he characterized as follows:

Instead of using an intricate classification for connecting up, we treat the concrete terms somewhat like geometrical magnitudes, i.e., one compared with another is either equal, greater or smaller, in the extent of its meaning; if equal, then we call the terms Synonyms and prefix the equal sign; if greater, then we call the terms Higher Collectives and mark them $<$; if smaller, then we call them Lower Specifics and mark them $>$. For every concrete in the card index there is a first guide on which these related terms are tabulated (1926, 23–24, § 13).

In comparing the relationships among terms of concretes to those among geometric magnitudes—that is to say, mathematical objects “that [have] dimension or extension”, such as, for example, “a line, a surface, or a solid” (Newcomb 1901)—, Kaiser invoked geometrical imagery to discuss semantic relationships among terms in much the same way as he had done in his earlier book, where he had deployed the notions of the overlapping and underlapping of plane figures as an aid in explicating the lack of congruence between mental pictures and terms or between the extensional meanings of two different terms (See Chapter 7, Sections 2.2.1 & 2.2.4, esp. pp. 328–330, 353, 358–360, above). In the present case, he drew an analogy between the area of extension of a figure and “the extent of [the] meaning” of a term. Just as, when two geometrical figures are compared to one another, one may be of equal size as the other, greater than it, or smaller than it, just so, when one compares two terms, one may have the same extent of meaning as its comparee, a greater extent of meaning than it, or, conversely, a smaller extent of meaning than it. When the extent of meaning between two terms was judged to be more-or-less equal, the relationship between them was that of Synonymy, whereas in cases where one term was judged to have a greater extent of meaning than the other, the one with the greater extent of meaning was a Higher Collective and the one with the lesser extent of meaning was a Lower Specific. Although the hierarchical relationship between Higher Collectives and Lower Specifics had already been a prominent element of the system of related terms delineated in Kaiser’s earlier expositions of the system (See Chapter 7, Sections 2.2.4 & 5.2.2.2, above), the expressions “Higher Collective” and “Lower Specific” represented a small terminological nov-

elty, apparently stemming from usage at Ardeer (Barbour 1919, 40R; 1921, 178; cf. Chapter 8, Section 2.1, esp. p. 725, above).

Kaiser's use of the simile of geometrical magnitudes to describe the kinds of relationship obtaining among terms of concretes was significant for his presentation of related terms in "Systematic Indexing" in three ways. First, in assimilating cross-referential relationships between Term X and Term Y to the quantitative ones of (1) Term X having a meaning equal in extent to Term Y, (2) Term X have a meaning of greater extent to Term Y, and (3) Term X having a meaning of lesser extent than Term Y, he tacitly reaffirmed the extensionalist assumptions underlying his account of the relational semantics of terms in *Systematic Indexing* (See Chapter 7, Section 2.2.4, esp. pp. 352–260, above). Second, it reduced the number of kinds of relationships between terms of concretes that he described. Whereas the aforementioned three relationships corresponded neatly to three of the basic relationships that Kaiser had identified in his earlier work, there seemed to be no room for the fourth: associative relationships in which one concrete was applied to another (Kaiser 1911, §§ 423, Point 3, & 424; cf. Chapter 7, Section 5.2.2.2, esp. pp. 619–620, above). To be sure, elsewhere in his article, he observed that "[r]elated terms ... cover to some extent the sub-divisions given in classifications, and what are known as cross-references" (Kaiser 1926, 27, § 21): the mention of cross-references—by which he presumably meant the kinds of cross-references sometimes found in the schedules of bibliographical classifications—suggests that, in practice, he still countenanced the contracting of associative relationships between related terms. However, the image of geometrical magnitudes that he had adopted as an explanatory model could not easily accommodate such relationships, with the result he relegated the latter to the background, much as he did with the category of countries in the discussion of the category system.

Third, and, perhaps most strikingly, the geometrical simile seems to have inspired Kaiser to introduce an innovation into the notational system for recording related terms on the face of a guide card. In the earliest published version of SI, the only notational sign to find sustained use was the hyphen as a substitute for the tab term in the multiword related terms in which it occurred (See Chapter 7, Section 5.2.2.2, above; cf. Kaiser 1926, 24, § 15 (b)). Although the position of the hyphen in such terms afforded some clues about the nature of the relationship between the terms in the list of related terms and the tab term—for example, if it preceded the other words, then the related term was a subdivision of the tab term, whereas if it followed a noun or adjective modifier, it indicated a lower specific of

the term in question—, it did not provide a means of distinguishing between synonyms and higher specifics related to the tab term, which, as a rule, did not have hyphens preceding them (See Chapter 7, Section 5.2.2.2, above). The notational system at Ardeer improved upon the initial notational system by prefixing the equal sign (=) to terms that were synonyms of the tab term (See Chapter 8, Section 2.1, esp. p. 726, Figure 47, above). Kaiser now expanded upon this idea by introducing two further pieces of mathematical notation: the “lesser-than” sign (<) was prefixed to terms that were hierarchically superordinate to the tab term and so functioned as higher collectives in relation to it, while the “greater-than” sign (>) was prefixed to terms that were hierarchically subordinate to the tab term and so functioned as lower specifics with respect to it. As the examples of related terms on the guide card for BOILER in Figure 50 show, Kaiser envisaged that these three symbols would be applied to all related terms, whether these contained a hyphen or not: in other words, the nature of the relationship between each term in the list of related terms inscribed upon a guide card and the tab term was systematically indicated in a visually distinct manner. In proposing these symbols as indicators of the relationships among terms on guide cards, Kaiser anticipated a convention that, *mutatis mutandis*, would be employed over half a century later in the British Standard Institute’s *Root Thesaurus* to indicate the broader terms (<), narrower terms (>) and non-preferred synonyms or quasi-synonyms (=) to which a thesaural descriptor was related (Aitchison, Gilchrist, & Bawden 2000, 100 & 124, Figure 23; British Standards Institute 1981, x & xiii; Hunter 2009, 106).⁶¹⁶

As he had done in *Systematic Indexing* (See Chapter 7, Section 5, above), Kaiser conceived of the relationships among related terms as primarily classificatory in nature. “Related terms ... serve a most important purpose in showing what positions a given concrete occupies among its own class or classes” (Kaiser 1926, 27, § 21), he declared, and, accordingly, insisted that it was important to establish such relationships among related terms with circumspection. “Before any concrete term (and therefore a first guide for it) is admitted to the Central Index”, he wrote, “it is carefully considered in all its bearings, definitions, connections, etc” (p. 26, § 19). “This”, he argued, “is necessary for proper

⁶¹⁶ The only significant difference between Kaiser’s and the *Root Thesaurus*’s use of these symbols is that the *Root Thesaurus* uses the equal sign (=) only to signal the non-preferred equivalents of a descriptor, or preferred term, listed in the entry for that descriptor, but uses the right-directed arrow (→) to signal the preferred equivalents of non-preferred terms listed in the entries for the latter, whereas Kaiser, because he made no distinction between “preferred” and “unpreferred” terms (See Chapter 7, Section 5.2.2.2, esp. pp. 622–625, above), used the equal sign for all relationships of synonymy. Otherwise it should be noted that the *Root Thesaurus* included symbols for relationships that did not feature in Kaiser’s schema of related terms.

connection and classification and for maintaining utmost accuracy in the index and giving it practically mathematical precision” (p. 26, § 19). Yet it was not only the properties of the new term that determined the classificatory relationships into which it was placed: the viewpoint of the business for which the index was being constructed must be taken into account as well. Thus, Kaiser averred, the “connections” between a term and its synonyms, higher collectives, and lower specifics “may be made in stages as necessary or suitable for the business the index is to serve and they will differ with each business” (p. 26, § 19). In contrast to his earlier discussions of related terms, he now envisioned that the hierarchical structures developed might eventually be brought coordinated by something akin to a series of *summa genera*: “the higher collectives may be cumulated in highest collectives, such as Labour, Material, Product, etc., the common main classes of most businesses” (p. 26, § 19). The presence of such highest collectives, which were analogous to the main classes in a classification or the top terms in a thesaurus (Aitchison, Gilchrist, & Bawden 2000, 104; Iyer 1995, 77), served to underline the classificatory aspect of the system of related terms in a Central Index by serving as top-level categories within it. A few years later, one of his former colleagues there would amplify this point. In response to a claim made by Pollard and Bradford (1930, 47) that the cross-reference structure in the “Kaiser system of indexing” would lead to a hypertrophy of related terms, Barbour (*apud* Pollard and Bradford 1930, 53–54) argued that a “systematic” and judiciously “limited” selection of related terms

results in the production of a small number of “genealogical trees.” At the head of each is one of the main headings denoting the subjects dealt with in the index—e.g., plant, material, product, labour, money, etc.—and at the foot the most minutely specific terms. The main headings and their chief sub-divisions are carefully thought out and tabulated for reference before the index is begun. These trees grow rapidly at first, but more slowly later, and the gatherer of information is led, when required, from branch to branch by means of synonyms. This is really the crowning achievement of the Kaiser system.

Yet, if Kaiser imagined related terms primarily within the framework of classificatory relationships and even envisaged the possibility of creating a series of highest collectives, he did not expect that the resulting classificatory structures would be equivalent to the monohierarchical structure typical of bibliographical classifications. As we have already noted, he anticipated that a network of related terms would be polyhierarchical to some degree (See Chapter 7, Section 5.2.2.2, pp. 612–619, above). The advantage of such structures was that they could both reflect the interests of a business organization as a whole and accommodate

the various points of view among the personnel working within the business. As Kaiser (1926, 26–27, § 20) explained,

[t]erms of commodities and of energies each form a class of comparable terms; by means of related terms we may ... combine them in as many logical classifications as may be called for by our business interests. We can choose these connections or classifications in strict accordance with our business needs, Take any commodity: it has a number of properties and may be viewed from a number of different aspects. Logically it belongs to just as many classes or classifications as it has aspects. For the technical men using the index it is obviously most desirable that all these aspects should be readily known; Any classification proposed by research men using the index can be incorporated with the related terms.

Inasmuch as a single term for a concrete might participate in a number of different classificatory relationships, the listing of related terms on its guide card virtually linked it to a number of other guide cards in the index under which information of relevance to that concrete might be filed. In Kaiser's words, it served

to concentrate that [sci., the information on the index cards entered under the guide card in question—TMD] with other information [sci., information filed under the guide cards for each of the related terms—TMD] at one point ... Every related term [on a given guide card—TMD] represents so many index cards, which, if need be, may drawn upon for additional information (pp. 26–27, § 20; cf. Kaiser 1911, § 183).

On this view, then, a main guide card naming a given concrete served as a point of concentration in two respects: first, it brought together the information about that concrete that had been filed under its name and, second, it brought together the names of concretes under the guide cards for which the user of an index might search for collateral information.

Kaiser ascribed one further function to the lists of related terms inscribed upon guide cards for terms of concretes. In addition to indicating the places in an index where supplementary information about a given concrete was located, related terms provided the user of an index with a compendious overview of the different aspects under which that concrete was viewed within the context of the business organization. In this, they played a rôle comparable to that of terms of processes, which likewise indicated certain aspects of concretes that were deemed to be especially salient from the perspective of an organization. Now Kaiser (1926, 27 § 21) was careful to distinguish the two kinds of terms, observing that, unlike related terms, “[p]rocess terms do not show relationship of concretes, but rather modifications to which they are subject”. Underlying this statement was the notion that the relationships between terms from different term categories within a statement participated in a different semantic structure than did the relationships between

terms belonging to the same category: the former formed part of what, in an earlier chapter, was characterized as the system of category semantics, while the latter formed part of what was there described as relational semantics (See Chapter 7, Section 2.2.2.4, above). And yet, much as the first guides in a systematic card index served as a point of concentration for information, both direct and indirect, about the concretes that they represented, so did terms for concretes become a point of convergence between the system of category semantics and that of relational semantics underpinning the conceptual structure of the index: as Kaiser (1926, 27, § 21) put it, “[r]elated terms and process terms together give an absolutely complete picture of every possible phase or condition in which a given concrete may be involved, so far as the information in the index goes”.

Such, then, was the image of SI that Kaiser set before the readers of the proceedings of the third ASLIB conference—that of an alphabetic-specific (see Glossary) indexing system in which each heading, or main filing term, invariably denoted a (kind of) concrete, which was both subdivided by subsidiary filing terms referring to processes and linked to semantically related headings by means of a syndetic structure (see Glossary) taking the form of related terms. In his opinion, such a mode of organizing a systematic card index was far superior to the alternative approach of arranging headings in a classified sequence in accordance with a subject-based classification scheme. With regard to the latter, he singled out the “Dewey” and “Brussels” classifications, the latter of which, he noted blandly, was increasingly being “recommended for indexing” as well as “cataloguing” purposes (Kaiser 1911, 28, § 26). Although he had long been a critic of both the DDC and its offspring (See Chapter 7, Section 6.2, esp. p. 684, n. 535), his awareness of Craver’s efforts to promote the UDC as an indexing tool for engineering literature (See Section 2 of the current chapter, esp. pp. 759–760, above) and of the propaganda on behalf of the system in British special library circles (cf. Kaiser 1926, 30, n. 4) led him to present arguments for the advantages of SI over subject-based bibliographical classifications and, in particular, the two decimal ones.

Kaiser considered the structural differences between SI and bibliographical classifications to be profound. “In a book classification”, he wrote, “we have a number of main headings with successive divisions and subdivisions”, whereas “in systematic indexing we have one class of terms for main headings—and all our headings are main headings—and another distinct class of terms for divisions” (Kaiser 1926, 25, § 16). On this view, although both SI and bibliographical classifications featured “main headings” that served as direct points of access to information, they differed notably in their criteria for what kinds of

subjects could serve these criteria. The rules of SI stipulated that all terms belonging to a certain category—that of concretes—function as main headings, regardless of their degree of specificity, while classifications restricted main headings to the few main classes, which typically represented broad departments of knowledge (cf. p. 29, § 30), with other, more specific headings being subdivisions of these: thus, in theory, SI had a greater number of main headings than any book classification did and so provided a greater degree of direct access to information. Furthermore, Kaiser argued, SI concerned itself primarily with the organization of “classes of terms”, whereas bibliographical classifications dealt primarily with “classes of subjects” (p. 25, § 16). By this, he meant that SI was based on a system of category semantics that divided terms into distinct categories, while bibliographical classifications did not, for their subjects comprised an indiscriminate mixture of “various classes of terms”, including “concretes, processes, [and] -ologies” (p. 28, § 26). This difference, Kaiser argued, led to the structural differences between the two forms of KOS:

Subjects of book classifications are made up of various classes of terms which constitutes one of their main troubles, ... ; concretes and processes are all mixed up, and we can continue to sub-divide indefinitely. In systematic indexing, concretes and processes have been brought into relation so that they cannot be mixed up, and there are no endless subdivisions; concretes are simply divided by processes (p. 25, § 16).

In his estimation, the difference between the structures generated by the simple division and articulation of terms according to the [CONCRETE]–[PROCESS] schema in SI and those created by the repeated subdivision of a series of main classes without any strict distinction between categories of terms had important implications for the comparative ability of each system to cope with the threat of duplication. “In a book classification”, declared Kaiser, it is practically impossible to concentrate at one point without a large amount of duplication” (p. 25, § 16). “In systematic indexing”, on the other hand, “concentration is automatic and ample”.

Kaiser (1926, 28 § 26) set forth three related arguments “from the standpoint of systematic indexing” to buttress his claim that, because bibliographical classifications do not distinguish between categories such as concretes and processes, they compromise whatever level of concentration, or collocation, of subjects they may achieve with a structure that leads to both duplication and the scattering of specific subjects. The first argument essentially recapitulated his critique of indexes created according to the catchword method. Taking up, again, the subject of Combustion of Coal, he noted that, in the

Relativ Index to the 10th edition of the DDC, “there are 19 call numbers for coal and 6 for combustion, which certainly does not look promising for concentration of one subject under one number” (Kaiser 1926, 28 § 26; cf. Dewey 1919, 638, s.v. “Coal” & 641, s.v. “Combustion”). Yet, he averred, even if one were to assume that the classification had only class number for Coal and another one for Combustion—“as it should be”, he stated in a parenthetical aside—,

then it can be demonstrated that there is still unavoidable duplication even between these two. For as long as there is a heading Coal and a heading Combustion, some information on combustion [*sic*] will be under Coal and some information on Coal will be under Combustion. Let me put it another way; information under Coal is incomplete as long as it excludes Combustion, and information under Combustion is incomplete as long as it excludes Coal; it is physically impossible to separate them absolutely, for combustion is one of the major processes of Coal. Even Dewey numbers bear me out: 621.182 is used for Fuel and for Combustion, 621.1331 is used for Fuels and for Combustion (Kaiser 1926, 28, § 26).

As this passage makes clear, Kaiser’s contention was that any classificatory structure that did not automatically subordinate the heading Combustion to that Coal as a process to a concrete would necessitate the filing of information regarding the combustion of coal under both headings and this, of course, was the very essence of duplication. Furthermore, Kaiser argued “[t]his objection holds not only for Combustion but for all other processes bearing on Coal, and it applies not only to Coal but to all concretes as long as the classification contains processes applicable to them” (p. 28, § 27): in other words, it constituted what he saw as a general structural flaw of bibliographical classifications as such.

At first blush, one may find Kaiser’s assimilation of the structure of bibliographical classifications such as the DDC, the main classes of which represent departments of knowledge as their main classes and so constitute “perspective hierarchies” (Svenonius 2000a, 151–153), to that of alphabetical indexes arranged on the catchword plan, which, in his view, were essentially non-hierarchical, to be deeply implausible: how could a hierarchical structure give rise to a phenomenon—that of duplication—that was characteristic of one that was emphatically not hierarchical? Kaiser’s choice of examples may only serve to reinforce skepticism, for the two class numbers that he cited to illustrate the phenomenon of categorial mixture, 621.182 and 621.1331, showed that concrete and process terms might be used to characterize the subject content of a single class number: in the schedules of the 10th edition of the DDC, the former was correlated with the headings “Fuels” and “Combustion” in the classificatory hierarchy “Useful arts: Engineering:

Mechanical engineering: Steam engineering: Steam generation and transmission: Fuels. Combustion”, while the latter was associated with the headings “Combustion”, “Fuels”, “Petroleum”, and “Fuel Consumption” in the hierarchy “Useful arts: Engineering: Mechanical engineering: Steam engineering: Locomotiv: Locomotiv boilers. Production of steam: Combustion. Fuels. Petroleum. Fuel consumption”.⁶¹⁷ Whereas this clearly supported his contention that concrete and process terms might be intermingled within the structure of classes in the DDC, it hardly demonstrated that this mixing led to duplication: after all, in such cases information on “Fuels” and information on “Combustion” would be filed together under the class numbers in question.⁶¹⁸ However, the argument gains some force if one recognizes that, within the classificatory hierarchies of the DDC, one can find instances of classes representing concretes standing side by side with ones representing processes within a array of coordinate classes: for example, the proximate subordinate classes of 649 “Nursery. Sickroom” included both concretes, such as “Rooms. Nursery” (649.2) and “Food” (649.3), and processes, such as “Care of children” (649.1) and “Exercise. Recreation” (649.5), as did those under 655.3 “Practical printing”—cf. “Printing Presses” (655.31) and “Stamps, stencils, etc.” (655.35) with “Drying: hydraulic pressing, etc.” (655.33) and “Nature printing” (655.37)—and under 696 “Plumbing Gas and steam fitting, etc.”—cf. “Rivets and riveted joints” (696.4) and “Screws and screw joints” (696.5) with “Gasfitting” (696.2) and “Steamfitting (696.3). In such cases, duplication might well arise, for if one wanted to index a piece of information on, say Screws and screw joints in Steamfitting, then one would presumably have to file it under both 696.5 and 696.3 to assure direct access to it. To be sure, Kaiser did not pursue this line of argument but confined himself to the schematic assertion that failure to distinguish between concretes and processes necessarily leads to duplication: nevertheless, there was at least some warrant to his claim that, if one were to use a bibliographical classification such as the DDC as an indexing tool, duplication would occur.

⁶¹⁷ Such examples could easily be multiplied, especially in the class of “Useful Arts” (600): see, e.g., “Dredging. Dredging Machinery” (627.7); “impurities and their removal: filter basins, etc.” (628.16); “Type and typesetting” (655), “Type founding. Tools of the art” (655.1), “Electrotyping and stereotyping, etc. Patent Blocks” (655.22), “Press work: making ready. Color printing. Cuts” (655.32), “Dyeing. Artificial colors. Silk and wool” (667.2), “[Bildung:] Material. Processes. Preservativs” (691).

⁶¹⁸ The fact that 621.182 and 621.1331 were different class numbers, each of which pertained to “Fuels” and “Combustion”, was, strictly speaking, immaterial to the argument that Kaiser was making, since they represented an example of subject scatter within a (rather maladroitly constructed) perspective hierarchy rather than the result of cross-categorical duplication.

Related to the first argument was another that called into question the utility of the “call numbers”—that is to say, the class numbers—of decimal classifications. “Most terms in book classification are incapable of exact definition”, declared Kaiser (1926, 29, § 28), and “to represent indefinite subjects by exact numbers is ... an expedient of questionable value, for we may be misled into thinking that our subjects are as exact as their call numbers, and by mistake act accordingly”. This statement expressed the misgivings about the lack of semantic precision in language that he had already discussed in his earlier books (See Chapter 7, Sections 2.2.1 & 5.2.1, above) and gave voice to his belief that, despite the apparent exactitude of the notation of the DDC and the UDC, the verbal headings to which the numbers referred were often insufficiently precise in their delineation of subject content (cf. Kaiser 1911, §§ 272–274; Chapter 7, Section 6.2, pp. 684–685, nn. 535 & 537, above). However, he did not provide any examples of such definitional inexactness, prompting one member of the audience at the ASLIB conference, the DDC enthusiast Turner (*apud* Kaiser 1926, 35), skeptically to inquire what, exactly, he meant by “indefinite subjects” and to suggest, uncharitably, that an indefinite subject was “one that did not fit his [sci. Kaiser’s—TMD] scheme or one that the indexer was too lazy to investigate and classify”. The deleterious effects of representing imprecisely defined subjects with decimal notation were compounded, in Kaiser’s (1926, 29, § 28) view, by the fact that “we have exclusive numbers representing subjects which can be shown to overlap, as with Coal and Combustion, etc.”, for here, again, the specter of duplication raised its head. This circumstance deprived the call numbers “of practical utility” because “they are not only misleading but “make” work rather than save it” (p. 29, § 28). Thus, he argued, decimal class numbers “should be rejected” on the grounds that “greater accuracy can be secured with the alphabet”. Furthermore, ease of use was to be kept in mind: noting that “an alphabetical key is necessary in any case where call numbers are used, as in the Brussels system”, Kaiser insinuated that alphabetical indexing schemes were more economical to consult than ones based on decimal classifications (p. 29, § 28; cf. p. 32, § 38). All in all, this argument traded on what Kaiser regarded as the superior accuracy, exactness, and, ultimately, efficiency of alphabetic-specific indexing using verbal terms to indexing based upon subject-based bibliographical classifications employing decimal notation, though given the extremely condensed manner in which it was formulated, one may well wonder how effective it was in advancing his overall critique of the DDC and UDC.

The third, and arguably the most convincing, of Kaiser's arguments against the use of bibliographical classifications for indexing had to do with the phenomenon of subject scatter. As we have already noted, in "Systematic Indexing", Kaiser identified direct access to information on specific subjects as a central *desideratum* for a systematic card index on the grounds that such information was generally the most useful for research purposes (Kaiser 1926, 22, §§ 8–9 & 30, § 31; cf. Chapter 7, Section 2.2.5, above). This, as we have seen, entailed the concentration of information about any specific concrete under the main heading that named the concrete in question. Such concentration, Kaiser argued, could not be consistently attained within the structural framework of a bibliographical classification. Even if one were to remove all process terms from a classification so that "only strictly comparable terms"—that is, terms for concretes—"remain", he wrote, one would still be confronted with the problem that

the so-called classification is in reality nothing more than a set of pigeonholes, 1,000 altogether, among which the subjects are distributed more or less forcibly to fall in with an arbitrary number of main classes. That is, in each pigeonhole there is, let us say, one class and its divisions and subdivisions. Now it can be shown that concentration of this kind is invariably accompanied by corresponding dispersion or scattering of subsidiary subjects, for they can be claimed by more than one pigeonhole, i.e., it is impossible to concentrate subjects under main classes without a large amount of duplication of subsidiaries (Kaiser 1926, 29, § 29).

This characterization of a decimally structured system as a set of pigeonholes, which somewhat maliciously alluded to Dewey's (1919, 18) own characterization of his classification as one that "gives us for each topic, as it were, a case of nine pigeon-holes, with a large space at the top", posited that maximal concentration would occur at the top, or most general levels of the hierarchy, while the more specific, subsidiary subjects would be scattered under the various collective terms to which they could be subordinated. By way of example, Kaiser cited the case of Iron, which, according to the Relativ Index to the 10th edition of the DDC, was distributed among no fewer than 32 class numbers: "it can be claimed by Buildings, Machines, Medicine, Metals, Railways and many other collectives" (Kaiser 1926, 29, § 30).⁶¹⁹ If, in indexing, one decided "to concentrate Iron all at one point"

⁶¹⁹ It is worth noting that Kaiser's examples of the general classes under which Iron might be placed are not those found in the Relativ Index itself. The closest equivalents to Buildings are "Iron: architecture" (721.9), "Iron: structures architect." (721.9), and "building material" (691.7); with regards to Medicine, there is "Iron: Materia medica" (615.272) and, for Metals, there is "Iron: Metallurgy" (669.1); see Dewey 1919, 740: neither Machines nor Railways have even approximate equivalents in the Relativ Index. The discrepancy between Kaiser's list of "collectives" and those given in the Relativ Index is significant, for it underscores the degree to which he was making his

—that is to say, if one filed all information pertaining to iron under the heading for Iron—, the result, he claimed, would be that “we would have to repeat it under Buildings, etc., so as not to leave these subjects defective, hence duplication”.⁶²⁰ This argument for duplication was not sound, for Kaiser overlooked the fact that within a perspective hierarchy like the DDC or the UDC, there would be no single class in which all information on iron as such could be collected: insofar as all classes fell under one or another main class representing a broad department of knowledge, each class for Iron represented iron from a specific point of view (e.g., Iron *qua* building material; Iron *qua* metal; Iron *qua* medicine, and so on). Here, again, it seems that he conflated the bibliographical classification and the catchword index.

Yet if Kaiser’s (1926, p. 29 § 30) contention that scattering inevitably entails duplication involved special pleading, his thesis that “in an analytical arrangement like Dewey or Brussels, whatever we gain by concentration at determined points we lose again by the scattering of subsidiaries” remained valid: he was, in effect, stating what would, in time, come to be known as the problem of “distributed relatives” (See Chapter 7, Section 5.2.2.2, esp. pp. 614–615, above). On this view, the degree of scattering was correlated with the position of subjects within the hierarchical structure of a classification, with the more general classes typically enjoying a higher degree of concentration than specific ones. Such a pattern of scatter, Kaiser observed, had definite implications for indexing.

[I]f you will look through the classification you will find that those subjects are concentrated which from the standpoint of indexing are of least use, if at all, for who is going to index “Natural Sciences,” “Physics” or similar subjects? On the other hand, the subjects most used in indexing, i.e., specifics are scattered; and the further the subdividing is carried, the greater the scattering and the more duplication (Kaiser 1926, 29, § 30).

This “top-heavy” mode of subject concentration in bibliographical classifications stood in stark contrast to SI, where the strict rule that all terms of concretes serve as main headings and that all terms of processes serve as subdivisions thereof both encouraged concentration of information on specific concretes at a single point in the index and minimized

arguments on general structural considerations rather than on the basis of the DDC and the UDC themselves.

⁶²⁰ I.e., all information pertaining to Iron and Buildings would be filed under the subject class for Iron and that for Buildings; all information pertaining to Iron and Machines would be filed under the subject class for Iron and that for Machines; all information pertaining to Iron and Medicine would be filed under the subject class for Iron and that for Medicine; and so on.

scattering.⁶²¹ In Kaiser's view, it was SI's capacity to concentrate information under specific terms for concretes and to avoid duplication by strict adhesion to the [CONCRETE]-[PROCESS] schema that ultimately rendered it superior to the DDC and the UDC for indexing purposes (1926, 28–29, § 27).

The argument from subject scatter represented a new development in Kaiser's critique of classification, for his earlier treatments of this subject in *Systematic Indexing* had confined themselves either to discussing bibliographical classifications as shelf classifications and so addressing such issues as the difficulty of accommodating polytopical books to a subject-based bibliographical classification (Chapter 6, Section 3.2.2, above) or to making *ad hoc* criticisms of particular features of the DDC (Chapter 7, Section 6.2, esp. pp. 684–685, nn. 535–537, above). Perhaps the least contentious of his three arguments in “Systematic Indexing” against the use of bibliographical classification in indexing, it is also the only one to have caught the attention of latter-day commentators (Anderson 1984; Olding 1966, 142; Rodríguez 1984, 164; Serrai 1979, 53; Svenonius 1978, 138). One of these has observed that SI itself was not immune from the phenomenon of scattering, for “Kaiser's “citation order” of facets scatters headings for particular processes under the “concretes” or objects of those processes” (Anderson 1984, 383). Now Kaiser (1926, 30, § 31) was well aware that his indexing scheme required the scattering of terms for processes. However, he did not consider this to be problematic in the least, for he retained his earlier conviction that the users of a systematic card index would tend to search for information on concretes rather than processes (Kaiser 1911, §§ 384, 433; see Chapter 7, Section 3.5, p. 481 above): as he noted with regard to the process term COMBUSTION, “nobody would expect to find information on Combustion generally in an index, but always combustion of something, i.e., a commodity” (Kaiser 1926, 22, § 7). Yet, Kaiser acknowledged that, in certain circumstances, users might want to search for information on certain process. For such cases, he reiterated the advice given in his earlier writings—namely, that one search for a process term under the terms of concretes with which it was most likely to occur: “supposing information is wanted on Combustion, etc. all we have to do is to attach this term to that of some commodity—Coal, Fuel, Oil, etc.—and Combustion will be found as a division under each one if there is information” (Kaiser 1926, 22, § 7; cf. 1911, § 446; Chapter 7, Section 5.2.1, esp. p. 600 above). However, he added, “in those cases where the processes are of import-

⁶²¹ Some scattering would occur because of the presence of synonymous terms in SI, a point that Kaiser did not make, perhaps because he was concerned primarily with the concentration of information under terms, not concepts (See Chapter 7, Section 2.2.3, above).

ance in our business they are collected in a process section” (Kaiser 1926, 30, § 31). In commending the use of a separate process section as a means of concentrating information on processes, he clearly drew upon his experiences at Ardeer, where the central index had included such a section (See Chapter 8, Section 2.1, esp. pp. 730–734, above).

Kaiser’s view that, ideally, only terms for concretes should always serve as main headings in SI did not command assent from all contemporary commentators. In the discussion following the presentation of Kaiser’s paper at the ASLIB conference, Turner (*apud* Kaiser 1926, 34) remarked unfavorably on the fact that “[u]nder the Kaiser system, “combustion was only found as a sub-heading under every fuel listed in the index”. Noting that “his experience led him to the view that inquiry for “all material on combustion” would be just as frequent as inquiry for “all material on coal”, Turner (*apud* Kaiser 1926, 34) condemned SI as a “system [that] fail[ed] to meet this demand without excessive labour”: to him, it seemed that “in actual practice, users of it found themselves compelled to set up separate indices for ... “process” headings” in the form of distinct process sections. Turner likewise attacked Kaiser’s claim that nobody would expect to find information on combustion under the term COMBUSTION *simpliciter* but always in conjunction with the name of a concrete undergoing combustion, dismissing it as “simply untrue”.⁶²² Another participant in the discussion, J. C. Withers (*apud* Kaiser 1926, 43), an industrial chemist with documentary interests affiliated with the Manchester-based Textile Institute and the British Cotton Industry Research Association observed less polemically that, at the library of the latter association, where a version of SI was used to index locally-made abstracts from the periodical literature on textile production, “the “process” section of the index [was] the one most commonly consulted”.⁶²³ As for Barbour (*apud* Kaiser 1926, 39), whose own central index at Ardeer featured a process section encompassing no fewer than 287 process terms,

⁶²² Some later commentators on SI voiced comparable reserves, although expressing them in a more diplomatic manner. Cf., e.g., Jolley 1955, 71: “Mr. Kaiser explains that there can be no entry under ‘combustion’ but combustion always appears as combustion of something or rather as ‘something-combustion’. It is hard to follow Mr. Kaiser in this. Where would he place a discussion of the theory of combustion which is clearly not concerned with the combustion of any one commodity?”.

⁶²³ In a paper delivered at the inaugural 1925 conference of what would later come to be ASLIB (cf. Chapter 1, Section 5.2.2, above), Withers (1925, 69–70) had described the index as follows: “The abstracts are ... indexed under the headings of (a) authors, (b) concretes, using guide cards on the “Kaiser” system, and (c) processes. In the long run, the author finds the last index to be the most useful. Each abstract is carefully scrutinized and indexed under the name of every process relevant to cotton research and the industry upon which it throws light. In this way it is possible to produce at short notice a review of all the important papers bearing on, say, cotton cultivation, bleaching or dyeing, or the testing of cotton materials, which have appeared since 1921, when the work began”.

he stated that “[s]peaking for himself, [he] did not see any difficulty” in designing indexes “where “process terms” terms predominated”. Citing a passage in *Systematic Indexing* in which Kaiser (1911, § 653; cf. Chapter 7, Section 3.5, p. 488, above) had “contemplated the possibility of having to index entirely by processes”, Barbour (apud Kaiser 1926, 39) suggested that, in such cases, terms for processes “could be subdivided quite well according to the “concrete” terms concerned with each “process”—a procedure that, in effect, inverted the statement form [CONCRETE]–[PROCESS] into [PROCESS]–[CONCRETE]. In most circumstances, however, he thought that keeping a carefully controlled process section alongside a primary central index file organized according to the standard [CONCRETE]–[PROCESS] template would prove sufficient. As Barbour’s and Withers’s interventions in the discussion at ASLIB indicate, the process section was arguably SI’s most effective answer to the problem of the scattering of terms for processes, even if it did require the extra effort of establishing an additional index file, as Turner had noted.

Although Kaiser had formulated his critiques of decimal bibliographic classifications primarily to argue against their utility for the purposes of indexing, he also made it clear that, in his opinion, they were unsatisfactory for book classification and cataloging as well. “There is no doubt in my mind that the schemes are fundamentally weak”, he declared, adding that “it is especially regrettable that the Brussels Institute [i.e., the IIB—TMD] is building up a huge superstructure without apparently having tested the foundations for they are certainly inadequate for it” (Kaiser 1926, 30, § 32). Yet, he did not expatiate further on the deficiencies of these particular schemes. Rather, taking as his point of departure that “[n]o book classification has ever been entirely successful and none is likely to be, ... unless a radical change in method leads to better results” (p. 30, § 32), he proposed what he considered to be a better method to go about the design of classifications:

We can look upon a book classification as an end product (to use manufacturers’ terminology), in which case the subjects or terms of which they are made up are the prime materials. These terms have certain properties (like any other materials i.e., some things we *can* do with them and some other things we *cannot* do with them, no matter how hard we try. The first operation in the planning of a classification should therefore be an exhaustive study of the terms (as materials) to find out definitely what can be done with them, how they can be divided into classes, brought into relationship, and what kinds of relationship, connotation, etc. When this has been done satisfactorily, then only are we in a position to think about classification; and it seems perfectly obvious that the classification must be based primarily on what we can do with the terms.

You will agree that no manufacturer would think of working his materials until he has found out their properties and how far they are suitable for his purpose, or

what he must do to them to make them suitable for turning them into the end product. But in classification, even in cataloguing and indexing, we are apparently quite unconcerned about materials, and simply take them as they come. I am aware that this proposed study would entail a great deal of work, much more than I have done myself in connection with systematic indexing, but I feel confident it would lead to a more acceptable classification than Dewey or Brussels, and in view of the talk about a classification for universal adoption it would surely be worth while trying. Even in your own work you will find that whatever time you spend in the study of terms will have been spent very profitably (pp. 30–31, §§ 33–34 [emphases his]).

Kaiser's (1926) suggestion that the design of a classification should begin with a close study of the terms used to designate subjects was based on his own experience with systematic indexing (p. 30, § 33), where, as we have already noted, he demanded that the indexer consider every new term for a concrete, upon its introduction into an index, "in all its bearings, definitions, connections, etc." (p. 26, § 18) in order to establish its place within the network of related terms. Its most noteworthy feature was the primacy that it accorded to the term, or verbal unit, in the constitution of classifications. The weight that Kaiser gave to the term in this context is best understood as a manifestation of his linguistic empiricism. As we noted in an earlier chapter, he understood terms to be visible bearers of meaning on the printed (or written) page and considered their visible form to be relatively stable, whereas the meanings that they mediated were, as a rule, not entirely determinate and so were liable to be understood in different ways by different persons (See Chapter 7, Section 2.2.1–2.2.3, above). The relative stability of terms *vis-à-vis* concepts led him to take the former as the elementary unit of indexing in *Systematic Indexing* (See Chapter 7, Section 2.2.3, above): it is likely that they underwrote his understanding of terms as the "prime materials" of classifications as well. Given Kaiser's (1926, 29 § 28) opinion that "[m]ost terms in book classification are incapable of exact definition", his admonition to attend to the study and definition thereof may seem somewhat quixotic. Yet, even if a careful examination of terms did not result in perfect definitional exactitude in all cases, it could nevertheless contribute to greater precision in definitions and so provide a surer semantic basis on which to build up a classificatory structure: it might also lead to a more consistent structuring of the vocabulary of headings used in classification, which, as we have seen, Kaiser thought to be hopelessly confused in the traditional decimal classifications. The reform of bibliographical classification, then, was to be sought in improved specification of the semantic contents of terms.

Kaiser's proposal that greater attention be paid to terms in classification design and, more generally, his emphasis on the term as the elementary unit of indexing and classification alike did not receive a warm reception among those who heard his paper at ASLIB. Turner (*apud* Kaiser 1926, 35 [emphases his]) pointed out that, in classification, "[o]ne was classifying *things* and *ideas*, not *words*, which were merely tools of our work", while the public librarian Jast (*apud* Barbour 1926, 122) "expressed his dissent from Mr. Kaiser's conclusions regarding the possibility of improving on Dewey or the Library of Congress [*sic*] schemes by manipulating terms", arguing that "[c]lassifications which were to be of any use were not arrangements of terms but of literary material, and of terms only inasmuch as they bore on literary material". Both men evidently understood Kaiser to be primarily interested in the classification of terms and found this approach to be too language-oriented to their liking: Turner countered with the argument that concepts and their referents, rather than words, were more appropriate elements on which to build a classification—a view to which many modern-day theorists of KO would subscribe (See Chapter 7, Section 2.2.3, esp. pp. 344–345, above)—, while Jast maintained that "literary material"—by which he presumably meant the subject contents of bibliographical units—should serve as the basis of classification, a view not far removed from the notion of literary warrant (on which, see Glossary, below). Later commentators would interpret Kaiser's proposal more sympathetically by generalizing its applicability to subject indexing as a whole: thus, one prominent latter-day Italian authority on knowledge organization has commended it as "precious advice to study the terms, the nomenclature, then the structure; in a word, the overall semantics of index entries" (Serrai 1979, 55). This appreciation neatly draws out some of the methodological consequences of the Kaiser's suggestion. However, in the original historical context in which he made the argument that a close study of terms might be a useful propaedeutic to elaborating a universal classification, it seemed to concern itself overly much with words and language to find favor among contemporary commentators who believed that the emphasis should lie elsewhere.

Although Kaiser was willing to offer methodological advice on how to design what he believed would be an improved form of subject-based bibliographical classification, he did not abandon the form(at)-based template for document organization that he had initially outlined in *The Card Index* (See Chapter 6, Section 3.1, above). With regard to "the arrangement of documents", he reaffirmed his conviction that "the best practice is ... to divide them all into classes by their physical characteristics, such as books, periodicals,

drawings, etc., taking great care not to allow overlapping if it can possibly be avoided” (Kaiser 1926, 31, § 35). The structure of the classification was to be reflected in that of the call numbers assigned to the documents in a library’s collection:

[e]ach class is designated by an appropriate letter, A, B, C, In each class the documents are numbered consecutively as filed. For large classes divisions may be made if required. The whole call number therefore consists of a letter denoting the class, a number denoting the division and a number giving the consecutive order, thus: B3.321, B3.322, etc. (p. 31, § 35).

Relatively new in this description of call numbers was the reference to divisions as a means of partitioning large document classes into smaller subclasses under which individual documents or filing units could be placed: although Kaiser (1908, §§ 81, 83) had employed such divisions for certain classes of documents, such as periodicals, in his earlier writings, it was only at Ardeer that their use became a prominent feature of the system of document organization as a whole (See Chapter 8, Section 2.1, esp. p. 709, above).

Perhaps because of the relative novelty of the secondary divisions within his scheme, Kaiser offered the readers of “Systematic indexing” some counsel regarding their use. Beginning with the disclaimer that “[t]he question of most suitable division is an individual matter for each business” and, accordingly, that “no universal rule can be laid down”, he proceeded to “strongly recommend ... the use of quasi-physical divisions wherever possible, dividing books for instance into official and non-official, dividing by countries or origin, etc.” (Kaiser 1926, 31, § 36). By the same token, he urged his readers not to use subjects as divisions “if you can avoid it, especially if the library is used by researchmen”.⁶²⁴ His rationale for avoiding subject-based divisions was that

as all research work ultimately boils down to pure classification work, it is against the best interest of researchmen to be tied to any subject classification (even for filing their papers): they should keep an open mind for all classifications as part of their work, not be committed to any one in particular (p. 31, § 36).

This argument, which Kaiser had not employed in his earlier writings, was based on what were, in effect, assumptions about the cognitive role of classification. Underlying the statement that “all research work ultimately boils down to pure classification work”

⁶²⁴ It is worth noting that Kaiser and his collaborators at Ardeer had not been able to avoid subject-based divisions altogether in the document classification used at the technical library there, for, as noted earlier, four of the divisions for books and pamphlets—Science (B1), General Technology (B2), Explosives Technology (B3), and Engineering (B4)—were quite clearly represented subjects (See Chapter 8, Section 2.1, esp. p. 709, above). With traditional library materials such as books, the advice to dispense with subjects was perhaps more easily preached than put into practice.

appears to have been the notion that classification—that is to say, the noting of similarities and differences between the various things in the world presented to the mind’s eye, through direct observation or verbal description, and the mental arrangement of those things on the basis of similarities and differences—was a fundamental component of human thought. Kaiser would have found no lack of precedents for the idea that cognition was, in large degree, tantamount to classification. It was a commonplace of elementary textbooks of traditional logic that “[t]he process of classification is involved not only in all processes of judgment and reasoning, but in those of conception and perception” (Ryland 1900, 232)—that is to say, all major cognitive processes—and that it underlay “[a]ll thought” and “all reasoning” pertaining to general concepts (Jevons 1881, 276). More interestingly, perhaps, Spencer (1897, 144–145) had suggested in *First Principles* that “knowing is classifying, or grouping the like and separating the unlike” and that “the unification of knowledge proceeds by arranging the smaller classes of like experiences within the larger, and these within the still larger”. If one accepts the tenet that classification underlies cognition, then, as one latter-day commentator put it, it is but a short step to the thesis that “re-classification of knowledge in the mind is the way new knowledge [might be] discovered and interpreted” (Olding 1969, 96). Insofar as subject-based document classifications typically represented classifications of knowledge adapted for bibliographical purposes (See Chapter 6, Section 3.2.2, above), any attempt to arrange documents in accordance with a single subject-based bibliographical classification imposed a particular organization of knowledge upon the collection of a special library. This created a particular régime of “cognitive scaffolding” (Jacob 2001, 89–91) that encouraged researchers to follow certain, preset grooves in their library research and, more generally, in their thought: after all, “a fixed arrangement of our literature according to one set of ideas may inhibit the formulation of new ideas” (Olding 1969, 96). By dissociating the organization of documents from their subject contents and arranging them in accordance with the cognitively more neutral criterion of documentary form(at), one circumvented—at least in theory—the problem of cognitive bias and its inhibitory effects upon making new connections among subjects. Such, restated in present-day terms, appears to have been the gravamen of Kaiser’s reasoning.

To this cognitively-based argument, Kaiser added a further, system-related one. In his estimation,

[t]he proper place for classification is with the related terms; it is their special function to supply not one, but all classifications required; and with them it can be

done very accurately; with documents as a whole it is impossible (Kaiser 1926, 31, § 36).

This series of statements represented a development of Kaiser's (1911, § 416) earlier thesis that "related terms ... provide a substitute for a logical classification" (cf. Chapter 7, Section 5.2.2, above), in that it now stressed the structural differences between the two: whereas a bibliographical classification was monohierarchical and so limited to a single set of relationships among the subjects that it covered, the syndetic structure of SI admitted polyhierarchy and so allowed for the embedding of multiple classifications within the network of related terms (See Chapter 7, Section 5.2.2.2, esp. pp. 612–619, above). The presence of polyhierarchical classificatory structures within the system of cross-references in SI would allow the "researchmen" of a business organization to survey the full spectrum of contexts within which a given concrete—be it a commodity or energy—was treated within the framework of their organization's interests. Of course, related terms did not do away with cognitive scaffolding altogether, for they still laid down definite structural pathways to be followed by the users of an index: however, the admission of polyhierarchy gave the indexer had greater freedom in structuring the relations between terms than the classificationist and so afforded the searcher a greater number of options for navigating—and conceptualizing—the universe of subjects represented in the index.

Kaiser's discussions of the design of a form(at)-based system for filing documents and his doctrine of related terms converged not only in their shared association with the general topic of classification but also in the fact that both were among the few points within the text of "Systematic Indexing" at which he alluded to the fact that systematic card indexes created in accordance with the rules of SI were to be configured to the individual requirements of the business organizations for which they were being constructed (Kaiser 1926, 26, § 20; 31, § 36; 32, § 37). Yet, if individuality as a factor in index design largely lurked as a background theme in Kaiser's exposition of his system, Barbour (*apud* Kaiser 1926, 40) thrust it onto center stage in the discussion following the presentation of Kaiser's paper at the ASLIB conference, where he took it upon himself to discuss "the development of individuality in indexes" as a point in favor of SI. He began with the general consideration that

[e]very index had a distinctive character if it was constructed to serve an individual or firm having definite interests. The individual or firm he [sci., Barbour—TMD] would call the owner. Since owners differed regarding the knowledge they possessed, the facilities they had for acquiring information, the energy they devoted

to acquiring and utilizing information, the financial resources at their disposal, and the breadth of their interests, it was obvious that even in those cases where for the moment two owners were apparently engaged in similar pursuits the index of one would differ from that of the other (Barbour, *apud* Kaiser 1926, 40).

Just as Kaiser had done in *Systematic Indexing* (Chapter 7, Section 6.2, above), Barbour conflated the individual businessmen who owned and managed business organizations with the business organizations themselves, speaking of both, indiscriminately, as the “owners” of indexes. In outlining the various factors that differentiated each owner from his, he effectively restated, albeit in less theoretical terms, the argument from epistemological individualism that Kaiser had outlined in his earlier book (cf. Chapter 7, Section 2.1, esp. pp. 308–309, above). Having established the fact of individuality, he went on to contend that, in virtue of its design features, SI was especially well adapted to the task of expressing the individuality of a given owner in the structure and contents of his index:

In the case of the Kaiser system every facility existed for developing individuality, particularly in the matter of choice of related terms, which were characteristic of the owner. The specific nature of the filing terms on the cards was another factor which made for differentiation from the index of another owner. Information with regard to a specific subject was new to one owner, but was not new to another owner; another specific point in the same article might be new to the second and not to the first. The article as a whole might not convey from its title any indication that either of these points was dealt with. But each extracted his little bit of useful information while the man who might be interested in either but who relied on titles and broad methods of indexing would stand a considerable chance of losing both items of information. He [sci., Barbour—TMD] said that cases of that type occurred very frequently indeed. The outstanding merit of the Kaiser system was that it provided so easily for selection of useful and rejection of useless information. Useful and useless to whom? To the owner of the index. And who was the owner? An individual or firm or group working in a restricted field each having definite characteristics (Barbour, *apud* Kaiser 1926, 40).

The freedom to select terms for concretes and processes for an index vocabulary in accordance with the particular field of interest of a given organization (cf. Chapter 7, Section 4.2, above); the capacity to establish classificatory linkages between main headings in accordance with the individual requirements of the organization (cf. Chapter 7, Section 5.2.2.2, above); and the facility to extract just those pieces of information from documents that were deemed useful for informing the work of its members (cf. Chapter 7, Section 1, above): such were the advantages that, in Barbour’s view, SI offered to those persons who wanted to create an index customized to the specific needs of an organization. Following Kaiser’s (1911, §§ 18, 639–640) lead, Barbour did not gloss over the fact that “the working

of the Kaiser system ... entailed hard work for the staff" of a special library or information bureau and was fairly costly to maintain (Barbour, *apud* Kaiser 1926, 38; cf. p. 737, n. 561, above); nevertheless, he maintained, the results that it yielded—"speed in consultation and quick comprehensive assembly of specific data" (p. 38; cf. p. 41)—justified the costs and made it an ideal system of indexing for special libraries, the context for which, he pointedly noted, it had originally been developed (p. 40).

Although Barbour made a powerful case for SI as an indexing system preeminently suited to serve the particular informational needs of specific organizations, he presented it at an unpropitious time for such a message. As noted earlier, in the late 1920s, a number of prominent figures in the world of British librarianship and documentation were urging special librarians to adopt the very bibliographical classifications that Kaiser (1926, 30, § 31) had condemned as "fundamentally weak" on the grounds that they provided the best means of fostering cooperative work among special libraries in the organization of knowledge (See Section 4 of the present chapter, above). Concerned primarily with the organization and dissemination of scientific literature, Pollard (1926b, 37–38) declared that "[w]ithout centralisation and unity in the methods, aims and sympathies in collecting and distributing information, no progress can be made", adding that "if some single and well-proven bibliographical classification is accepted, and all those concerned agree to abide rigidly by its rules and to introduce no changes in the scheme without the sanction and approval of the central body from which the classification emanates, half the battle is won": the classification that he had in mind, of course, was the UDC. Quoting the text of the foreword to the proceedings of the inaugural conference of the organization that would become ASLIB (Cunliffe-Lister 1926), Bradford (1928, 105) lamented that the "volume of modern knowledge" had grown so large as to be "far beyond the mental grasp of any individual or group of persons however erudite" and called for the provision of "a master key whereby the common storehouse may be unlocked": in his view, "a comprehensive index to recorded information" was a first step in forging such a key and "co-ordination" among different bibliographical agencies to be a necessary precondition thereof. The best way of securing such cooperation would be "the adoption of a standard classification" (p. 106), for "by adopting a standard classification, the bibliographical work of each individual would fit into one whole like the standardised parts of a machine, and the desired master-key would be attained" (p. 107). Needless to say, for Bradford, too, this master classification could only be the UDC. Also endorsing the idea of adopting "a single standardized scheme of

classification for all library and all information bureau purposes” was Sayers (1926, 68), who had been favorably impressed by a visit to Paul Otlet’s Palais Mondial in 1921 (Metcalf 1976, 137). Rejecting the skepticism of “those who still argue that a standard scheme of classification which can be applied to all ramifications of human thought and activity is absurdly impossible”, he argued that “as the work of the whole bibliographical intellect of the world”—that is to say, as a cooperative work—it would be quite a possibility”: “What we need to do”, he advised, “is to agree upon some general method of working in this direction, and then to see that specialised treatment is given to the scheme of classification which receives the majority of our suffrages” (Sayers 1926, 68). It goes without saying that these proposals would have been anathema to Kaiser, who, in *Systematic Indexing*, had argued vehemently against the use of standard classifications in business libraries on the grounds that, insofar as one could not standardize the human intellect, no such system could do justice to the individual requirements of businessmen (Kaiser 1911, §§ 243–249; see Chapter 7, Section 6.2, above).

To persons committed to the idea of bibliographical cooperation at the national or international scale, it was apparent that SI did not subserve their goals. For instance, in the discussion of Kaiser’s paper at the ASLIB conference, M. C. Butler (1884–1970), a musician, Esperantist of distinction, and librarian of the British Esperanto Association (BEA), observed that “it would appear that in using the Kaiser system each librarian had to work out for his own use his own index” (Butler, *apud* Kaiser 1926, 43). This, he noted disapprovingly, “involved tremendous duplication of labour”. “Moreover”, he added, “no two persons thought alike or made the same decisions as to terms to be used”. If he agreed with Kaiser on that point, he drew a vastly different conclusion from it, for, to his mind, such individuality “involved difficulties in co-ordination of effort with other libraries”. Butler, who used the DDC and, later, the UDC, with extensions for Esperanto-themed subjects, for cataloging and indexing purposes in the BEA library (Butler 1923; *The B. E. A. Library* 1939–1940), identified yet another aspect of SI that militated against bibliographical cooperation on a wider scale: its use of natural-language indexing terms. “Alphabetical arrangement in one language was useless to those using another language”, he averred: for this reason, “the Kaiser system apparently rendered international co-operation impossible” (Butler, *apud* Kaiser 1926, 43). By contrast, he noted, “[a] numerical system on a subject basis, like Dewey, was applicable universally and to all languages and was therefore best for purposes of international collaboration”—a standard line of argument among proponents of

the UDC (e.g., Otlet 1934, 380, § 412.33, Point 4; Pollard & Bradford 1930, 42). For Butler and other proponents of decimal classification, SI was simply too individualistic an indexing system to be useful for cooperation, at any level, in bibliographic indexing. Some fourteen years after the conference, Bradford (1940) would characterize it as a system designed for “non-co-operative purposes”: he did not mean this as a compliment.

Proponents of Kaiser’s system agreed with its critics that it was not likely to be useful for certain models of coordinating the organization of knowledge. During the discussion of Kaiser’s paper, Barbour (*apud* Kaiser 1926, 40) stated that, given the individualistic nature of SI, it was simply not suitable for use in cases in which a single centralized agency was responsible for indexing the literature of a given domain:

a central card distributing agency using this system for workers in a given field was peculiarly liable to waste effort, and the same remark would apply with much greater force to a central institution which attempted to index by this system for a clientele the members of which possessed widely different interests.

However, neither did he consider a model of centralized indexing to be ideal, for he went on to add that “the idea of establishing a national institution with an independent staff carrying out the work of intensive indexing on all phases of activity was, in his opinion, ... impracticable” (p. 41). He favored a more distributed approach to cooperation in indexing, whereby a “Central Institution”—say, for example, one dealing with “Economic Intelligence”—would receive “at regular intervals or spasmodically, on terms to be agreed, duplicates of cards or other records of information bearing on subjects of importance” from individual special libraries: under such a dispensation, he believed, “the efforts of a few dozen special libraries which met the requirements of modern business and industrial conditions efficiently were capable of being co-ordinated in such a way as to produce valuable results” (p. 41). Implicit in this was a critique of the ideal of centralized indexing that had animated Otlet’s work at the IIB (See Chapter 1, Section 5.2.3, above), a point that was made openly by Barbour’s colleague Rintoul (1925, 173) in a lecture on the theme of “library and office organisation for chemists” delivered to London section of the Institute of Chemistry of Great Britain and Ireland in 1925:

In approaching the matter of a general register of knowledge ... from the bottom upwards, rather than in the much more ambitious method underlying the conception of the great Biographical [*sic*] Index in Brussels, we are more likely to arrive at, at least, a partial realisation of the object for which we are striving.

Yet, if Barbour and Rintoul argued for a mode of cooperation based on the joint initiative of special libraries and envisaged that each individual library would perform its own indexing on the documentary materials pertaining to the particular field of interest of its parent organization, they maintained a discreet silence regarding the questions of how, precisely, the indexing was to be coordinated, whether any effort would be made to harmonize the indexing schemes used by the participating libraries, and if so, what was the optimal scheme for the purpose. It is perhaps not surprising that they should have done so, for such questions did not favor their preferred system of indexing: even within the framework of the relatively decentralized model of cooperation that they endorsed, it is difficult to see how index items emanating from systematic card indexes belonging to different organizations could have been integrated into a single centralized master index without great confusion in the establishment of related terms.

SI was, indeed, best suited to a régime of special librarianship in which each library, information bureau, or intelligence department functioned as an atomistic unit unto itself and in which indexing was, so to speak, individualistically oriented. The advocates of Kaiser's system had no good response to its critics' charges that it failed to contribute to bibliographical cooperation and, accordingly, stressed the initiative of the individual library rather than the central agency in their discussions of the place of indexing in cooperation between special libraries. Some came, in time, to plump for the decimal alternative: for example, by 1931, Frederic Nathan, the erstwhile manager of the Ardeer plant who had originally engaged Kaiser there and who had publicly commended SI in the discussion following the Kaiser's paper at ASLIB (See Chapter 8, Sections 2 & 3, above), had become a vocal advocate of the UDC as the best means of international indexing of scientific literature and a collaborator with Pollard and Bradford in their efforts to promote the cause of the classification on British soil (Muddiman 2007b, 91; Nathan 1931).

Ultimately, the results of the presentation of SI at ASLIB were mixed. On one hand, Kaiser's paper was a signal contribution to the propaganda carried on behalf of his system in Great Britain (See Chapter 8, Section 3, above), for in it he clearly outlined the primary elements of SI, indicated the points of contrast between it and the decimal classifications that he perceived to be its main rivals for use in the special library, and made a case for what he considered to be its advantages as a method of indexing within that context. Barbour's intervention in the discussion that followed his delivery of the paper served to enlarge upon, and deepen, some of Kaiser's points and set them more firmly within the

context of current British debates regarding the organization of knowledge in special libraries. Viewed from the perspective of the history of KO, “Systematic Indexing” is notable because it reflected certain shifts in Kaiser’s conceptualization of his system: he now presented the categorial scheme of SI as primarily dyadic, focusing almost exclusively on the categories of concretes and processes; he reconfigured the definitions of these categories so that terms of concretes now encompassed terms of commodities and of energies, while those of processes comprised terms referring to the static and dynamic conditions of concretes; he set forth the category sequence [CONCRETE]–[PROCESS] as the statement form *par excellence*; and he explicitly assimilated the relationships between related terms, or cross-references, to relationships between geometrical magnitudes and devised an innovative symbolic means of indicating these. Because the article was less exhaustive—and so less exhausting to read—than his earlier books and, more importantly, because it appeared in a publication that enjoyed a high profile among British special librarians and documentalists, the image of SI that it delineated would, in subsequent years, become the standard one in the British discourse of special librarianship (See Section 6 of the current chapter, below).

Yet, the discussion following the delivery of the paper at ASLIB also reflected the fact that the appeal of SI as a KOS had definite limits. “It is difficult to form a fair estimate of the Kaiser systematic indexing from description alone” (Jolley 1955, 71), a later commentator would note, and reactions to SI varied in accordance with whether a person had experience with it or not. Those special librarians whose organizations had adopted it tended to speak of it in glowing terms (e.g., Sellars, in Kaiser 1926, 41; Nathan, in Kaiser 1926, 42). Users of the DDC and UDC, on the other hand, dismissed it on grounds varying from the conviction that, as a matter of principle, no alphabetical ordering of information could be superior to a classified one (Turner, *apud* Kaiser 1926, 33–35) or that it was useless for cooperative purposes (Butler, *apud* Kaiser 1926, 43) to the belief that the system was too complex, costly, and labor-intensive to employ in any but very large libraries, whereas the UDC, already published and available, was easier to apply to the needs of a special library or information bureau (Matthews, *apud* Kaiser 1926, 35). Kaiser’s paper does not seem to have won over those whose prepossessions led them to favor decimal classification, though at least one of them conceded that he “admired the great ingenuity and extreme skill shewn in the Kaiser method” (Matthews, *apud* Kaiser 1926, 35): within British special librarianship, it remained very much an acquired taste.

Another reason for the limited appeal of SI lay in Kaiser's insistence that SI was only suitable for use in certain contexts. Most notably, he firmly rejected the notion that SI might have any rôle to play in the indexing activities of a "municipal or public library" (Barbour, *apud* Kaiser 1926, 40). In the discussion at ASLIB, Barbour drove this point home by quoting a long extract from a letter that he had received from Kaiser, in which the latter laid out his position on the issue by comparing the needs of public libraries to those of special libraries:

Municipal or Public Libraries, and Firms or Departments using my system—call the former A's and the latter B's. The B's cover a well-defined field of knowledge, that of the A's is much less defined. With the B's the index *must* be used; with the A's it is merely a matter of probability. The B's can therefore do intensive indexing and do it thoroughly; the A's would do it more or less superficially (not necessarily dyslogistically). With the B's a Central Index is obligatory; with the A's a dictionary catalogue is obligatory. With the B's the Central Index is the main source of information, the dictionary catalogue being merely supplementary; with the A's the dictionary catalogue is the main source and the indexing supplementary. *With the B's inquiries are largely limited to the field marked out; with the A's almost any question may be fired at them at any time.* For the B's my system is suitable; it is designed for them. The A's use the decimal system simply because they use it for the books. If the A's were to use my system, it would put them all out of business for want of funds, and even if they had the funds, it would be a terrible waste to do intensive indexing merely on chance. You see, therefore, that there is no basis for direct comparison. My system has very definite characteristics and should only be used where it actually will be of service (Kaiser 1926, 40 [emphases his]).

This passage, which built upon, and, greatly expanded, the contrasts between public and business libraries that Kaiser had already made in *Systematic Indexing* (Kaiser 1911, § 246; cf. Chapter 6, Section 2.3, above), forthrightly gave a number of reasons why public libraries *shouldn't* use SI within their régimes of knowledge organization: it was only suitable for indexing specific fields of knowledge, not the universe of knowledge as a whole; public libraries were concerned primarily with books and so had a much greater need of a good dictionary catalogues than a systematic card indexes; and, last but by no means least, intensive indexing was simply too costly an activity to be supported by the limited budget of the municipal library. On these points, Kaiser's rationale was compelling: however, it cannot but have discouraged those public librarians attending the ASLIB conference from exploring his system further or bringing it to the attention of their fellows. The consequence was that discussion of SI would remain outside of the discourse of general librarianship for thirty years, when an Australian public librarian and library educator would undertake to make it better known to his colleagues (See Section 6 of the present chapter, below). In the

years following the ASLIB conference, however, knowledge of SI appears to have been almost entirely confined to the community of British special librarians.

9.5. Hercules Powder Company and Death, 1927

Having called renewed attention to SI and summarized its basic features in print, Kaiser soon had occasion to put its principles into practice again, for he received an invitation to design and install a new index for an American industrial concern. The invitation came from the Hercules Powder Company (hereafter, Hercules), a chemicals manufacturer based in Wilmington, Delaware. Founded in 1912, this company owed its existence to a protracted antitrust action against the giant explosives firm of E. I. Du Pont de Nemours and Company, which had built up a conglomerate of holding companies and subsidiary businesses into a “powder trust” that dominated the explosives industry in the United States in the first decade of the twentieth century (Dyer & Sicilia 1990, 39–42). Found by the courts to have violated the Sherman Antitrust Act, Dupont was compelled to divest itself of significant portions of its assets, which were partitioned between two new companies, one of which was Hercules (Dyer and Sicilia 1989, 61; 1990, 42–46, 61–63).⁶²⁵ Originally, the new company specialized primarily in the production of explosives such as dynamite and black powder. However, during World War I, it also began making nitrocellulose products and, shortly after the war, it opportunistically branched out into the production of naval stores—i.e., rosin, turpentine, pine oils, and derivatives thereof—as well (Dyer and Sicilia 1989, 61–63; 65–68; 1990, 10–11). By the late 1920s, Hercules was producing a wide array of explosives, naval stores products, nitrocellulose lacquers, purified cotton linters, and industrial acids (Hercules Products and Branch Offices 1928), thus greatly exceeding the range of manufactures expressed by its nominal designation as a “Powder Company”.

Like other industrial concerns specializing in the production of chemically active substances, Hercules depended on research to develop its products and refine its manufacturing processes. Because of a court-mandated agreement with Dupont drawn up at the time of its formation, the then fledgling company was able to utilize the research facilities of its parent corporation for the first few years of its existence (Dyer & Sicilia 1990, 108). Over the course of the First World War, Hercules began to develop its own research capabilities. In early 1916, it opened a laboratory to support research on military explosives

⁶²⁵ The other was the Atlas Powder Company, the headquarters of which were likewise located in Wilmington.

at its factory in Kenvil, New Jersey, a hamlet located approximately forty miles to the west-northwest of New York City. In November of the following year, the company made this laboratory the cornerstone of a new research facility to carry out investigations relating to both military and commercial products (p. 109). Known as the Hercules Experimental Station, the facility subsequently became the center of research directed towards developing the company's diversifying lines of explosives and specialty chemicals: by the end of the 1920s, it encompassed separate divisions for work on explosives, smokeless powder, ballistics testing, and nitrocellulose, as well as a department of physical chemistry and an analytical laboratory (Pickett 1929).⁶²⁶

Among the divisions of the Experimental Station were two that pertained specifically to the documentary aspects of research: its office, where correspondence was kept and internal research reports were typed and filed, and a library, the holdings of which consisted largely of technical periodicals (Pickett 1929, 17).⁶²⁷ The early history of these two divisions is obscure. Nevertheless, it seems that, by the mid-1920s, the manner in which they organized the technical information falling within their purview was failing to give satisfaction to the research staff at Kenvil, for the Experimental Station's administrators decided that a new method of information organization was to be introduced. They appear to have consulted with colleagues at other companies within the chemicals industry about systems suitable for adoption, among whom were contacts working at the Nobel's factory at Ardeer, who informed them about their central index, the system on which it was operated and the person who designed it (American Society of Mechanical Engineers 1928).⁶²⁸ Impressed by the Ardeer index, executives at Hercules

⁶²⁶ In 1923, a second laboratory devoted to research on naval stores was opened at another of Hercules's plants in Brunswick, Georgia (Davis & Sicilia 1990, 172). However, it was much less extensive than that at Kenvil: in 1927, it numbered only 7 staff members, while the Experimental Station had no fewer than 96 (West & Risher 1927, 54, No. 424).

⁶²⁷ As of 1929, library's stock consisted of "approximately 3500 volumes of which 2400 [were] bound periodicals" and its reading room regularly received 121 technical journals: at that time, it also had associated with it a small abstracting and translating service (Pickett 1929, 17).

⁶²⁸ In a brief account of the history of information services at Hercules, Skolnik (1974, 124) writes as if this consultation took place in 1928: "Hercules research management was unique in 1928, 14 years after the founding of the company when it assigned a chemist the task of setting up a report index. At that time, the chemist could not find a report indexing operation within the United States, but had to travel to Scotland (Ardeer) to seek aid and advice". The apparent discrepancy between his chronology and that given here is resolved if one recalls that Hercules was founded in 1912: the fourteenth year from that date was 1926, not 1928. Most likely, Skolnik, who does not otherwise seem to have been aware of the fact that Kaiser worked at Hercules, conflated two distinct dates: (1) the year in which planning for the report index began (1926) and the year in which the index actually began operation (1928).

contacted Kaiser to inquire further about his system and, late in 1926, he agreed to come to Kenvil “for the purpose of organizing the library and correspondence, and developing a central index of technical information” at the Experimental Station (Hercules Powder Company 1927).

Having taken a leave of absence from his work at the ASME at the beginning of the new year, Kaiser arrived in Kenvil on 10 January 1927 (American Society of Mechanical Engineers 1928; Hercules Powder Company 1927). Once settled in, he began to lay the groundwork for the new indexing system. According to the protocols for “planning and organizing a system” that Kaiser (1926, 32–33, § 40) had outlined in his recently published paper for ASLIB, “[t]he first step” in a project such as the one he was undertaking was “to determine exactly what the problem is, what is given in the way of literature and other materials, what conditions have to be met, what results are expected, and what amount of time is available”. Thus, it is likely that, much as he had done at Ardeer (see Chapter 8, Section 2, above), he commenced by inspecting the Experimental Station’s document collection and canvassing the research staff at the Experimental Station to learn about their needs and expectations for the central index that he was to design.

Yet, no sooner had Kaiser’s work at Kenvil begun than it was abruptly and irrevocably cut short. On the evening of 2 February 1927, as he was taking a walk along the highway near the Technical Club, a social center for employees of the Hercules factory (Platt 1922, 221–222), he was struck by an automobile that, according to one account, was speeding (American Society of Mechanical Engineers 1928; Hercules Powder Company 1928). The collision knocked him unconscious and left him badly injured with “a fractured leg, contusions of the head, three broken ribs, and internal injuries” (Hercules Powder Company 1927). In this parlous condition, Kaiser was transported to the General Hospital in the nearby town of Dover, New Jersey, where he underwent medical treatment. For two days, his life hung in the balance but, ultimately, his injuries proved to be insuperable and, in the late evening of 4 February, he died “without having regained consciousness” (Hercules Powder Company 1927), a little over one month shy of his fifty-ninth birthday. Kaiser died, as he had lived, a bachelor and his employers at Hercules were unaware of his family in Australia: accordingly, they took upon themselves the task of arranging for his burial. On 9 February, following a funeral service at the Hercules Technical Club in Kenvil, his body was

interred at the cemetery of the First Presbyterian Church in the neighboring hamlet of Succasunna, New Jersey, where it lies to this day (Hercules Powder Company 1927).⁶²⁹

In its issue for the following month, March of 1927, the house magazine for the Hercules Powder Company, entitled the *Hercules Mixer*, published a brief obituary of its recently deceased indexing consultant. In addition to recounting the main points of Kaiser's career and the circumstances of his untimely death, the author of the unsigned piece sought to give readers a broader sense of his or her subject's *persona* by listing some of his pursuits outside of the workplace:

Mr. Kaiser was a musician. He composed several works, conducted orchestras and choruses, and played well. He was also interested in mathematics, and among his effects was found the manuscript of a new text on geometry, in which he disagreed with some existing theories. He was an amateur chess player of standing, and he had interesting collections of stamps and coins (Hercules Powder Company 1927).

This enumeration of avocations offers us a glimpse of a side of Kaiser's life otherwise largely invisible to the historical gaze. With regards to music, we have already seen that, during the late 1880s, Kaiser had made a name for himself in Brisbane as an amateur zither player of note (See Chapter 2, Section 2 above): there are slight indications elsewhere in the historical record that, after his departure from Queensland, he continued to involve to himself in various musical activities of the sort indicated in the obituary, at least in Philadelphia⁶³⁰ and in London.⁶³¹ There is also some evidence, unfortunately somewhat equivocal, that he took

⁶²⁹ For an image of the tombstone marking Kaiser's grave, see <http://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GRid=56626208> (accessed 27 March 2012).

⁶³⁰ In the spring of 1898, a composer by the name of "Julio Kaiser" living in Philadelphia applied for, and obtained, a copyright for a piano piece published in Berlin by the music publisher Scheithauer under the title "Recuerdos de Mira Mar. Valse. Para Piano" (Friedrich Hofmeister [1898], 257; Library of Congress, Office of Register of Copyrights 1898, pp. 769 & 796). In light of the facts that (1) "Mira Mar" is an alternate spelling of "Miramar", the name of the beach at Viña del Mar in the proximity of which Kaiser had taught during his sojourn in Chile (Chapter 2, Section 3), that (2) the person who published the piece had connections in Germany, and that (3) Kaiser was living in Philadelphia in 1898 (Chapter 3, Section 1), there is every reason to believe that the "Julio Kaiser" in question was none other than our personage, who, after departing from the Chilean Versailles, had written a waltz evoking the memories (*recuerdos*) of his time there.

⁶³¹ In a list of the shareholders of the CIB drawn up in late December of 1904, at the end of Kaiser's first year with the Tariff Commission, Kaiser's occupation is given not as "librarian" (as it was in the list of shareholders drawn up in June, 1900), but as "musician". See UKNA BT 31/8875/65304, Summary of Capital and Shares of the Commercial Intelligence Bureau, Ltd., 23 December 1904. The fact that Kaiser could be listed as a musician in a formal document such as this strongly suggests that, at that period of his life, music was for him an object of serious leisure. One cannot, of course, infer whether, at this time, his musical activities were oriented primarily toward solo performance, composition, or conducting: in the latter case, he would most likely have conducted amateur ensembles, much as his brother, Albert Emil Oscar Kaeser, who, as we have seen, combined a career

part, not without success, in amateur chess competitions during his sojourn in London.⁶³² As for his unfinished treatise on geometry and his coin and stamp collections, nothing is known about them apart from what was recorded by his obituarist.

Although the evidence for Kaiser's activities outside of his professional work is limited, its significance should not be minimized, for it throws additional light upon his intellectual inclinations and temperament. Most notably, the kinds of hobbies that he took up required that he deploy many of the same skills as he did in his work as librarian and indexer. An obvious point of continuity between avocation and vocation was his keeping of private collections of coins and stamps, an activity that reflected a penchant for collecting and organizing. Contemporary writers on classification in the library press often cited stamp or coin collections as examples of classification in everyday life (e.g., Richardson 1901, 1–2; Sayers 1926, 24; *The Value of a Knowledge of Classification in General Education* 1921, 215) and, as we saw earlier, Kaiser (1911, §§ 162–172) himself used the classification of coins as an example of the classification of concretes (See Chapter 6, Section 3.2.2, esp. pp. 236–239, above): in this respect, then, he practiced for his own recreation the art of classification that he preached to his readers. His interest in chess required mastery of a set of rules and the creative manipulation of abstract patterns within the framework of a regular and well-structured procedure wherein players take turns in moving pieces upon the chessboard: it is not difficult to see how a person with an affinity for such an activity might also be inclined to favor the development of systematic procedures for filing and indexing in accordance with a set of well-defined rules (See Chapter 7, Section 6.1, above). Kaiser's mathematical interests and his work on a treatise on geometry are likewise suggestive of an intellectual propensity towards dealing with abstract patterns in accordance with a rigorous process of reasoning. Furthermore, they are congruent with his use of geometrical images, such as that of the overlapping and underlapping between terms and mental pictures as well as between terms in *Systematic Indexing* (See Chapter 7, Sections 2.2.1 & 2.2.4, esp. pp. 328–330, 353, 358–360, above) and his later comparison of

as a musical store owner and teacher with intensive activity as a performer and conductor of amateur bands and orchestras around Brisbane did (See Chapter 2, Section 2, esp. p. 78, above).

⁶³² In the June 1908 issue of a British magazine entitled *The Chess Amateur*, we read, in a column entitled "Chess Chat" (1908, 258), that a "Mr. J. Kaiser" had won the Russell Cup—one of four prizes awarded annually by the City of London Chess Club—for the year and, with it, a prize of £ 4. The J. Kaiser in question is not further characterized and his precise identity must, perforce, remain uncertain: nevertheless, in light of the characterization of Julius Otto Kaiser as "an amateur chess player of standing" in the Hercules obituary, there is good reason to suspect that he was the person mentioned in the column on Chess Chat.

terms of concretes to geometric magnitudes in “Systematic Indexing” (See Section 4 of the current chapter, pp. 797–799, above).

Kaiser’s unfinished treatise also reflects another important trait in his temperament—namely, a strong sense of intellectual independence and individuality. His project of undertaking a study to point out what he saw as flaws in contemporary theories of geometry was indicative of that critical cast of mind that had led him both to find fault with the index of at the PCM’s Bureau of Information shortly after he had entered his indexing career (See Chapter 3, Section 3.3, above) and to subject the leading bibliographical systems of classification, above all the DDC, and, indeed, the very notion of subject-based bibliographical classification, to strong critiques (See Chapter 6, Section 3.2.2; Chapter 7, Section 6.2, esp. pp. 684–685; Chapter 8, Section 1; & Section 5 of the current chapter, above): in all these cases, he possessed sufficient independence of mind to go against the grain of what he saw as conventional wisdom. Such an intellectual disposition went hand-in-hand with the strong tendency toward individualism that, as we have seen, Kaiser had manifested not only in his occupational and personal life—he had, as a young immigrant to Queensland, struck out upon a career path other than the one for which his formal education had destined him (See Chapter 2, Sections 1–2, above); he had not hesitated to refashion his surname while residing in Chile (See Chapter 2, Section 3, above); and, once he had taken up indexing at the PCM, had quickly developed his own indexing scheme after finding the one in use there to be wanting (See Chapter 3, Section 3.3, above)—but also in his design for SI as a system of indexing customizable to fit the individual requirements of business organizations and, especially, in in his theoretical justifications for making allowance for the individuality of organizations and of persons that informed this design (See Chapter 7, Section 6.2, above). Kaiser’s musical activities as a zither soloist and as a composer can also be readily construed as expressions of individual creativity consistent with a sense of personal *Eigentümlichkeit*, while his conducting of choruses and orchestras—an activity the goal of which is to coordinate multiple individual musicians in accordance with one’s own considered interpretation of a musical score in order to achieve a harmonious group performance—formed a parallel on the plane of artistic avocation to the management of individual indexers, filers, and clerical workers in his work as librarian (cf. Chapter 3, Section 3, esp. p. 108, above): like the latter, it was subject to the tension inherent in striking a balance between inuring the members of group—be it a body of musical performers or clerical workers—to a given set of standards with which they were to comply

and giving them sufficient liberty with which to express their individuality (See Chapter 7, Section 6.2, esp. pp. 690–694, above). All in all, Kaiser’s leisure-time activities were of such a sort as to both manifest and reinforce the intellectual and temperamental traits that informed his work on knowledge organization: in this respect, there appears to have been a deep coherence underlying his general approach to life and work.

9.6. Systematic Indexing after Kaiser: From Practical System to Canonical Profile in KO

Kaiser’s death nipped his work at the Hercules Experimental Station in the bud and deprived collaborators of his experience and expertise; however, it did not shake the resolve of the station’s administrators to have his methods applied to the organization of their technical information. *Mutatis mutandis*, the project of establishing a central index was kept alive and, in 1928, an index “using the Kaiser system” began operation (Skolnik 1974, 125). Maintained by a “report index group” whose members were responsible for the indexing and abstracting of research reports generated by chemists and engineers working for Hercules, this index—which was variously known as the central index or report index—would become an enduring part of the research infrastructure at the company (Shorb 1949, 15–16; Skolnik 1969, 216; 1974, 125). In 1948, twenty years after its inception, an Australian librarian who visited the Hercules Experimental Station in the course of a research tour observed that the Kaiser system was still being used for the indexing of reports there as well as for journal indexing in the Station’s library (Johnston 1949, 6–6a, 31, 43). Over time, the Hercules report index underwent incremental modifications that altered its complexion in various ways so that, by the end of the 1950s, it had been transformed, in the words of the manager of the research department, into “[a] completely new system” (Skolnik 1974, 125; but cf. Skolnik 1959, 27): yet, a careful examination of contemporary descriptions of the index reveals that key elements of the underlying indexing system—such as the treatment of composite index terms—continued to follow the basic patterns of SI that had been instituted some thirty-one years before (Skolnik 1959, 29–31, Figs. 4, 6, 7, 9).

The Hercules Powder Company is the only major industrial concern in the United States whose information services are known to have utilized a form of SI in the quarter-century following Kaiser’s death: if any others did so, they have, so far at least, remained invisible to

the historian's gaze.⁶³³ On the other hand, during this same period, SI enjoyed a somewhat wider diffusion in Great Britain, where Kaiser had undertaken the first full-scale implementations of his indexing methods and where it continued to find use at a handful of corporate libraries and information departments. Versions of card indexes structured in accordance with the Kaiser system or modifications thereof are known to have been in use at the technical information division of the Mond Nickel Company, Ltd. (Burkett 1961, 107–108; Johnston 1949, 6–6a; Mohajir 1962, 61–63), the information service of the Tin Research Institute (Holmstrom 1943, 259; 1953, 202–203), the information department of the phosphorus manufacturing firm Albright and Wilson (Burkett 1961, 141), and the central registry of the chemicals giant Imperial Chemical Industries, Ltd. (hereafter, ICI) (Holmstrom 1953, 201–202), as well as some of the technical libraries belonging to the latter's far-flung divisions, including the Nobel works library at Ardeer, where the central index originally designed by Kaiser and perfected by Barbour continued to be a valued research tool (Brown 1950, 87–89; Holmstrom 1940, 199–200; 1956, 422–423; Miles 1955, 70–71).

Of these various implementations of SI, the one at ICI is of especial interest in that it had direct institutional links with Ardeer. Late in 1926, Nobel Industries, Ltd., the successor of Nobel's Explosives Company, Ltd., merged with three other leading British chemicals companies—Brunner, Mond, & Company, Ltd.; United Alkali Company, Ltd.; and British Dyestuffs Corporation, Ltd.—to form ICI (Reader 1975, 3, 20–21). Situating its front offices in London, the new mega-firm, whose plants and research facilities were scattered throughout England and Scotland, initially sought to follow a strongly centralized model of corporate governance; soon, though, it came to balance central coordination with considerable autonomy for the various manufacturing divisions of the firm, each of which represented a particular field within the chemicals industry and was largely self-managing (Black 2007b, 160; Holmstrom 1951, 22). As part of its thrust toward centralization, ICI

⁶³³ It is striking that, in an article on “the library's place in business” penned for the journal *Drug & Chemical Markets*, two researchers from E. I. du Pont de Nemours and Company, the explosives and chemical giant from parts of which the Hercules Powder Company had originally been formed, listed “Kaiser's Systematic Indexing” alongside the “American Library Association Catalog rules”, the “Library of Congress' Handbook of Card Distribution”, the “Rules for Filing Cards issued by the Carnegie Library of Pittsburgh” as “desirable hand books” on “[t]he work of cataloging” (Kenney & Vinsonhaler 1922, 1234)—an indication that Kaiser's monographic account of SI was, at the very least, known to members of the information service of that firm. Whether the persons responsible for the subject indexing of the extensive data files kept by the firm drew inspiration from Kaiser's system is unknown (Schofield 1923, 166–168 & cf. 131–132): this is a matter that calls for further investigation.

established at its London headquarters a central registry for filing copies of internal reports and policy papers (Holmstrom 1953, 201). William Barbour, who, as we have seen, had taken part in designing the original central index at Ardeer, had overseen its early development, and had been the foremost proselytizer for SI on the British special library scene in the early 1920s (Chapter 9, Sections 2, 3 & 4, above), was placed in charge of the registry, where he established a central index modeled on the one at Ardeer but limited in its coverage to two classes of unpublished documents: research reports from the company's various divisions, copies of which were sent to headquarters, and such items of "correspondence on file as were deemed to be of commercial value" (Holmstrom 1953, 201; Royal Institute of Chemistry 1958). Begun in 1927, the ICI central registry's Kaiser index underwent continuous augmentation until 1940, when wartime exigencies brought it to a halt (Holmstrom 1953, 201; Pears 1951, 82).

In 1946, when indexing activity at the central registry resumed under the leadership of John Edwin Holmstrom (1898–1982), the original central index remained closed and a new master index, which covered not only internal reports and correspondence but also bibliographical information about published articles of interest to the firm culled from various abstracting services, was begun in its stead (Holmstrom 1948b; 1953, 201–202). In selecting an indexing system, the designers of the master index did not revert to SI: at first, they adopted an alphabetic-classed indexing system devised by Holmstrom but soon turned to the UDC, using Holmstrom's system as a supplement thereto (Holmstrom 1948b, 389–397; 1953, 70–71, 202). This transition from a central index based on SI to a master index based initially on Holmstrom's scheme and then primarily on the UDC reflected, in large measure, a changing of the guard in the oversight of the central registry. Barbour had been a dedicated partisan of SI, while Holmstrom was no less committed to his own system. When he ultimately switched to the UDC, he did so because much of the bibliographical data that the master index was incorporating came pre-indexed with UDC numbers, making it more efficient to use them than to index the data *de novo* (Holmstrom 1948b, 390, 396): the move also undoubtedly promoted a measure of coordination between the master index at ICI headquarters and the indexes of those research divisions within the company that already used the UDC for organizing their information files (Holmstrom 1953, 200–201).

It would be a mistake to reduce the transition from central index to master index at the ICI's central registry to a function of managerial predilections alone. This shift was also part of a broader tendency in the world of British special libraries and information services that

boded ill for the future of SI: although the Kaiser system continued to be used in some quarters and was still considered a live option—an exhibition at the Royal Society Scientific Information Conference held in London in 1948 included a display devoted to illustrating and explicating its use, alongside exhibits on the UDC, various chemical classifications, and punched card indexing systems (Exhibition Catalogue 1948, 229; Holmstrom 1948a, 80)—⁶³⁴ fewer information workers engaged in setting up new indexes were opting for its use. Emblematic in this regard was the experience of W. E. Batten of the Patents and Intelligence Department of the Plastics Division of ICI, who was responsible for implementing an indexing system for a small collection of patents in the mid 1940s. Although SI appears to have been his default option, Batten ultimately “ruled out any form of Kaiser Index” on the grounds that it would lead to inefficiencies in indexing: instead, he developed a technique of coordinate indexing using punched cards that would come to be known as the peek-a-boo system (Batten 1947, 37; see Glossary). Batten’s eschewal of SI would be recapitulated in other contexts throughout the 1950s and 1960s, as special librarians and information workers came increasingly to rely on indexing systems of more recent vintage and new methods of mechanized information retrieval relying on technologies that went beyond the traditional apparatus of the card index.⁶³⁵

Yet if practical utilization of SI was on the wane after the mid-century, Kaiser’s indexing methods continued to receive attention in discourse about indexing and classification within the world of special libraries and documentation services. During the 1940s and early 1950s, perhaps the most prominent expositor of SI was, ironically enough, the same man who replaced it with the UDC at ICI’s central registry, J. E. Holmstrom. An engineer-turned-information-specialist with wide-ranging interests in what today would be called information management and terminology, he authored a number of manuals devoted to the techniques of documentation as well as numerous journal articles and conference

⁶³⁴ Interestingly, the exhibit on the Kaiser system was arranged by ICI and a Mr. W. J. Wright, a reflection of the strong tradition of use of SI within certain divisions of ICI. Tellingly, ICI’s other exhibit was on the “UDC mechanized by microphotography”, a demonstration of the procedures used in the production of the central registry’s master index (Exhibition Catalogue 1948, 230–231).

⁶³⁵ A good example of the succession of systems comes from Silk’s (1979, 148) brief historical overview of the different indexing methods used by the agricultural information services at ICI: these underwent a progression from “traditional card indexes with abstracts, filed according to the Kaiser system ... to a simplified Kaiser system ... next [to] a peek-a-boo type of co-ordinate index, and finally [to] KWIC indexing with stylizers”, which, in turn, was ultimately superseded by the online system ASSASSIN. Unfortunately, Silk does not give the dates of adoption of the new systems and so the chronological framework for the progression from the Kaiser System to ASSASSIN must remain relative, not absolute.

presentations on these themes (Bell 2008, 117–118). Deeply interested in issues of indexing, he produced a number of surveys of the methods of classification and indexing used in contemporary special libraries and information centers, which routinely included brief expositions of the basic features of the SI (Holmstrom 1940, 199–205; 1947, 250–256; 1948c, 510–511; 1953, 46–48; 1956, 422–423). Drawing both on Kaiser’s (1926) article in ASLIB and on materials in ICI’s own card files, Holmstrom (1940, 204) characterized SI as “truly analytical” form of indexing, in which the indexer did not confine himself to preparing one index entry per document, but created, for any one document, “as many separate cards as are necessary to cover all the points of possible interest therein”. His expositions, which varied in details, routinely tended to focus on the categorial system of SI and its network of cross-references. With regard to the former, Holmstrom presented the dyadic form [CONCRETE]–[PROCESS] as primary, adopting the definitions of the two categories that Kaiser had given in his final paper (See Section 4 of the current chapter, esp. pp. 780–784, above). His accounts of the treatment of terms, according to which indexers could only use process terms from a pre-established list altered at five-year intervals but had a greater degree of freedom in choosing terms for concretes (Holmstrom 1940, 201–202; 1953, 48; 1956, 423), apparently were based on practices at ICI inherited from Ardeer, as were his allusions to a separate section in the card index for process cards (See Chapter 8, Section 2.1, esp. pp. 730–734, above), although he seems to have mistakenly generalized the limitations on terms for processes in the process section to the index as a whole. Holmstrom’s (1940, 202–203; 1953, 47–48) description of cross-references on the guide cards for concretes followed, for the most part, Kaiser’s (1926) later account of SI’s syndetic structure, although he somewhat surprisingly eschewed the latter’s innovative use of “<” and “>” to indicate higher collectives, and lower specifics, respectively (See Chapter 8, Section 2.1, p. 726, Figure 47; Chapter 9, Section 4, p. 795, Figure 50, above; cf. Holmstrom 1940, 203, Figure 6; 1953, 48, Figure 48A). In his estimation, the network of cross-references was the source of the Kaiser system’s “great merit of flexibility” (Holmstrom 1940, 204), though it did not come without tradeoffs: a methodical search for information by means of guide cards might be “time-consuming”, the person who undertook such a search could be “absolutely certain that he will eventually find whatever there may be in the index that will satisfy his quest” (Holmstrom 1953, 48). Compact in their presentation and evenhanded in their treatment, these accounts, which reflected the ICI version of SI derived

from Ardeer, became, for many readers, the source of first recourse for information about the basic outlines of the Kaiser system (e.g., Jackson 1951, 95; Smith 1949, 31).

In those same years, other writers on documentation or special library techniques also discussed, to a lesser or greater extent, the basic tenets of SI (e.g., Roskill 1946, 17–19; Wright 1946, 40–41): like Holmstrom, they tended to take Kaiser's paper for ASLIB, with its dyadic model of the category system, as the basis of their discussions. Perhaps the most substantive efforts came from the pen of a young chemist-turned-industrial librarian employed at ICI's Butterwick Research Laboratories by the name of Brian Vickery (1919–2009), who, in 1950, published two papers in which he considered, *inter alia*, the structural features of the Kaiser system from a comparative perspective. In the first of these papers, which appeared in *The Industrial Chemist*, he briefly discussed the structure of composite index terms, the arrangement of index terms within a file, and cross-reference mechanisms of SI and compared its features to those of the UDC (Vickery 1950b, 221). This choice of indexing systems allowed him to compare an alphabetical and a classed scheme. It also doubtless reflected the fact that SI and the UDC were the two systems most commonly in use among the various research departments of ICI (Holmstrom 1953, 200–201): indeed, as Vickery (2004, 8, 10) would later recollect, the UDC was in use at the particular division library where he worked, while he learned about the Kaiser system through contacts with the works library at Ardeer.

Like Holmstrom (1940, 200), Vickery (1950b, 220) conceived of an “analytical subject index” as one that indicated “the existence and the location of every item of information of any kind possessing potential permanent value to the organisation served”—i.e., one in which “items of information” within documents, not documents as a whole, were the primary units of analysis. To his mind a key requirement for an adequate subject index was that it “should readily lead the searcher from one subject to all allied subjects” (p. 221). By this, he had primarily in mind the ability of a complex index term composed of smaller units to allow users to identify relationships between different substances, objects or entities and to be able to find such subjects under each of their component terms in the index. For example, given the relationship of between nitric acid (A) and steel (B), which is one of corrosion (R), he suggested that an index would need complex headings of the form A:R:B, B:R:A, and R:B:A—that is to say one in which NITRIC ACID was the main term, subdivided by CORROSION and STEEL; one in which STEEL was the main term, subdivided by CORROSION and NITRIC ACID; and one in which CORROSION was the main term,

subdivided by STEEL and NITRIC ACID (p. 221). Another way of leading a searcher to allied subjects was through the indication of “family relationships”—i.e., classificatory relationships—which were automatically built into a classification-based indexing scheme and supplied by cross-references in an alphabetical one.

It was with the foregoing criterion primarily in mind that Vickery compared SI with the UDC. With regard to the former, he described the structure of index terms as follows:

Kaiser chooses as his main headings “concretes”—commodities and forms of energy—and arranges these alphabetically. Each concrete he subdivides into a number of “process” headings—static or dynamic conditions of the concrete, he calls them. All items relating to a given concrete are indexed under the appropriate process sub-heading, in A:R form. All items referring to a given process are also brought together under a main process heading, in R:A form. The system does not allow of expanding the heading to A:R:B or R:A:B (Vickery 1950b, 221).

Evidently based on Kaiser’s (1926) later, dyadic account of SI’s category, this description is noteworthy for two reasons. First, he did not make an explicit distinction between the main and the process sections of a Kaiser index but simply noted that items of information relating to concretes were indexed according to the [CONCRETE]–[PROCESS] schema while those pertaining to processes were characterized by index terms following the inverse [PROCESS–CONCRETE] model. This represented a simplification in the description of such indexes. Second, and more important, he identified what he understood to be a significant structural limitation in the formation of complex index terms in SI: they could not express the relationship between two concretes but were limited to indicating the relationship between a concrete and process alone. Whereas a subject such as “the corrosion of steel by nitric acid” would ideally be represented by tripartite index terms of the form *NITRIC ACID—CORROSION—STEEL, *STEEL—CORROSION—NITRIC ACID, and *CORROSION—STEEL—NITRIC ACID, SI only permitted forms such as *NITRIC ACID—CORROSION and *STEEL—CORROSION or their inverses, *CORROSION—NITRIC ACID and *CORROSION—STEEL.⁶³⁶ Kaiser (1911, § 327) had been well aware of this limitation but had accepted it without demurrals as a price well worth paying for retaining the consistency of statement forms in his system of indexing (See Chapter 7, Section 3.6, esp. p. 497, above).

⁶³⁶ The forms *NITRIC ACID–CORROSION and *STEEL–CORROSION have the disadvantage that they do not differentiate between a statement in which the concrete is the cause of the action and one in which it is the object thereof: since Kaiser permitted the use of verb forms for processes in Systematic Indexing, it is likely that he would have chosen the forms *NITRIC ACID–CORRODES and *STEEL–CORROSION to distinguish between the two; cf. Kaiser 1911, §§ 459–460.

By contrast, Vickery (1950b, 221) noted, the UDC allowed for the formation of complex index terms of the form A:R:B and its variants. This it did by means of a “sign of relation” taking the form of the colon (:), which could be intercalated between two class numbers to indicate a relationship between the classes that they represented: thus, for example, the number “537:63” designated “Electricity (537) in relation to Agriculture (63)” (Hopwood 1907, 313), while “331.2:667” signified “Salaries (331.2) in the Textile Industry (667)” (Pollard 1926a, 6). Because one could reverse the order of terms connected by the colon—what Vickery (1950b, 221) called “reversing round the colon”—, it was possible to create multiple subject headings for a given complex subject in which each element occurred as the first element of the term: thus, for example, our subject “the corrosion of steel by nitric acid” could be represented not only as 669.14:620.191:661.56 (“Steel (669.14) in relation to corrosion (620.191) in relation to Nitric Acid (661.56)”) but as 661.56:620.191:669.14 (“Nitric Acid (661.56) in relation to corrosion (620.191) in relation to Steel (669.14)”) and 620.191:669.14:661.56 (“Corrosion (620.191) in relation to Steel (669.14) in relation to Nitric Acid (661.56)”).

For Vickery (1950b, 221), the UDC’s capacity to express complex subjects of the triadic form A:R:B gave it “an advantage over the Kaiser system”, which could only represent them in the dyadic form A:R. However, SI exhibited other strengths. For one thing, despite its prescription of an alphabetical arrangement of the index file, the related terms on the “concrete guide cards” permitted the indication of “family relationships”—which Vickery identified as those between “synonyms”, “concretes which are members of the same family” (i.e., coordinate terms), “terms standing in the position of genus to the concrete as species” (i.e., higher collectives), and “terms standing in the position of species to the concrete as genus” (i.e., lower specifics)—which secured for it the advantages of classification. Although Vickery considered the UDC’s classified order to be superior to SI’s alphabetical one on the grounds that the latter led to alphabetical scatter, he conceded that “[t]he Kaiser system scores ... in that its guide-cards can exhibit more than one set of family relationships” whereas the UDC’s order reflected only “one set of family relationships, the set chosen by the makers of the classification” (p. 221): in other words, he acknowledged that the system of related terms in SI was able to accommodate polyhierarchy, whereas the classificatory structure of the UDC was monohierarchical. In the end, Vickery did not award the palm either to SI or the UDC, for his intent was not to “advocate either one system or the other”: yet, he observed, “industrial chemical indexes tend to combine, in some form or the other,

systematic and alphabetical arrangement” and stated, as a parenthetical aside, that “the Kaiser system does this by its inherent structure” (p. 221).

The second paper, which was published in the *Journal of Documentation*, widened the comparison among different kinds of alphabetical, classified, and coordinate (“punched card”) indexes (Vickery 1950a, 142), all of which were evaluated along the following five criteria:

1. The place in the index of each heading must be readily apparent.
2. The structure of the heading must be explicitly in the form *ARB* so that the searcher who consults the index under *A* is directed to the other aspects of the relation, *B* and *R*.
3. The searcher must be led from *ARB* to *AR* to *A*, and back again.
4. The searcher must be led from *A* to ΣA to $\Sigma\Sigma A$ and back again, for all relevant genera.⁶³⁷
5. The searcher must be led from A_1 to A_2 to A_3 in each class or genus ΣA .

These criteria represented a more specific articulation of those that Vickery had employed in his other article, pertaining to the ease with which the headings might be found within an index file (Criterion 1), the capacity of the internal structure of composite index terms to reveal the relationships between their component terms (Criteria 2–3), and the capacity of the indexing system to represent classificatory structures between superordinate and subordinate terms (Criterion 4) as well as hierarchically coordinate terms (Criterion 5). Taken together, they constituted the most important design features of what Vickery termed a “connective index”, namely one that “*reveal[s] the interrelations existing between [its] headings*” (p. 140 [emphasis his]).

Within the framework of this paper, Vickery (1950a, 144–145) gave a slightly more detailed account of the basic structures of SI than he had done in its companion. Whereas he repeated Kaiser’s characterization of concretes as “commodities and forms of energy” and of processes as “dynamic or static conditions of the concretes”, he now assimilated the former to “what we ... call[] ‘things’” and the latter to “types of relation” (p. 144). Second he noted that whereas the headings took the form [CONCRETE]–[PROCESS], “cross-references to all indexed items are collected under ‘process terms’” in the form [PROCESS]–[CONCRETE]: this characterization of items in the process section was close to that of the classical form of the Ardeer index, but it made the assumption that all index items with a

⁶³⁷ The notational convention “ ΣA ” indicates a “heading[] of a higher order”: thus, for a given heading *A*, “ ΣA ” denotes a proximal genus; “ $\Sigma\Sigma A$ ”, a genus once removed; and so on.

heading of the form [CONCRETE]–[PROCESS] were given a cross reference of the form [PROCESS]–[CONCRETE], whereas, as we have seen, Barbour had emphasized that only certain select process terms were to receive such treatment (See Chapter 8, Section 2.1, esp. p. 732, above). Finally, Vickery noted that the related terms on guide cards for concretes expressed the “logical connexions of the heading, so far as they exist in the index”. Interestingly, he indicated that, on the guide cards, the sign “<” was to be used to indicate higher collectives; “>”, lower collectives; and “=”, “what Kaiser calls synonyms but are really class-mates [sci., coordinate terms—TMD]” (Vickery 1950a, 144).

From these structural features, Vickery (1950a, 150) concluded that SI fully met the first, third, fourth, and fifth criteria for an adequate index: he also lauded the consistency of the [CONCRETE]–[PROCESS] structure and the well-developed system of related terms that it harbored. Nevertheless, he saw in it two significant disadvantages. First, he regretted the fact that the form of complex index terms was strictly limited to the structure AR, whereas, ideally, a complex index term should be expansible, in his view to forms such as AR’BR’’C (as in, for example, “microscopic (C) examination (R’) of crystallization (R’) of salt (A) from water (B)”; p. 141).⁶³⁸ However, prompted by a personal communication from the then librarian at Ardeer, he acknowledged the fact that this structural limitation was mitigated somewhat by “the use of extended [sci., multiword—TMD] concrete terms which incorporate relations in adjectival form”: thus, he noted, a term for concrete such as “drying oil modified polyhydric alcohol polycarboxylic acid condensation product” would “direct[] the user to the concretes A (drying oil), B (alcohol), and C (acid), and the relations R” (condensation) and perhaps R’ (modification”) (pp. 144–145). Second, Vickery observed that, because the terms for concretes in SI did not allow inversion and the only permissible subdivision was by terms for processes, “practically all concrete group relations must be indicated by cross-reference—the alphabetical scatter of related references is therefore far greater than in a book index” (p. 144), which would typically allow for the presence of inverted terms (p. 143).

Both of the foregoing critiques placed SI at a disadvantage *vis-à-vis* another type of indexing system that Vickery discussed in his article—“synthetic” classifications

⁶³⁸ Strictly speaking, the tripartite statement form [CONCRETE]–[COUNTRY]–[PROCESS], discussed by Kaiser in his book on *Systematic Indexing* (See Chapter 7, Sections 3 & 3.5), would have constituted a restricted case of an AR’BR’’C pattern: however, Vickery took no note of tripartite statements in his analysis, doubtless because he was taking Kaiser’s (1926) ASLIB paper, in which stress was placed on the bipartite form, as his primary point of reference—despite the fact that, in the article, it was the latter’s 1911 book that he cited in his reference list (Vickery 1950a, 151, Reference 7).

exemplified by the UDC and S. R. Ranganathan's Colon Classification (p. 148). In his view, such classifications fulfilled all five of the criteria for a connective index, provided that they were supplied with "a full alphabetical key" (p. 150). To be sure, he held fast to the view that "the solution to the problem of a connective index to scientific material is ... a combination of alphabetical and systematic arrangement" and that, ultimately, "which aspect of the combination should be most prominent in the product is mainly a matter of convenience" (p. 151): this pragmatic judgment, which echoed his statement that industrial chemical indexes tended to combine both methods of arrangement, left open the possibility that either an alphabetically oriented system with a cross-reference structure like SI or a synthetic classification such as the UDC or the Colon Classification might prove useful in a given context. Yet, in closing the article with the statement that "this paper leaves open the question whether the existing kinds of synthetic classification (U.D.C., Colon) are the most suitable modes of systematic arrangement on which to build ... a connective index" (p. 151), Vickery clearly signaled that his sympathies lay with synthetic classifications—a sign of things to come.

Despite their fairly similar analyses of SI, Vickery's two articles differed in one important respect. The former, entitled "Some problems of a technical library", embedded Vickery's structural analysis of SI within a discussion the horizons of which were very much limited to practical issues of special librarianship in the chemicals industry. The latter, which bore the title "The structure of a connective index", represented a more developed form of the same analysis within a broader theoretical framework. In later years, Vickery (2004, 11)—who went on to become a leading light of the Classification Research Group (CRG) and, arguably, the preeminent British theorist of faceted analysis in the 1950s—would retrospectively identify this article as his first published contribution to the field of "information organization for retrieval". It is thus surely significant that, in his discussion of the structural features of connective indexes, he invoked not only the work of authors active in special librarianship and documentation such as Holmstrom but also writers from the world of general librarianship such as Bliss (1929), Cutter (1904), Pettee (1946), and Ranganathan (1944) (cf. Vickery 2004, 10–11). SI was starting to be considered within a wider perspective on knowledge organization that drew upon the discourse of general librarianship, as well as that of special librarianship and documentation, for theoretical inspiration.

The entry of SI into the wider realm of KO discourse received a powerful fillip in the late 1950s from John Metcalfe (1901–1981), a prominent Australian librarian and library educator who had made his career in public libraries (Metcalfe 1957, 9–10; Nelson 1998, 199–200; Rayward 1995, 1–3). A man of forceful temperament and strongly held opinions, he wrote several books on the theory and history of cataloging, indexing, and classification (Metcalfe 1957, 1959, 1965, 1976) that found readers throughout the anglophone library world (Olding 1971, 13; Rayward 1995, 2). Firmly convinced of the superiority of alphabetic-specific (see Glossary) indexes to classified catalogs, the historically-minded Metcalfe (1957, 11; 1959, 164, 263; 1965, 21) took the principles of subject cataloging enunciated by Charles Cutter in the *RDC* as his central point of reference on what constituted good indexing practice: he considered himself to be a “Cutter man” through and through (Olding 1971, 14). Yet, if Metcalfe considered Cutter’s *Rules* as foundational for alphabetic-specific indexing, he also believed that they were capable of refinement at some points, such as the syntax of complex subject headings, which, in his opinion, Cutter had not worked out with sufficient consistency (Metcalfe 1957, 31, 73, 225–226; 1959, 52, 164; 1965, 33–34). Such consistency he found in Kaiser’s prescriptions for the structuring composite index terms according to the [CONCRETE]–[PROCESS] schema, which he first appears to have encountered in the early 1940s (Metcalfe 1943, 255–256) and which, by the late 1950s, he had come to view as constituting “a consistent grammar and logic for alphabetic-specific entry” (Metcalfe 1957, 235).⁶³⁹ Although not uncritical of what he saw as occasional excesses in Kaiser’s application of the schema, Metcalfe held that SI’s treatment of composite index terms was a significant advance over that of Cutter and, indeed, he adapted elements of it in his own theoretical considerations about the proper constitution of subject headings for an alphabetic-specific catalog (Metcalfe 1957, 31, 75–76, 128, 235, 237, 239–241; 1959, 164, 263, 269, 297–300; 1965, 45; Svenonius 1976, 173). In his estimation, Kaiser was an indexing theorist of the first rank, whose contributions placed him in a class with Cutter and perhaps beyond: indeed, he went so far as to claim that “[i]n sheer capacity for really scientific and logical thinking Kaiser’s was probably the best mind that has ever applied itself to subject indexing” (Metcalfe 1959, 298, 300). No less laudatory was his judgment that Kaiser’s analytic approach to subject indexing anticipated,

⁶³⁹ From his earliest published discussion of SI, a section from a roneotyped textbook on library practice published in 1943, it is clear that Metcalfe had read both Kaiser (1911) himself and Holmstrom (1940) on Kaiser: one may well wonder whether he came to the former through the latter.

in many ways, the ideas of more recent authorities, to which he added the provocative rider that Kaiser's conceptualization of subject analysis possessed, on the whole, greater clarity than that of later, trendier writers (e.g., Metcalfe 1957, 18, 235–236, 290; 1959, 299–300).

Metcalfe's enthusiastic characterizations of Kaiser and his indexing system affected the profile of SI and its creator within KO in three important ways. First, in claiming that Kaiser's ideas had relevance for subject cataloging in general librarianship (e.g., Metcalfe 1957, 236; 1959, 164) and doing so in books addressed to audiences that included general librarians and students of library science (Nelson 1998, 205–206), Metcalfe introduced them into a domain where, as he himself noted, they had been hitherto largely ignored (Metcalfe 1957, 271). He thus not only broadened the context in which SI might be considered, as Vickery had already had done, but also widened the circles of those in a position to become acquainted with Kaiser's system.⁶⁴⁰ Second, by incorporating SI into an account of the development of alphabetic-specific indexing within which he cast Kaiser in the rôle of an (unwitting) successor to Cutter,⁶⁴¹ Metcalfe treated SI and its creator from a historical, as well as a theoretical, perspective. In this, he was a pioneer, for he appears to have been the first writer to accord Kaiser and his system a place within a *historiographical* framework for KO; in doing so, he set a precedent that many other commentators would follow. No less consequential was Metcalfe's clamorous insistence on the significance of Kaiser and SI for indexing theory. The emphasis with which he promoted the cause of Kaiser was motivated not only by a desire to secure broader recognition for a thinker who, in his opinion, had been unduly neglected but also to advance a distinct metatheoretical agenda. In Metcalfe's (1953, 1957, 38–39; 266–267; 283–289; 1959, 240–248) view, the discourse of knowledge organization had been unnecessarily complicated—indeed, corrupted—by what he took to be an overabundance of speculative theorizing, or, as he dismissively styled it, “metaphysics”, “pseudoscience”, and “bibliosophy”, the culmination of which he

⁶⁴⁰ The fact that by 1966, Kaiser's final article had been included in a book of “readings in library cataloging” (Olding 1966) alongside selections from such figures as Panizzi, Dewey, Cutter, Bliss, Ranganathan, Osborn, and Lubetzky testifies to the assimilation of Kaiser into the “mainstream” discourse of cataloging in the wake of Metcalfe.

⁶⁴¹ See, e.g., Metcalfe 1959, 297: “The only published and comparatively well-known, but still too little known advance on Cutter's rules for his specific entry is in Kaiser's Systematic indexing, It has, however, not been recognized as such, even by its author. [H]e [sci., Kaiser—TMD] does not refer to Cutter's Rules and if [he] had read them does not appear to have seen his own system, with its very different terminology, as a further rationalization of Cutter's specific entry. ... [B]ut Cutter's specific entry is equally applicable to information indexing, and what Kaiser preferred and developed as a method of information indexing as distinct from literature cataloging, is Cutter's specific entry. ...”

considered to be found in the newly emergent theory of facet analysis first articulated by Ranganathan and developed by his followers in England. To the baroque theoretical speculations of those whom he derided as “bibliosopers”, Metcalfe (1957, 15, 231, 303) counterposed the ideas of earlier authors, such as Cutter, Dewey, Hulme, and Kaiser, which, he claimed, were relatively free of “metaphysics” and so provided a sane, solid, and sufficient basis for any theory of classification and indexing (pp. 269–271).⁶⁴² Needless to say, Metcalfe’s invectives against the evils of systems supposedly rooted in bibliosophy did little to slow their development; facet analysis, for one, has continued to occupy a prominent place in the discourse of knowledge organization to this day (La Barre 2010). Nevertheless, his calls for renewed attention to what he took to be the primal sources of classification and indexing theory were not without effect on the domain of KO: one result thereof was that Kaiser acquired a lasting reputation as a historically important theorist of indexing (cf. Maltby 1975, 133).

Metcalfe laid the foundations for what would become the canonical profile of Kaiser and his indexing method in KO (see Chapter 1, Section 2). However, it was a British librarian and theorist of subject indexing, Eric James Coates (1916–), who gave it the particular form that would dominate much of the subsequent commentary on Kaiser and SI. Coates, like Metcalfe, came from a background in public librarianship before taking a position as a cataloger at the British National Bibliography (BNB) in 1949 (Landau & Collison 1954, 39). In sharp contradistinction to Metcalfe, however, he wholeheartedly embraced Ranganathan’s facet-based approach to knowledge organization after meeting the Indian classificationist in 1950, subsequently becoming a charter member of the CRG, which

⁶⁴² To be sure, Metcalfe (1957, 271) did not think that Kaiser’s thought was altogether devoid of the taint of “metaphysics”, which he characterized in the following vein: “He [sci., Kaiser—TMD] based his system on logic, but restated his distinction of species and property or subject and attribute in his own terms of concrete and process, and in doing so introduced at last a slight element of metaphysic, but one which didn’t greatly affect his system, except for his insistence on such substitutions as Books–Description for Bibliography. This particular bit of metaphysic has interest, and even respectability, in so far as there is philosophic interest and value in reducing abstractions to their material references, but it is the business of indexing to mind its own business, not to join in any campaign against the tyranny of words.” A more objectionable manifestation of tendencies toward “metaphysic” in Kaiser’s thought, in Metcalfe’s view, was his late invocation of Spencer: “[H]e [sci., Kaiser—TMD] made one curious and explicit excursion into questionable metaphysics in 1926 when he related his Concretes to Herbert Spencer’s Space, Matter and Force, and his Processes to Spencer’s Time and Motion. This is getting uncomfortably close to Ranganathan, though he does not make the same use, or any use of these ‘fundamentals’ ...”. As these passages show, Metcalfe acknowledged the speculative elements of Kaiser’s thought, but excused them on the grounds that, apart from the semantic factoring of certain abstract terms, they did not affect the structure of the system. In this, he seems to have underestimated the impact of Kaiser’s theoretical ideas about subjects such as knowledge and language (see Chapter 7, Sections 2–2.2.2, 2.2.5, above) upon his protocols for SI.

fostered the development of faceted classifications in Great Britain in the 1950s and 1960s (Coates 1999; Foskett 1976, 84; Kawamura 2004, 337; Vickery 2004, 13). In 1960, Coates (1960, 17–18) published a treatise on subject cataloging addressed primarily to general librarians, in which one of the major themes that he addressed was what he termed “the problem of subject heading language”. This problem arose in consequence of a key assumption that Coates made about the proper scope of subject headings: in his view, any subject heading should summarize the subject of a document as a whole in as precise a manner as possible (pp. 15–16). However, in the case of many documents, this would require formulating compound subject headings consisting of two or more component terms set in some kind of relation to one another (pp. 15–16). If a subject heading language was to utilize complex subject headings in a systematic and consistent fashion, it was necessary to frame rules for the ordinal arrangement of the component terms within a compound subject heading in such a way that (1) the most significant term would serve as the main entry term and that (2) the sequence of the component terms would express in a clear, predictable, and economical way the interrelation of the different concepts that they denoted (pp. 21–24). The challenge, then, was to develop a regular syntax for compound subject headings.

In considering this problem, Coates (1960, 31–49) undertook a historical review that discussed the solutions of the four writers who, in his estimation, had made the greatest theoretical contributions to the formulation of compound subject headings. They were, in chronological order, Cutter, whose *Rules* had constituted the first attempt to develop a set of systematic guidelines for subject cataloging in general; Kaiser; Ranganathan; and J. E. L. Farradane (1906–1989), a fellow member of the CRG who had developed a method of “relational analysis” that took a classification of basic kinds of relationships, rather than categories of terms, as its point of departure for analyzing complex index terms (e.g., Farradane 1950, 1952, 1955).⁶⁴³ With regard to Kaiser, Coates (1960, 39–43) gave a brief but trenchant overview of SI based on a reading of *Systematic Indexing*, which he, like Metcalfe, considered to hold lessons not only for the special librarian but for the general public librarian as well. Although he did not fail to mention the system of cross-references

⁶⁴³ Farradane, who, like Vickery, had trained as a chemist and had a deep background in scientific documentation, was also well aware of the Kaiser system, which he characterized as being “much more flexible” than standard classifications such as the UDC (Farradane 1950, 86). However, he also believed that its category structure led “to oversimplification of relations, and consequently unwieldy types of concepts” as well as “arbitrary standardization and relations of terms, without sufficient indication of the method of choice or type and order of relation”.

embodied by related terms (p. 40), his focus was squarely on the categories and complex index terms formed therefrom. Taking concretes and processes as the two elementary categories, he succinctly reviewed the kinds of terms that fell under each. In dealing with concretes, he reformulated Kaiser's distinction between movable, immovable, and abstract concretes as that between "things, places, and abstract terms not signifying actions or processes" (p. 39), noting that the subclass of abstract concretes could give rise to "some uncertainty in definition", noting that an "intangible economic commodit[y]" such as LABOUR could easily be imagined as a process (p. 40). As for the category of processes, Coates (1960, 39) was the first writer on SI to distinguish explicitly between process terms referring to an action or condition described in a text and those denoting the discursive action on the part of the text's author—a distinction of which Kaiser (1911, § 663, s.v. "Concrete and Process") seems to have been obscurely aware but which he had not articulated in his writings (See Chapter 7, Section 3.3.2, esp. pp. 438–441, above). Coates (1960) did not fail to mention the category of countries (p. 40), which, following Kaiser, he regarded as a particular form of concretes (p. 39). Its presence, he observed, required double entry of tripartite statements under the two forms [CONCRETE]–[COUNTRY]–[PROCESS] and [COUNTRY]–[CONCRETE]–[PROCESS] (cf. Chapter 7, Section 3.5, esp. pp. 482–483, above).

All in all, Coates (1960, 41) considered Kaiser's resolution of the "the problem of the relative importance of the components of a compound subject" by dividing "all terms into two great classes, Concretes, and Processes, according to their meanings" to be "a fundamental theorem in subject cataloguing". Nevertheless, he did not forbear to note the limitations of SI. For one thing, he noted that Kaiser's use of index terms based on "the somewhat hazardous forms of natural language", might give rise to difficulties: after all, the notion denoted by the term "high tension underground electric traction motor" might equally well be formulated as "high tension electric underground traction motor" or "underground traction high tension electric motor" (p. 41). "No directions for subject cataloguing and indexing can be considered adequate if they do not help the cataloguer to regularise situations such as this", declared Coates, insinuating that Kaiser's advice to take terms as they were found in the texts being indexed (See Chapter 7, Section 2.2.3, above) was not sufficient. More fundamentally, he observed, "Kaiser attempted to derive a subject heading order from the character of individual terms in isolation, rather than from their mutual relationship in the phrase" in which they occurred (Coates 1960, 41): in his

estimation, the statements of SI did not sufficiently characterize the nature of the interrelations between their component terms and the specific rôles that the terms played in such interactions.

Considerations such as the foregoing would lead Coates to propose his own system of categories for index terms and protocols for combining them into compound subject headings. This he founded on an initial distinction between terms for *things*—i.e., entities of which one can mentally form “static images”—and those for *actions* (Coates 1960, 50). Within the framework of a compound heading, he argued, an index term for a “thing” should, *ceteris paribus*, precede one for an action. His rationale for this was that people can think of things *qua* static objects without imagining them performing or undergoing actions in time whereas one can never think of an action in itself but only in relation to a thing performing or undergoing it (p. 51). Thus, in the normal course of search, he deemed it more likely that an inquirer looking for information in a catalog or index would choose a term for a “thing” rather than an “action” as the term under which to search: accordingly, a compound heading structure of the form [THING]–[ACTION] would prove most helpful to those undertaking search (p. 51). Needless to say, the distinction between things and actions recalls that Kaiser’s “fundamental theorem” of the distinction between concretes and processes, while the argument that mental images of actions are always dependent upon an antecedent image of a static object involved in them was, in effect, a psychologized version of Kaiser’s (1911, § 574) notion that “processes are dependent upon concretes” (cf. Chapter 7, Sections 2.1 & 3.5, esp. pp. 300 & 479, above): given Coates’ antecedent knowledge of SI, it is reasonable to conclude, as previous commentators have done, that he drew inspiration from Kaiser’s thought in formulating this fundamental basis of his own system (Foskett 1976, 84; 1982, 95, 128, 130; Riaz 1989, 132–133; Rowley 1988, 129). To be sure, Coates (1960) would develop his scheme well beyond this initial distinction, first expanding the number of categories to three—comprising “things”, “materials”, and “actions” (p. 51)—and, then, to five, comprehending “things”, “parts”, “materials”, “actions”, and “properties” (p. 57): moreover, considering the different rôles that terms belonging to these categories might play within the complex noun phrases on which compound subject headings were based, he proposed no fewer than twenty different structural forms for the latter, many of which deviated significantly from the basic [THING]–[ACTION] template (“Relationship Table”, facing p. 55). Nevertheless, all this was elaboration upon a foundational pattern that seems to have been based, in large measure, upon that of Kaiser.

In addition to dealing with the systemic aspects of SI and incorporating them, to some degree, into his own method for the formation of subject headings, Coates placed Kaiser into his own historical narrative of the development of subject heading theory, giving him a double rôle therein. On one hand, he considered Kaiser to be a successor to Cutter who improved upon him in his treatment of complex subject headings (Coates 1960, 41), an interpretation that, in its essentials, built on that of Metcalfe. However, Coates went further. He treated Kaiser as a precursor to Ranganathan, noting that both theorists had used categories for terms as the basis for the syntactic structuring of compound index terms: in his estimation, Ranganathan's utilization of five different categories—Personality, Matter, Energy, Space, and Time—constituted “a useful improvement on Kaiser's pair” of Concretes and Processes (pp. 45, 43). This interpretative move on the part of Coates had twofold significance for the subsequent historiographical status of Kaiser in KO. On one hand, in emphasizing the category-based structure of composite index terms in SI and comparing it to that formulated by Ranganathan, it placed Kaiser and his indexing system into relation with the then emergent tradition of facet analysis. On the other, it resulted in a developmental schema running from Cutter through Kaiser to Ranganathan (and beyond), in which Kaiser became, as it were, a *Bindeglied* between an old dispensation represented by Cutter and the new order initiated by Ranganathan: Kaiser's treatment of composite index terms was now no longer simply an improvement on Cutter, but also marked a step on a way to facet analysis. Coates's alignment of Kaiser with the facet-analytic tradition proved to be very influential: even an avowed opponent of the tradition like Metcalfe (1976, 183) would reluctantly concede that “there is something in this”, though he otherwise bristled at the idea of Kaiser being considered as a “stumbling forerunner” to Ranganathan.

Coates was not alone in setting Kaiser's category system in relation to that of Ranganathan, for, throughout the later 1950s and early 1960s, other theorists of classification and indexing discerned certain parallels between them. If we are to understand why they found affinities among two, it is necessary briefly to outline the main features of Ranganathan's category system, which he elaborated within the framework of his Colon Classification (CC). Although Ranganathan (1961) had begun work on the CC in late 1924 and early 1925 and published the first edition of its classification schedules in 1933 (p. 85), he did not develop the notion of five “fundamental categories” until 1944 (p. 86), outlining them in print for the first time in a textbook on library classification published in that year. There, he enumerated the categories in an order of increasing concreteness as

Time, Space, Energy, Matter, and Personality (Ranganathan 1944, 429–436), a mode of presentation that he and other commentators continued to use in their discussions of the theory of faceted classification into the 1960s (e.g., Palmer & Wells 1951, 42, 49; Ranganathan 1949, 232–233; 1951b, 54–60; 1967, 399–401). Within the framework of the CC, these categories were combined into formulae for the formation of composite class terms that were then translated into an elaborate notation. Every composite class term, or subject, consisted of a Basic Class, which represented a broad department of knowledge (Mathematics, Chemistry, Physics, Biology, Useful Arts, Mining, Medicine, Linguistics, Philosophy, Education and so on), followed by formulae for combining concepts from the different categories, which differed across Basic Classes (Ranganathan 1962, 82; 1965, 62). Whatever the Basic Class, the formulae for combining concepts were structured in accordance with the general sequence Personality, Matter, Energy, Space, and Time: this sequence, which arrayed the categories in order of decreasing concreteness, became known simply as PMEST (e.g., Ranganathan 1962, 85; 1965, 66–67; 1967, 399; cf., e.g., Aranalde 2009, 99–100; Frické 2012, 189; La Barre 2010, 251; Maniez 1999, 252; Mazzocchi & Gnoli 2006, 21; Sales 2012, 88 & 159; Svenonius 2000a, 175).

Ranganathan seems to have originally discussed the five fundamental categories in an order of increasing concreteness because this sequence subserved the purpose of defining them, for some of his later writings suggest that he considered the relatively abstract categories to be more easily definable than the relatively concrete ones (Ranganathan 1967, 399–401). *Time*, “perhaps the most abstract of the five”, was intuitively easy to understand, covering chronological concepts, while *Space*, which was “perhaps more concrete than Time but not as much as the other categories” (Ranganathan 1944, 430), referred to topographical and geographical entities and regions on “the surface of the earth essentially and also the space beyond and beneath it” (1965, 63). *Energy*, which Ranganathan (1944, 431) considered to be “much more ubiquitous than any other” category, was originally defined as taking the form of “a problem to be solved” or “a mode of work or approach” (Palmer & Wells 1951, 44; cf. Ranganathan 1944, 431–432): it soon came to be understood to “denote action and interaction of and among all kinds of entities—inanimate, animate, conceptual, intellectual, and intuitive” (Ranganathan 1965, 63). *Matter*, which involved “comparatively little of abstraction and a good deal of concreteness”, encompassed material objects, the substances of which they were made, and commodities, which might either be intermediate

commodities, or semi-finished products, or ultimate commodities, or finished products (1944, 432–433; 1965, 63).

The final, least abstract, and most concrete category, that of *Personality*, also proved the most difficult to define. Ranganathan (1944, 433; 1949, 233) originally characterized it as “everything ... which have [*sic*] an individuality or aroma of their own”: for the rest, he declared it as “unanalysable” and admonished his readers that “[w]e have to take it gently and as a whole” (cf. Vickery 1953, 42, s.v. “personality”), while his earliest British expositors, drawing upon the notion that “the personality of a man is everything about him; that is, his wholeness”, argued that “[b]y extension of meaning, the term personality is used ... for the wholeness of any subject. Personality inheres in the subject itself and gives colour to the other fundamental concepts transforming them into concrete things” (Palmer & Wells 1951, 46). In time, Ranganathan (1962, 83) came to prefer another definition of Personality that sought to define it by what it was not:

The category Personality is ... a rather difficult concept. It is often only recognisable by elimination. After separating out the manifestations of Time, Space, Energy, and Matter in a subject the residue will often turn out to be Personality. For the residual facet must be a manifestation of one of the five fundamental categories, and by assumption the manifestations of all the other four fundamental categories have been separated out before reaching the residue. This may be called the Method of Residues.

On this view, Personality was what was remained in a subject after one had accounted for its temporal, geographical or topographical, dynamic, and material dimensions (Aranalde 2009, 103; Gnoli 2004, 13; Svenonius 1979, 68–69). Although Ranganathan himself never went beyond the tentative and (deliberately?) vague definitions of wholeness or residues, (Roberts 1969; Vlasák 1967, 158), latter-day commentators have suggested that the latter, negative definition could be restated in a more positive manner as reflecting a category “that represents the essential and distinctive characteristics of the object analyzed and that at the same time forms the substrate which renders possible the application of the other categories” (Mazzocchi & Gnoli 2006, 22). This reinterpretation reflects the intuition of many scholars that Personality corresponds to the ontological notions of “thing” or “entity”. As early as 1953, Vickery (1953, 42, s.v. “personality”) argued that falling under the category were “entit[ies] whose parts cannot be separated without loss of identity” (cf. Roberts 1969, 139–140), while Holmstrom (1953, 87) characterized Personality as “mean[ing] the thing (or the part of the thing, or kind of the thing) which is subjected to further division from the other facets involved”; more recent commentators have taken up this line

of interpretation with the suggestion that Personality encompasses “entities, their types or kinds and (their) respective parts or organs” and that, for this reason, “the concepts of entity, thing, whole, final product, types or kinds, parts or organs can be identified with this fundamental category” (Aranalde 2009, 101; cf. Sales 2012, 160). Other commentators have preferred to view Personality in more functional terms as designating a “key concept” within, or the “object of study” of, a given field of knowledge designated by a Basic Class in the CC (San Segundo 1996, 106, cited in Straioto & Guimarães 2004, 118; cf. Cheti 1990, 33; Frické 2012, 189; Gnoli 2008a, 111): this would also provide the rationale for its initial position in the PMEST formula. The ontological and the functional notions need not be mutually exclusive and both can be deduced from the admittedly murky indications in Ranganathan’s writings: at any rate, both were implicit features of what Ranganathan considered to be a definitionally elusive category.

Although the formal definitions of Ranganathan’s categories in the 1950s were hardly clear and distinct, they provided sufficient demarcation thereof to allow commentators to note similarities between Kaiser’s and Ranganathan’s categorial schemes. In 1954, in the course of an epistolary exchange pertaining to a controversial article decrying the state of pedagogy of library classification penned by Metcalfe (1953) in the British *Library Association Record*, a young library lecturer and member of the CRG named Jack Mills (1918–2010) noted that, in dealing with the problem with “the systematic arrangement of subjects”, Kaiser had “simplif[ied] [the] procedure by placing all of his terms in a rigid framework of three categories: Concrete—Country—Process”. Although the number and order of categories in Kaiser’s system differed from those in Ranganathan’s, the latter’s five categories could also be seen as “a simplifying of procedure and their strict preferred order [sci., as PMEST—TMD] [could] be regarded as an application of Kaiser’s own doctrine of a system based on “fixed points”” (Mills, in Mr. Metcalfe and Classification Systems 1954, 89). To this statement, which drew an analogy between Kaiser’s and Ranganathan’s *modi operandi* in using categorial systems, Metcalfe (in Mr. Metcalfe and Classification Systems 1954, 92) responded with a yet more detailed analogy: “Ranganathan’s Personality is essentially Kaiser’s Concrete ...; his Energy is Kaiser’s Process ...; and his Space is Kaiser’s Country”.⁶⁴⁴ A few years later, in 1957, Mills (1957, 31) would reactivate the comparison on a more reduced scale in a paper on the “classification of a subject field” at the International

⁶⁴⁴ Interestingly, this comprehensive mapping of Kaiser’s categories upon those of Ranganathan has recently reemerged in the discourse of KO, albeit apparently independently of any knowledge of Metcalfe’s bluntly phrased comparison (Sales 2012, 162; Sales & Guimarães 2010, 126 & 128).

Study Conference on Classification for Information Retrieval held at Dorking, in which he wrote that

[i]t is well known that that Ranganathan assumes that there are only five such categories, which he calls Personality, Matter, Energy, Space, and Time, and these have in fact proved remarkably successful as pragmatic assumptions. If the more obvious categories of Space and Time are disregarded, and if Matter is recognized as essentially dependent on Personality (when it is not acting as proxy to it), then the two major categories of Personality and Energy may be seen to reflect the old indexing distinction between concretes and processes drawn by Kaiser thirty years earlier.

Here, Mills argued for a direct analogy between Kaiser's categories of concretes and processes and Ranganathan's categories of Personality and Energy much as Metcalfe had done, but did not draw a further connection between the former's category of countries and the latter's category of Space. It is unclear whether he omitted the latter because (1) he wished to emphasize what he took to be the primary categories of Personality, Matter, and Energy in Ranganathan's scheme; (2) he felt scruples about the fact that the relative sequence of the categories of countries and processes in [CONCRETE]-[COUNTRY]-[PROCESS] statement forms didn't match that for Energy and Space in the PMEST formula (cf. Mills, in *Mr. Metcalfe and Classification Systems* 1954, 89); or (3) he took Kaiser's ASLIB paper, with its dyadic version of the statement, as his point of reference (as, in fact, the chronological allusion at the end of the passage indicates). At any rate, Vickery (1960a, 24) would make the same comparison in an influential manual on the construction of faceted classifications that appeared in 1960, writing, with regard to Ranganathan's category system that "[t]he two major categories of Personality and Energy recall the useful indexing distinction between Concretes and Processes made by Kaiser many years ago": this dyadic comparison, no less than its triadic counterpart, has also been revived in recent years (Straiato & Guimarães 2004, 113). Finally, in the same year that Vickery's manual appeared, Coates (1960, 45) observed, in his treatise on subject cataloging, that, although "'Personality' remains incapable of close definition", ... "[i]t is often equivalent to Kaiser's 'Concrete'": in his view, the former differed from the latter in that it could "also denote function, use, or product". This is not the place to offer a critical assessment of the foregoing attempts to map Kaiser's categories onto those of Ranganathan, for such a task would require both a fuller consideration of the original contexts in which they were made⁶⁴⁵ and a

⁶⁴⁵ This is especially true for Metcalfe's argument, which would require a much deeper engagement with his claim that the contrast between "concretes" and "processes" can be construed in terms of the

much more detailed comparison of Kaiser's and Ranganathan's categorial systems than can be undertaken here.⁶⁴⁶ Here it is sufficient to note that both the fiercest contemporary critic of facet analysis and classification (Metcalf) and three of the leading British exponents of this method of knowledge organization (Coates, Mills, Vickery) agreed that Kaiser's categorial scheme was comparable to that of Ranganathan: the unspoken implication was that Kaiser was a precursor of Ranganathan.⁶⁴⁷

traditional logical distinction between, as he variously put it, "Species" [*sic*] and "Property" (so Metcalfe, in *Mr. Metcalfe and Classification Systems* 1954, 89), "subject" and "qualification" (Metcalf 1957, 239) or, as he later put it, "Substance" and "Attribute" (Metcalf 1976, 180): this, however, demands an analysis of Metcalfe's (1957, 292–303) own general interpretation, and application, of the doctrines of traditional logic and so is best reserved for a separate study. Similarly, a full appreciation of Mills's and Vickery's statements requires that they be contextualized within the discourse on categories and faceted classification within the CRG in the late 1950s and early 1960s: this, too, calls for a separate investigation.

⁶⁴⁶ For a commendably in-depth comparison of Kaiser's and Ranganathan's categorial systems and general approaches to the use of categories, see Sales 2012, 143–177.

⁶⁴⁷ The precise relationship between the two has been interpreted in various ways. Mills, Vickery, and Coates confined themselves to noting structural, or if one will, typological parallels between Kaiser's and Ranganathan's systems: only Metcalfe (in *Mr. Metcalfe and Classification Systems* 1954, 89) sought to explain the similarities between the two, which, in his view, resulted from common dependence upon certain logical principles. Later commentators would suggest that one could account for the parallels between Kaiser's and Ranganathan's categorial systems through a model of historical influence. In a wide-ranging UNESCO report on the use of general categories for classification and coding in documentation published in various languages in the early 1960s, Eric de Grolier (1911–1998), an eminent French historian and theorist of classification, suggested that "[i]t is ... possible that he [sci., Kaiser—TMD] may have inspired Ranganathan, although the latter makes no mention of Kaiser" (Grolier 1962, 44). Although Grolier's conjecture seems to have found only the faintest of echoes in the subsequent literature of KO (Vlasák 1967, 155), in recent years, several commentators have taken up the thesis of direct influence anew; see, e.g., Straioto & Guimarães 2004, 110: "[The theoretical conception of facet analysis] is due to the works of Ranganathan who, in the decade of the [19]30s, developed the *Colon Classification*, the structure of which was elaborated with the aim of accompanying the production of knowledge in a permanent state of development. Such work was, in its turn, directly influenced (*teve ... influência direta*) by the ideas of Concrete and Process established by Kaiser in 1911, in the United States [*sic*], during the development of his systematic indexing"; Cervantes 2004, 44: "Kaiser was one of the pioneers of representation by facets ..., influencing (*influenciando*) afterwards the work of Ranganathan [*sic*]"; Neto 2008, 38: "Guimarães ... emphasizes (*ressalta*) that the theory developed by Ranganathan underwent great influence (*sofreu grande influência*) from Kaiser, since the facets Personality and Energy derive directly (*derivam diretamente*) from the facets Concrete and Process set forth by the German Julius Kaiser, just as the facet Space finds a foundation (*encontra fulcro*) in the geographical delimitation proposed by the latter"; Dos Anjos 2008, 217: "It is possible to observe that the ideas of Kaiser, in particular, what he says regarding the category of concrete and the category of process influenced (*influenciaram*) Ranganathan in the establishment of the categories personality and energy, respectively". Such assertions of direct influence are not accompanied by *any* positive historical proof but seem to be based solely on the intuition that the structural parallels between the two categorial systems are simply too close to be explained in any other way, even if Ranganathan nowhere in his writings evinces knowledge of Kaiser or his system, as Grolier recognized. Needless to say, this is shaky ground upon which to build a thesis of historical influence. Unfortunately, limitations of space do not allow a full discussion of the problem here: we must content ourselves with noting that

By the early 1960s, then, all the key elements of the canonical profile of SI and its creator—an emphasis upon the system’s use of categories and rules for the formation of composite index terms; the assignment to Kaiser of a place within a developmental schema of progress in indexing theory that linked him to both Cutter and Ranganathan; and an association with facet analysis—had begun to crystallize within the discourse of KO. Metcalfe’s and Coates’s writings would set the tone for subsequent discussion on SI, which tended largely to confine itself to the paths which they had staked out: insofar as later commentary consisted of individual variations on, or elaborations of, the well-established themes reviewed in the foregoing discussion, we shall not trace its individual strands further here (for the main trends, see Chapter 1, Section 2, above): suffice it to say that, despite the appearance of a few studies that have sought to go beyond the well-worn grooves of the canonical profile of Kaiser and his indexing system (pp. 3 & 6, n. 1, above), its present-day contours do not differ, in their essentials, from those established by the commentators of the 1950s and 1960s. In halting our steps at the emergence of the canonical profile, we have come full circle: “the end of all our exploring” [has been] to arrive where we started” (Eliot 1971 [1943], 59, ll. 239–240). Yet, the journey that we have undertaken in the interim has given us a much fuller picture and, hopefully, an enhanced understanding, of Kaiser’s indexing system in its historical context, as well as better knowledge of, and appreciation for, the man who created it, than we had when we first ventured forth.

neither the available historical evidence nor a close comparison of the definitional content of the categories of Concrete and Process on one hand, and those of Personality and Energy, on the other, lends encouragement to the thesis that Ranganathan drew directly on Kaiser’s thought in the elaboration of his own categories. In the absence of any irrefragible documentary evidence that Ranganathan was aware of Kaiser’s writings at the time prior to his first articulation of fundamental categories in 1944, an explanation along the lines of that suggested by Metcalfe—namely, that one can account for the parallels by viewing them as the result of the (independent) use of common logical ideas—is to be preferred on the grounds that it is more parsimonious, relies on fewer unfounded historical assumptions, and is consistent with the fact that, sometimes, two or more thinkers living at different times and/or in different places can develop very similar ideas. In short, whatever links bind Kaiser to Ranganathan are most likely purely typological, not historical, in nature.

Chapter 10. **By Way of Conclusion**

This study began with the observation that Julius Otto Kaiser and the method of Systematic Indexing, or SI, that he developed at the turn of the 20th century have hitherto occupied a paradoxical position within the disciplinary consciousness of modern KO. On one hand, researchers have long recognized SI was an innovative system of indexing and acknowledged Kaiser as a pioneering figure in KO (See Chapter 1, Section 1, above). Yet, if Kaiser and SI have found a place in the annals of the discipline, they have also suffered a fate common to all historical KOSs and their creators: that of being reduced to a canonical profile that highlights a few select features of the system deemed to be especially salient, obscuring the rest in a veil of benign neglect, and, at the same time, slots the creator into a fixed position within a standard narrative of disciplinary history. In the case at hand, the canonical profile of SI has focused almost exclusively on two of its basic features: (1) its use of a set of categories—concretes, countries, and processes—into which the terms constituting an index vocabulary are to be partitioned and (2) its deployment of a set of syntactic rules by means of which to combine terms from these categories into structured complex index terms, or statements (See Chapter 1, Section 2, above). At the same time, Kaiser has been cast into a stereotyped rôle within a historical model of developmental progress in KO theory, wherein he appears as both a continuator of a tradition of alphabetic-specific tradition of subject indexing associated with the name of Cutter and as a precursor of the tradition of facet analysis associated with the name of Ranganathan (See Chapter 1, Section 2, above). Although Kaiser and his system have received greater attention in recent years and scholars have begun to explore dimensions of SI beyond its category system (e.g., Dousa 2007, 2008, 2009–2010; Sales 2012), the canonical profile has continued to set the tone for how they are generally portrayed in the literature of KO. To be sure, the standard image of Kaiser and SI does identify undoubtedly foundational features of the system and allows researchers to “place” its creator within an intelligible narrative of the history of KO. Yet, at the same time, it sets limits to the common perception of the methodological and theoretical features of SI and almost completely ignores the specific historical context(s), institutional and discursive, in which Kaiser developed the system, knowledge of which is crucial if we are to understand how he conceptualized it.

If one is to gain a fuller understanding of the theoretically significant, but comparatively little-studied KOS that Kaiser created and to gain a more complete appreciation of the

rationale underlying its design features than previous studies thereof have afforded, it is necessary to transcend the limits of its canonical profile by examining SI in its systematic *ampleur* and embedding it firmly within its historical context. Such has been the aim of this dissertation, which has sought to provide both an in-depth analytical account of SI *qua* system and, within the limits of the available documentary evidence, a reasonably thick description of the historical context(s) within the framework of which Kaiser conceptualized, implemented, elaborated, and discussed it. Setting the agenda for the study were three research questions (See Chapter 1, Section 3, above), which I repeat here *pro memoria*:

[RQ 1]. What was Kaiser's background and what were the milieux, institutional and discursive, within which he conceived of, and developed, SI?

[RQ 2]. What were the key theoretical and methodological features of SI and how did Kaiser conceptualize them?

[RQ 3]. How did Kaiser's conceptualization of the theory and method of SI reflect the the milieux, institutional and discursive, within which he conceived of, and developed, SI?

Over the course of the previous nine chapters, we have examined, in some detail, both (1) the course of Kaiser's life and career, with special reference to the informational practices and knowledge organization régimes of the institutional settings within which he worked (See Chapter 1, Section 5.1, above), and (2) the method and theory of SI, as set forth in his writings and those of his collaborators (See Chapter 1, Section 4, above), selectively comparing and contrasting its features with those of other contemporary modes of knowledge organization drawn from domains as diverse as those of office management, general librarianship, special librarianship, Documentation, and literary indexing (See Chapter 1, Sections 5.2.1–5.2.5, above). This two-pronged strategy of biographical framing and systemic analysis of SI has been adopted to allow us to address the research questions posed above: the former served as a means to answer RQ 1 and to pave the way for a response to RQ 3, while the latter provided the avenue to respond to RQ 2 and, in conjunction with the relevant historical data, RQ 3. Now that we have come to the term of this inquiry, it is appropriate to present, in summary form, our main findings with respect to these questions and to offer some suggestions how the results of the present study can be extended through further research.

10.1. Conclusions about Kaiser, his Background, and his Career

Let us begin by considering the question of Kaiser's background and the institutional milieu where he worked. Born in Stuttgart in 1868, almost three years before the unification of Germany, he came from a modest social background, his father, whose surname was Käser, being a cabinetmaker (See Chapter 2, Section 1, above). His formal education followed a pattern commensurate with his station: he attended public schools in Stuttgart, his *cursus* culminating with the *Fortbildungsschule*, or continuation school, an educational institution that offered part-time instruction in commercially and/or technically oriented subjects to young men who had entered into full-time work. This educational profile suggests that young Julius Käser was destined for a career in one of the trades plied by the *kleine Leute* inhabiting the lower reaches of the *Mittelstand* in late 19th century Germany. But destiny took a different course, for, in 1886, shortly after his 18th birthday, his family immigrated to the colony of Queensland, settling in the environs of Brisbane. There, he quickly began pursuing an occupational track quite different from the trades-related work for which he had been trained. Parlaying both his musical skill as a zither player and his native's command of the German language, he made his living first as a freelance music and language teacher, and then as an assistant schoolmaster within a private school (See Chapter 2, Section 2, above). In 1892, he left the antipodean shores of Australia and moved to Chile, where he continued his pedagogical career, working as a schoolmaster at private schools in Viña de Mar, a suburb of the major port city of Valparaíso (See Chapter 2, Section 3, above). It was apparently during his Chilean sojourn that Julius Käser made one lasting change to his public *persona*, altering the spelling of his name and so becoming Julius Otto Kaiser.

In 1896, for reasons unknown, Kaiser changed his abode once again, translocating himself to the city of Philadelphia in the eastern United States, where, apparently not long after his arrival, he took up work as a translator, indexer, and librarian at the recently established Philadelphia Commercial Museum (PCM) (See Chapter 3, Section 1, above). The institutional goal of the PCM was to stimulate American businessmen's participation in international commerce, especially in Latin America and other markets of the developing world, by collecting, organizing, displaying, and disseminating information about foreign trade conditions and opportunities: to this end, it not only presented museal displays of goods produced and sold in foreign markets, but also maintained a Bureau of Information that served as a nodal point for the collation of trade-related and dissemination thereof to

interested businessmen in the form of special reports on particular commercial topics (See Chapter 3, Section 2, above). Attached to the Bureau was a commercial library, which Kaiser seems to have managed and where he oversaw both the preparation of translations and the maintenance of a card index consisting of separate files devoted to (kinds of) goods, countries, and general commercial subjects (See Chapter 3, Sections 3.2 & 3.3, above): it was in conjunction with the goal of improving the latter that, shortly after he entered upon work at the PCM, he began to develop the method of indexing that would, in time, become SI (See Chapter 3, Section 3, above). As we shall presently see, Kaiser's experiences at the Bureau of Information of the PCM appear to have had a determinative influence on two of the central features of SI—the granularity of indexing and the choice of categories.

After three years in Philadelphia, Kaiser decamped to London in 1899, where he undertook work as librarian for a newly established Commercial Intelligence Bureau, Ltd. (CIB). Founded by the appropriately-named London-based advertising magnate Henry Sell, the CIB was a business that combined British imperial patriotism and profit by offering to its clientele—namely, British businessmen—informational services comparable to those of the Bureau of Information at the PCM, after which it was modeled and with which it shared close institutional links (See Chapter 4, Section 1, above). Although little is known about Kaiser's time with this commercial information service, internal clues scattered in his writings suggest that he implemented a version of SI there. In 1903, he left the service of the CIB to work as librarian and indexer at the recently founded British Westinghouse Company, Ltd. Apparently attached to firm's Publishing Department quartered at its London headquarters, he oversaw both the organization and indexing of what appears to have been a collection of periodicals, press clippings, and reference books, implementing such features as a daily bulletin to apprise the company's research staff of recently published periodical articles and newly acquired books and press cuttings (See Chapter 4, Section 2, above). Again, internal evidence in his writings suggests that he implemented a form of SI here as well, one that encompassed commercial and technical information pertaining to the company's chief interests—electrical and railway appliances.

Kaiser's stay with British Westinghouse proved brief, for, at the beginning of 1904, he entered into the service of a recently founded organization known as the Tariff Commission. Headed by the economist W. A. S. Hewins, the Commission had been called into being to carry out research in connection with a campaign for Tariff Reform spearheaded by the Liberal Unionist political leader and sometime Colonial Secretary, Joseph Chamberlain. Long

concerned with the unity of the British Empire and increasingly worried about the position of Great Britain in a global economy in which its industries were increasingly hard pressed by competition from the United States and Germany, Chamberlain championed the adoption of a tariff régime, a highly controversial move in a country that, for over sixty years, had operated under a policy of free trade which had become elevated to the rank of a political dogma (See Chapter 5, Section 1, above). The self-imposed task of the Tariff Commission was to determine the impact of foreign trade practices and tariff régimes upon the major British industries and to formulate a “scientific tariff” that, by balancing out the differential effects of duties on various industries and on domestic prices for staple goods and by setting preferential rates for members of the British Empire, would protect the whole of British industry against what Chamberlain and his allies saw as the predatory practices of foreign competitors and, at the same time, strengthen the economic might of the British empire as a whole (See Chapter 5, Sections 1–2, above). To this end, the Tariff Commission undertook a massive mail survey of British firms and commercial organizations inquiring about their current economic state and the effects of foreign trade régimes upon them and convened meetings, primarily in London, to hear more detailed testimony on these subjects from businessmen willing to volunteer such information: combining the results of these inquiries with information gleaned from correspondence, written testimonies, and library research, it eventually issued a series of reports on various British industries as well as a series of shorter memoranda on various tariff-related subjects, although it never accomplished its goal of formulating a “scientific tariff”, the impetus for which had largely petered out by 1910 (See Chapter 5, Sections 2–3, above).

Kaiser worked as librarian for the Tariff Commission from 1904 to 1911. During that time, he was responsible for designing, implementing, and overseeing the maintenance of the elaborate system of document files, card registers, and card indexes kept at the Commission’s London offices that served as the informational basis for its reports and memoranda, as well as for the various interventions in the press and at the podium by Hewins and his colleagues in the cause of tariff reform (See Chapter 5, Section 3, above). In addition to this, he prepared the indexes to the series of monographic reports that the Commission published; participated in the copy-editing of the reports and served as the Commission’s liaison with the establishments that printed them; and also seems to have taken part in managing the correspondence and arranging for the distribution by mail of the organization’s circulars. Yet, in the course of this work, Kaiser found time to compose two

books on the basis of manuscripts that he had been elaborating since his days at the PCM. The first of these, *The Card System at the Office*, which Kaiser arranged to have printed by one of the Commission's printers and which he published himself in 1908, discussed the basic features of card and vertical file equipment, outlined Kaiser's preferred method for the filing of documents, and gave instructions on the construction of card registers and indexes as mechanisms for locating documents and information within the files of a collection; the second, *Systematic Indexing*, published by the well-known house of Isaac Pitman and Sons in 1911, set forth a detailed account of SI that complemented practical protocols for making a systematic card index with more theoretically oriented chapters dealing with the milieu in which the method was to be used, the presuppositions—linguistic, epistemological, and social—underpinning the analysis of literature, and general considerations on the classification of concretes (i.e., objects in general), books, and name (See Chapter 5, Section 4, above). The two books were originally intended to form part of a three-volume series on "The Card System", of which the projected third volume never appeared: as the name of the series and the contents of both books clearly indicate, they were addressed primarily to an audience of businessmen and office managers (See Chapter 1, Section 5.2.1, above), though they did not escape the notice of literary indexers, documentalists, and librarians (See Chapter 8, Section 1, above).

The Card System and *Systematic Indexing* were generally well received by their reviewers and helped to consolidate Kaiser's reputation as an indexing expert. One result was the opening up of new professional opportunities for him as a consultant in the area of filing and indexing. In the wake of the publication of *Systematic Indexing* in 1911, he was invited to reorganize the correspondence files at the London offices of the munitions firm Vickers, Ltd., an episode about which little, unfortunately, is known (See Chapter 8, Section 1). In the following year, he was engaged by the factory manager of the Nobel's Explosives Company's plant at Ardeer, Scotland, to reorganize its works library (See Chapter 8, Section 2). Between mid-1912 and the autumn of 1914, he designed and implemented a scheme for document organization and a systematic card index for a collection of documentary materials, ranging from books, pamphlets, and periodicals to drawings, patents, and technical reports, oriented primarily towards explosives technology and ancillary scientific and technical subjects (See Chapter 8, Section 2.1, above). This implementation of SI proved to be highly successful and, by the end of the 1910s, Kaiser's co-workers at Ardeer had become evangelists for his indexing system. They published descriptions of their index in

professional journals, demonstrated its operation to persons from other firms visiting their library, and, in general, extolled the virtues of Kaiser's methods to documentation-minded colleagues working at other industrial concerns (See Chapter 8, Section 3, above). Thanks to their efforts, over the course of the 1920s, several other British firms and research organizations installed versions of SI in their own libraries: some of these so-called Kaiser indexes, including the one at Ardeer, were still in use as late as the late 1950s and early 1960s (See Chapter 8, Section 3; Chapter 9, Section 6, above).

Kaiser himself was unable to reap in full the benefits of the success of his system at Ardeer, for, with the onset of the First World War, his German origins made him suspect in the eyes of the British authorities and, despite his having obtained British citizenship in 1906, he was subjected to nominal internment (See Chapter 9, Section 1, above): his situation became unbearable enough that late in 1914, he returned to the United States, where he settled in New York. In 1916, he became a research assistant at the Engineering Societies Library (ESL), the foremost engineering library in the United States, and, a year later, he took on an additional job as an associate editor for the American Society of Mechanical Engineers (ASME), the offices of which were housed in the same building as the library (See Chapter 9, Sections 2–3, above). At the ESL, where he was employed until 1922, Kaiser rose to the rank of chief bibliographer, a position within its recently founded Library Service Bureau that involved conducting detailed bibliographical searches for patrons and compiling bibliographies in response to their queries (See Chapter 9, Section 2, above), while at the ASME, for which he worked until 1926, he also became an indexer and reviewer of foreign journals for the *Engineering Index*, the foremost index to engineering literature in the anglophone world (See Chapter 9, Section 3, above). Despite his reputation as an indexing expert in Great Britain, he seems to have had no influence on the various indexing projects undertaken at the ESL, where the directors of the library under whom he served harbored quite ideas about the scope and technique of indexing quite different from his (See Chapter 9, Section 2, esp. pp. 755–760, above). There is some evidence that he wielded more influence at the ASME, but to what extent remains unclear: while some features of the indexing system underlying the *Engineering Index*—most notably, the structure of certain kinds of complex subject headings—resemble those of SI, it is uncertain whether these parallels are to be attributed to direct influence from Kaiser or whether they simply represent a convergence between the two systems (See Chapter 9, Section 3, esp. pp. 765–773, above).

Although Kaiser seems not to have carried out any implementations of SI during his tenure at the ESL and the ASME, he had occasion to return to his indexing system in 1926, when, most likely at the behest of his erstwhile British colleagues, he prepared a paper outlining the primary features of SI for the third conference of the Association of Special Libraries and Information Bureaux (ASLIB), a recently formed organization that sought to foster cooperation and an exchange of ideas among persons in Great Britain interested in special librarianship and its techniques (See Chapter 1, Section 5.2.2; Chapter 9, Section 4, above). Building upon his experiences at Ardeer as well as upon his earlier expositions of *SI*, the paper set forth, in summary form, the primary features of SI and compared it to rival systems of indexing, namely various versions of decimal classification (See Chapter 9, Section 4.1, above). Although Kaiser himself was unable to attend the conference, one of his former collaborators at Ardeer presented the paper in his stead: delivered at a time when there was considerable controversy about the respective merits of alphabetic-specific and classification-based approaches to indexing among British special librarians and documentalists, the presentation was well-received by persons inclined favorably to SI but was accorded a notably cooler reception by partisans of its primary classification-based rivals, the Dewey Decimal Classification (DDC) and the Universal Decimal Classification (UDC) (See Chapter 9, Section 4.1, esp. pp. 818–823, above). At any rate, the paper was printed as an article in the proceedings of the conference and, insofar as ASLIB conferences were a major venue—arguably, the major venue—for publications pertaining to special libraries in the United Kingdom in the late 1920s and the 1930s, this assured the absorption of SI into the British discourse of special librarianship, whence, in due time, it was taken up into the broader discourse of KO (See Chapter 9, Section 6, above).

Kaiser's article for ASLIB would prove to be his swan song. Late in 1926, on the recommendation of his former colleagues at Ardeer, he accepted an invitation from an American explosives and chemicals firm, the Hercules Powder Company, to reorganize its library and install a technical index at its Experimental Station in Kenvil, Delaware (See Chapter 9, Section 5, above). Having taken a leave of absence from the ASME, he began work for Hercules in January of 1927, which, however, was abruptly cut short by his death as the result of injuries sustained when he was hit by an automobile while out on an evening stroll scarcely a month after his arrival in Kenvil. Despite Kaiser's death, the staff at the Experimental Station would succeed in constructing a systematic card index based on SI, which would not be substantially redesigned until the 1950s: this would prove to be the

only major implementation of a Kaiser index in the United States, in contradistinction to the United Kingdom, where, as we have already noted, several corporations continued to use forms of SI into the 1950s and early 1960s.

Such, then, was the trajectory of Kaiser's professional life and career. When viewed as a whole, this *Lebenslauf* exhibits several salient features that deserve comment. First, it is evident that Kaiser led a peripatetic existence on an international scale. By the time of his thirtieth birthday, he had lived in four countries situated on four different continents: Germany in Europe (1868–1886), the colony of Queensland in Australia (1886–1892), Chile in South America (1892–1896), and the United States in North America (1896–1899). During the last twenty-nine years of his life he would lead a somewhat more settled existence with protracted stays lasting well over a decade in the megalopoleis of London (1899–1912) and New York (1914–1926), respectively. Yet the impression of sedentariness and stability that Kaiser's sojourns in London and New York may give is in large measure, illusory, for, he seems to have changed his place of residence quite frequently while living in those cities;⁶⁴⁸ moreover, he displayed a willingness to relocate to geographically more remote places, such as Ardrossan in Scotland (1912–1914) or Kenvil in the state of Delaware (1927), in order to pursue occupational opportunities. In short, for much of his life, Kaiser seems to have been a man on the move.

Kaiser's *Wanderjahre* in the 1880s and 1890s were a time when he developed certain skills and traits that would prove to be of lasting benefit to him over the course of his career. One important consequence of his early international experience was that he acquired a working knowledge of several languages, for, in addition to his native German, he had occasion to learn English, Spanish, and French (See Chapter 2, Sections 1–3, above). Throughout his adult life, Kaiser used his linguistic skills as a point of *entrée* into occupations for which he otherwise had no formal qualifications. In Queensland, he parlayed his native speaker's knowledge of German into a career first as a freelance teacher

⁶⁴⁸ During the first six-and-a-half years of his residence in London (October 1899 to March 1906), a period that covers his tenure with the CIB, Ltd., and British Westinghouse, as well as the opening years of his work for the Tariff Commission, Kaiser lived at no fewer than nine addresses, his longest stay at any one being for a duration of 2 years and 5 months (UKNA, HO 144/832/143880, Memorial "A", § 5, declared 20 June 1906): furthermore, he lived at (at least) two different London addresses between 1907 and 1911 (TCP, 6/1/14, Kaiser to Hewins, 14 August 1907 [letterhead]; Kaiser 1908, § 6; UKNA RG14/2393/RD25/SD 7/ED 2/SN 7) and at (at least) two different addresses in New York between 1920 and 1926 (American Society of Mechanical Engineers 1926, 488; USNA Microfilm Publications T625, Roll 1203, p. 9A, Enumeration District 760 [available via: <http://www.ancestry.com>]).

of the language and, then, as an assistant master at a private school (See Chapter 2, Section 2, above). It is likely that his command of German and English likewise stood him in good stead during his time as a schoolmaster in Chile (See Chapter 2, Section 3, above). When he first came to Philadelphia, he advertised knowledge of languages as his occupational speciality and it is highly likely that it was his polyglottism that initially secured him a position as translator and indexer at the PCM's Bureau of Information (See Chapter 3, Section 1, above). In London, his acquaintance with several languages was one of the factors that weighed in his favor when he was being considered for the post of librarian at the Tariff Commission (See Chapter 4, Section 2), while, later, in New York, both his freelance work as translator prior to joining the ESL and his later position as reviewer of foreign journals for the ASME were predicated on his linguistic versatility (See Chapter 9, Sections 2–3). It is evident, then, that, for Kaiser, a knowledge of the principal commercial languages of the West had pragmatic value as a means by which to help secure a livelihood in the anglophone societies within which most of his career unfolded. At the same time, one may wonder whether his multilingual background did not contribute to his heightened sensitivity to the semantic lability of language in general and his belief that language could not reproduce thoughts exactly: after all, he compared translation from one language to another with that from thought to language, claiming that whereas the former could result, at best, only in “an approximation” of the original, the latter was “more difficult still” to achieve adequately (Kaiser 1911, § 60; cf. Chapter 7, Section 2.2, above).

Another way in which Kaiser's geographical mobility during his young manhood affected his later life and career was that it gave him the occasion to develop a *habitus* of initiative, self-reliance, opportunism, adaptiveness, and independence. Emblematic of this was his course of action after he emigrated with his family from Germany to Queensland. As we have already noted, in Germany, his attendance at a *Fortbildungsschule* had set firm limits on his career options in a society where the kind of educational institution that one attended circumscribed the kinds of occupation that one could pursue (See Chapter 2, Section 1, above): his formal education qualified him for a career in the small trades. Yet, within a few months of having moved into the less rigidly articulated social environment of Queensland, he struck out upon quite a different occupational pathway, deploying his own musical skills in musical performance and his linguistic background as a native German speaker in a primarily anglophone society as stepping stones to a pedagogical career, progressing from freelance instruction of languages and music to teaching at a private

school, where his lack of formal qualifications would not be an obstacle to employment (See Chapter 2, Section 2). This episode suggests that Kaiser had a strong awareness of his own personal skills and a keen awareness of how they might be employed to make a living in the particular circumstances within which he found himself: manifesting a certain independence of mind and a touch of entrepreneurial spirit, he seems to have adapted himself quite rapidly to conditions of life and work in Queensland.

This initial impression is only deepened when one recalls Kaiser's subsequent willingness to uproot himself from his kith and kin in Australia in order to seek his fortunes as a schoolmaster in Chile, as well as his decision shortly thereafter to alter his surname from "Kaeser" to "Kaiser", a move in which one can, perhaps, espy the individualist ethos of a self-made—or, at least, a self-fashioning—man. Further evidence of his independence and adaptability would be forthcoming when he moved to Philadelphia and embarked upon a new career as translator, indexer, and librarian at the PCM's Bureau of Information: within a few months of taking up indexing work, he had already identified what he considered to be flaws in the system of subject cataloging and indexing used at the Bureau's library and begun to develop the method of indexing that came to be known as SI. Clearly, Kaiser's willingness to make the lateral move from teaching to indexing and librarianship, his apparently rapid assimilation of the basic elements of his new *métier*, and his interest in improving existing practices by introducing his own innovations all bespoke a capacity for intelligent adaptation to new occupational circumstances and their requirements as well as a penchant for original thought. This latter quality he would continue to manifest throughout the rest of his life in various ways, not only in his professional indexing work—one need only remember the remark of one of his reviewers that "the author of "Systematic indexing" disagrees with almost everything that has so far been done in the matter with which he concerns himself" (Brooks 1913, 371; cf. Chapter 8, Section 1, above)—, but in his avocations as well, as is apparent from the treatise on geometry on which he was working at the time of his death, in which he challenged some of the existing theories in the field (Hercules Powder Company 1927; see Chapter 9, Section 5, above).

Kaiser's initiative, independence of thought, and adaptability served him well over the course of a thirty-year career as indexer and librarian during which he worked for no fewer than nine different organizations. It is not difficult to discern certain patterns in the kinds of milieux within which he was employed. First and most obviously, the institutions at which he worked were special libraries or organizations devoted to providing information

services for a specific clientele, be it businessmen interested in foreign trade (as in the case of the Bureau of Information at the PCM and the CIB), businessmen working for a particular firm (as in the case of British Westinghouse Company and Vickers), economic researchers involved in a project to generate a “scientific tariff” (as in the case of the Tariff Commission), engineers in general (as in the case of the ESL and the ASME’s *Engineering Index*), and scientific and technical researchers working for a given company (as in the case of the British Westinghouse Company, Nobel’s Explosives Company, and the Hercules Powder Company).

Second, many of the organizations with which Kaiser was associated over the course of his career were at comparable stages of their institutional development when he worked for them. It is noteworthy that the four special libraries at which he was employed prior to the publication of *Systematic Indexing* in 1911 were part of entirely new organizations (i.e., the CIB and the Tariff Commission) or ones that had been recently formed (i.e., the PCM and British Westinghouse Corporation), while, by contrast, after the appearance of his *opus magnum*, he was engaged primarily by institutions that had been in existence for some time but that were in the process of reorganizing or consolidating their library and information services (i.e., Vickers, Nobel’s Explosives Company, the ESL, the ASME, and the Hercules Powder Company). Importantly, the relative newness of the libraries or document collections with which Kaiser worked in the earlier stage of his career gave him the opportunity to design, and oversee the implementation of, the KOSs used within them, save for the library associated with the Bureau of Information at the PCM, where a régime of knowledge organization was already in place when he arrived on the scene and where, accordingly, he seems to have established a separate testbed for the earliest version of SI (See Chapter 3, Section 3.3, above). Later in his career, the reputation that he had gained as an expert in indexing led to invitations to reorganize the correspondence department at Vickers and the technical libraries at Nobel’s Explosives Company and the Hercules Powder Company—assignments that gave him further scope to implement versions of SI and its related mode of document classification. The only institutions with which he was associated and for which he did *not* create systematic card indexes were the ESL, where his position was that of a bibliographical searcher rather than indexer and where the directors of the library held ideas about indexing quite different from his own (See Chapter 9, Section 2, above), and at the ASME, where he worked and, apparently, consulted for, but did not direct, the *Engineering Index* (See Chapter 9, Section 3, above). In short, Kaiser spent much of his

early career as librarian and indexer overseeing or organizing new special libraries in accordance with the system of indexing and document classification that he was elaborating, while, in its later stages, he worked either as an expert consultant who reorganized pre-existing document collections or as a search specialist and indexer for institutions at which others had oversight over policies relating to classification and indexing.

Third, all of the libraries and information services with which Kaiser was affiliated had as their mission the support of research through the collection, organization, and distribution of information, though the scope and nature of this support differed across the various institutions. The Bureau of Information of the PCM sought to provide information to American businessmen throughout the world about commercial opportunities abroad by communicating to them the addresses of foreign firms and dealers in their line of trade and by having in-house researchers prepare customized reports about special commercial subjects in response to queries: its card index thus served primarily as a search tool for these researchers (See Chapter 3, Sections 3.2–3.3, above). The CIB rendered similar services for English businessmen, though, unlike the Bureau, it distributed directly to its clients printed cards bearing extracts of information from current trade literature on subjects of interest to them as well as bibliographical references pertaining thereto: in this way, it made the contents of its card index(es) immediately available to its subscribers instead of filtering them through reports (Chapter 4, Section 1, above). At the Library Service Bureau of the ESL, a similar service was performed by the chief bibliographer and his assistants who, using the library's card catalog, printed bibliographies and indexes, and their own bibliographical acumen, compiled lists of bibliographic references in response to specific queries from individual patrons (See Chapter 9, Section 2, above): as already noted, Kaiser was responsible for this work during his time at the ESL.

Whereas the PCM's Bureau, the CIB, and the ESL were dedicated to providing information services for a broad range of persons and organizations interested in particular domains of human knowledge and endeavor (foreign commerce, in case of the first two, and engineering, in the case of the latter), the informational régimes of the other institutions for which Kaiser worked were more specific in nature. The Tariff Commission, as we have already noted, was chiefly concerned in carrying out research that would lead to the construction of a politically acceptable tariff system for the United Kingdom (See Chapter 5, Section 2, above): although the Commission's offices came to serve as an information

bureau of sorts for persons interested in the cause of tariff reform, its card registers and indexes were intended primarily to subserve the needs of its own economist-researchers as they prepared the industry reports and memoranda that were intended to provide the argument for, and the basis of a “scientific tariff”. As for the libraries of the Publishing Department of the British Westinghouse Corporation, the Ardeer factory of Nobel’s Explosives Company, and the Hercules Powder Company, they were intended primarily for the use of researchers employed by these firms: the card indexes at the library of British Westinghouse appear to have been designed to support both commercial and technical research (See Chapter 4, Section 2, above), while those of Nobel’s Explosives Company and the Hercules Powder Company were oriented much more strongly towards scientific and technical research (See Chapter 8, Section 2; Chapter 9, Sections 9.5, above). The card index system of the correspondence department at Vickers, on the other hand, most likely aided the work of the business managers at that firm’s headquarters, though precise information about them, unfortunately, is lacking (See Chapter 9, Section 1, above). Thus, in addition to working for information bureaux such as that of the PCM or the CIB, Kaiser had experience in the organization and management of company libraries and, in the case of Vickers, the institutional equivalent of a filing department (cf. Chapter 6, Section 2.2, above).

A fourth, and final, pattern that merits our attention relates to shifts in the broad domain orientations of the organizations for which Kaiser served as librarian and/or indexer over the course of his career. Like other special librarians of his day, he distinguished between commercial information—i.e., information deemed useful to those who were engaged in the selling or distribution of products in the market—and technical information—i.e., information relating to the applied sciences, technology, and industrial procedures used in the research for, design, and manufacture, of products for the market (See Chapter 6, Section 2.3, above). To be sure, a business organization’s library or document collection was likely to include both commercially oriented and technically oriented literature, for, as Kaiser (1911, § 664, s.v. “Business Literature”) observed, businesses typically have both commercial and technical interests and so require information on commercial and technical subjects alike. Nevertheless, depending upon the particular kind of organization of which it formed part, a special library, information bureau, or information service might well foreground one or the other kind of information.

Now the libraries and information bureaux at which Kaiser worked over the course of his career can be roughly divided into two groups, those with a primarily commercial and

those with a chiefly technical emphasis. Belonging to the first camp were, for the most part, the institutions at which he was employed prior to the publication of *Systematic Indexing* in 1911. As their very names suggest, the Bureau of Information of the PCM and the CIB were focused on the collection, organization, and provision of commercial information (See Chapter 3, Section 2; Chapter 4, Section 1, above); the Tariff Commission likewise collected information relating principally to commerce and trade, whereas the library at the Publishing Department of British Westinghouse appears to have collected and indexed both commercially and technically oriented literature (See Chapter 4, Section 2; Chapter 5, Section 3, beginning, above). In the years after 1911, however, the organizations with which Kaiser was associated tended to have much more technically oriented interests. Although direct evidence is lacking, it seems likely that the documents collected and organized in the correspondence department of the main offices of Vickers dealt with both commercial and technical subjects, much as those at the company library of British Westinghouse had done. There can be no doubt, however, that the works library of Nobel's Explosive Company at Ardeer was focused on scientific and technical information relating to explosives technology and manufacture, as was the case with the library at the Experimental Station of the Hercules Powder Company (See Chapter 8, Section 2-2.1; Chapter 9, Section 5, above), while the ESL and the *Engineering Index* sought to cover literature dealing with the various phases of engineering (See Chapter 9, Sections 2-3, above). In sum, Kaiser initially created and elaborated his indexing system while working at special libraries and information bureaux that were oriented primarily toward commercial information but, in the latter half of his career, he worked as indexer, indexing consultant, and bibliographical searcher for libraries and an indexing service that were focused mainly on technical information (See Chapter 9, Sections 4, above). We shall presently see the implications of all this for his conceptualization of the fundamental components of his indexing system—namely, its categories of terms. But before we do so, it is necessary to review the primary methodological and theoretical features of SI as a whole.

10.2. Conclusions about the Methodological and Theoretical Features of Systematic Indexing

In simplest terms, SI was a method of subject indexing used to generate a particular kind of alphabetico-specific (see Glossary) index with the card index serving as technological infrastructure. However, for Kaiser, his method of indexing was not a KOS unto itself but rather formed part of a broader régime of knowledge organization that also involved

the utilization of a particular model of the organization of documentary materials and the creation of complementary mechanisms to aid in the retrieval of documents within a collection. This régime of knowledge organization, in turn, was intended for use in a particular context—what Kaiser called the intelligence department (See Chapter 6, Section 2.2, above). On the latter point, he was quite firm, expressly denying that SI would be of use in other settings such as, for example, public libraries (See Chapter 9, Section 4.1, esp. p. 823, above).

Kaiser viewed the intelligence department as that unit within a business organization responsible for the collection, organization, storage, and provision of information, a traditional function of the office that, in the early 20th century was increasingly being distributed to specialized divisions such as filing departments or company libraries. Although he understood the work of the intelligence department to be a kind of office activity essentially identical to what other writers characterized as the work of the filing department, his own experience as a librarian encouraged him to assimilate the intelligence department to the business library (See Chapter 6, Section 2.3, above). For Kaiser, the sole difference between an intelligence department and business library was that the former might collect both samples of goods—that is to say, material objects—and literature, or textual documents, whereas the business library confined itself to textual documents alone: yet, given his acknowledgement that many intelligence departments might not handle samples, this distinction was, for all practical purposes, academic (See Chapter 6, Section 2.4, above). He identified the primary tasks of the intelligence department, or business library, to consist in filing the textual documents belonging to a given business organization (i.e., arranging them physically in accordance with a given scheme of organization), indexing them (i.e., identifying, indicating, and collocating the various pieces of information that they contained within a card index), and summarizing information (i.e., preparing brief reports on particular topics) in response to queries from patrons (See Chapter 6, Sections 2.2–2.3). Insofar as the chief aim of an intelligence department, or business library, was to make all relevant *information* on subjects of interest to a given business organization available to its clientele (Kaiser 1911, §§ 36, 663, s.v. “Business Library”), Kaiser deemed indexing to be the most important of the three functions (See Chapter 6, Section 2.2, above).

In Kaiser’s view, the function of filing was to store in an orderly manner the documentary materials housed by an intelligence department, or business library, so that they could be retrieved immediately when needed (See Chapter 6, Section 3, above). To this end, he developed a method of classifying documents based almost exclusively on

documentary kinds. According to his template for document classification, literature was to be divided into a series of broad classes, each of which encompassed a different kind of document: for example, correspondence, periodicals, press cuttings, books and pamphlets, and trade catalogs. Within each class, documents *qua* filing units were to be arranged in consecutive numerical order, primarily on the basis of the sequence of their accession into the intelligence department's collection (See Chapter 6, Section 3.1, above). Each individual filing unit was assigned a call number that indicated the class to which it belonged and its position within the sequence of filing units within that class: the call number of a filing unit served both as a unique identifier for it within the framework of a given intelligence department and reflected its position within the files or on the shelves thereof. This form of classification, which Kaiser seems to have derived from the conventions of correspondence filing (See Chapter 6, Section 3.1, esp. p. 226, above), effectively dissociated the classification of documents from the indication of their subject content.

Acutely aware that his method of document classification ran counter to contemporary library practice, which favored the use of subject-based classification schemes such as the DDC, Kaiser developed a series of arguments, both practical and theoretical, in support of it. On a practical level, he maintained that the heterogeneity of documentary materials typically handled by intelligence departments necessitated a classification thereof by documentary kind and argued that the method of directly subdividing broad document classes by filing units in the numerical sequence of accession had the virtues of simplicity and efficiency in comparison to the relative complexity of subject-based bibliographic classification (See Chapter 6, Section 3.2.1, above). On a theoretical level, he set forth a detailed critique of subject-based classifications as a means of shelf arrangement. The gravamen of his argument was that documentary materials—especially substantial ones such as books—are, on one hand, physically discrete, concrete objects and so, barring the procurement of duplicates, could occupy only a single position within the files or shelves of a given collection; yet on the other hand, they are bearers of complex discursive content and so tend to be polytopical with regard to their subject matter (See Chapter 6, Section 3.2.2, above). Inasmuch as conventional, subject-based classifications required that the position of documents in files or on shelves be based on their subject content, any arrangement based on such classifications would fail to achieve perfect collocation of all the documents treating of a given subject, since no book could be distributed to all the different classes to which it might be assigned on the basis of its contents. Since all subject-based classifications would

inevitably yield unsatisfactory results on this score, he argued, it was best to dispense with them altogether: to this, in time, he added the ancillary argument that any subject-based classification would present a researcher with only one way of conceptualizing the relationships between subjects, whereas a more semantically neutral classification, such as one based on documentary kinds, did not encourage the mind to follow preordained grooves (See Chapter 9, Section 4.1, esp. pp. 814–815, above). Such were the objections to subject-based classifications that Kaiser gave as a rationale for eschewing their use within the setting of the intelligence department in favor of the classification by documentary form that he proposed.

Because the call numbers serving as the unique identifiers of individual documents were restricted to indicating the position of the latter within a particular group of documents within a collection, it was necessary, for the purposes of retrieval, to correlate the call number of each document with some attribute with respect to which the clients of an intelligence department were most likely to search for documents, such as the name of the organization or person from which it emanated, the name of the trade in which the organization or person in question was involved, or the name of the place in which the organization or person in question was located (See Chapter 6, Sections 3 & 3.4, above). To this end, Kaiser developed the mechanism of card registers. In its most elementary form, a card register was a set of card records, each of which correlated a name associated with a given document and the call number thereof (See Chapter 6, Section 3.4, above). In most kinds of registers, the card record—which generally was 3 x 5 inches in height and width, respectively—was in such a way that the name occurred in the top left-hand corner of the card, the call number on the upper right-hand corner of the card, and any ancillary information, such as, say, the address of a correspondent, the place of publication of a periodical, or the publisher of a book on the upper main body of the card: registers of this sort were typically arranged in the alphabetical order of the names in the upper right corner, be these the names of persons or organizations, geographical entities, trades, or other attributes specific to particular document types (See Chapter 6, Section 3.4, esp. pp. 257, 259, 261–263, above). Another kind of register was comprised of card records in which the call number appeared in the left-hand corner and the name of the entity associated with it in the upper main body of the card: such registers, known as numerical registers, served as the functional equivalents of library shelf lists, providing a check on the holdings of an intelligence department at a given point in time (See Chapter 6, Section 3.4, esp. pp. 259,

261, above). Separate alphabetical registers might be compiled for each different kind of document within a collection; conversely, a single so-called central register might encompass records for all the documents in a collection, thus facilitating the retrieval of all materials relating to a given person or organization regardless of documentary form(at) (See Chapter 6, Section 3.4, esp. pp. 269–271, above).

Kaiser's document classification, then, served as a means of physically organizing the documentary materials into groups on the basis of their form(at), while his system of card registers provided a mechanism for locating individual documents *qua* filing units within a given collection and so facilitated the retrieval thereof. Although both were necessary parts of the régime of knowledge organization in a well-ordered intelligence department, they were also limited in important ways. First, both the document classification and the system of card registers took the document, or bibliographic unit, as their primary point of reference: the former dealt with documents—or, in the case of correspondence, groups of documents—as filing units, while the card records in the latter referred to individual documentary units as wholes—that is to say, they accorded them the same level of treatment as library catalogs did to books and periodical indexes to journal articles (cf. Chapter 7, Section 1, esp. pp. 274–280, above). Second, neither the document classification nor the system of card registers provided much in the way of indicating the informational contents of documents: the former simply did not include coverage of subjects within its purview, while the latter restricted it to certain classes of documents, such as books and pamphlets, periodicals, and trade catalogs and, even then, simply correlated subjects with documentary units as wholes (See Chapter 6, Sections 3.2 & 3.4, above). Accordingly, if an intelligence department was to meet Kaiser's goal of making information on subjects of interest to the members of its parent organization accessible to them, it was necessary to create a highly granular tool of subject access that would guide them to the particular pieces of information contained within the documents in the department's collection pertaining to these subjects. This tool was the systematic card index and the system that it embodied was that of SI (See Chapter 7, Section 1, above).

For Kaiser, the process of making a systematic card index ultimately consisted of two phases: (1) the analysis of literature—or rather, the information mediated by literature—into smaller pieces, or units, of information, which were to be rearticulated in accordance with a certain structural pattern and (2) the arrangement of these pieces of information in accordance with a fixed plan that would both collocate those pertaining to the same subject

and arrange the subjects in such a manner that each would have a readily discoverable “fixed point” within a card index file (See Chapter 7, Section 1, esp. pp. 282–283, above). The analysis and rearticulation of textual information, which, in his estimation, constituted indexing in the strict sense of the word (Kaiser 1908, § 77; 1911, §§ 295, 625), was intended to enucleate pieces of information at a level of granularity comparable to that of book indexes: however, the resultant systematic card index differed from the latter in two important respects. First, it did not confine itself to a minute analysis of the informational content of a single bibliographical unit as a book index did but included pieces of information from a given *corpus* of documents, which might encompass all the documents in a given collection—in which case the index was a Central Index—or only documents belonging to a certain documentary kind (See Chapter 7, Sections 1 & 5, above). Second, and more important, a systematic card index was not to include *all* the pieces of information that might be identifiable and isolable within a given corpus of documents but only those pertaining to subjects of interest to the organization for which the index was being compiled (See Chapter 7, Sections 1 & 4.2, esp. pp. 292–295, 510–512, above). This principle of selectivity Kaiser (1911, §§ 45–46; 309) considered to be of utmost importance in the constitution of a card index, for, by incorporating into an index just those pieces of information in documents that were considered to be pertinent to the informational needs of a given business organization’s personnel, the indexer not only brought to the attention of users information that was most likely to be of immediate use to them in the pursuance of business-related activities but it effectively shielded its users from those parts of the documents that fell outside of their organization’s sphere of interests: in this sense, it reduced the bulk of the information that a person using the intelligence department had to peruse (See Chapter 7, Section 1, esp. pp. 293–294, above). By virtue of both its relatively high degree of granularity and its selective inclusion of only that information pertaining to subjects of interest to a given business, argued Kaiser (1911, §§ 6–7, 10–15), a systematic card index could serve the informational needs of the organization better than any library catalog or printed periodical index could. Such was his rationale for SI.

Kaiser’s method of indexing thus constituted a form of highly analytical, but selective, indexing carried out upon textual documents. From a theoretical point of view, he based it on what can broadly be characterized as an empiricist understanding of the nature of knowledge and its relation to language (See Chapter 7, Section 2.1, above). In his view, all literature—and by “literature”, he meant primarily business literature, be it commercial or

technical in nature—was a descriptive record of (1) human observation of things in the world—what he called “concretes”—and the various actions or conditions in which they were implicated—what he termed “processes”—and (2) the results of reasoning, be it inductive or deductive, from these observations: the text of a document was thus a linguistic representation of knowledge (See Chapter 7, Sections 2 & 2.1, beginning, above). To be sure, this knowledge was itself subject to certain limitations. In Kaiser’s view, knowledge of things, or concretes, was restricted to how they appeared, or manifested themselves, to observers: in this, he seems to have held a view comparable to that of epistemological phenomenalism (See Chapter 7, Section 2.1, esp. p. 305, above). By the same token, he was of the opinion that knowledge is never final but ever revisable in the light of new observations or reports thereof: in this, he subscribed to a form of fallibilism (See Chapter 7, Section 2.1, above, esp. pp. 307–308, above). Furthermore, he believed that all observations were individual, all knowledge was perspectival, and that any conclusions that one reached from one’s observations or reading were contingent upon his or her particular situation in the world and the point of view and interests that arose from his or her past experiences and projects for the future: in this, he was an epistemological individualist (See Chapter 7, Section 2.1, esp. pp. 308–310, above). One consequence of all this was that, in Kaiser’s (1911, §§ 297) eyes, information—which he took to be knowledge encoded in, and so rendered communicable through, language (cf. Chapter 7, Sections 2 & 2.1, esp. pp. 298 with Figure 14, 310–311, above)—could consist of both (statements of) “fact” and (those of) “opinion” (See Chapter 7, Section 2.1, esp. pp. 312–320, above). The job of an indexer was to include within an index all statements of facts and opinions relating to subjects of interest to the organization for which he worked; the task of the researcher consulting an index and preparing a summary on the basis of the information that it contained was to sift through the latter, separate out what he took to be facts from what he understood to be opinions, and draw his conclusions on what he identified as facts: as Kaiser (1911, § 297 [emphasis his]) put it, “an index merely furnishes ... material, to turn it to account, to draw deductions, that is one of the functions of *business* properly so called”.

Complementing Kaiser’s empiricist understanding of knowledge was his essentially empiricist approach to language. In his view, the text of every written document was the product of a process of translation of its writer’s thoughts about, or mental picture of, certain things in the world into language—one might also speak of the encodation of one’s thought into language—and the reading of a document entailed the interpretative trans-

lation—one might also speak of the decoding—of the words of the text into the thoughts of, or mental picture carried by, the reader (See Chapter 7, Section 2.2.2, esp. p. 337, Figure 16, above). Underlying this *de facto* model of written communication, which exhibited some striking similarities to the later Shannon-Weaver model of communication (See Chapter 7, Sections 2.2.1–2.2.2, esp. pp. 338–342, with Figures 17 & 18, above), were the assumptions that there was a disjunction between thought and language and that the relationship between the two was tenuous and fragile. In accordance with his epistemological individualism, Kaiser (1911, § 112) held that, although different persons might well agree on the core elements of meaning of a given word, they would, in virtue of their differing perspectives, vary in their understanding of the precise definitional contours thereof. By the same token, he believed that the conventional meanings of words rarely, if ever, captured with precision individual persons' mental pictures of the things whereof they wrote (§§ 60, 67), so that every writer's translation, or encodation, of his thoughts into language embodied the adage *traduttore traditore*, while every reader's translation, or decodation, of a given text's words into his own thoughts ran the risk of misinterpreting the message intended by the writer (§§ 64–65). On this view, the only (relatively) stable element in the process of written communication through which knowledge became information was the *ipsissima verba* of a text (See Chapter 7, Sections 2.2.2–2.2.3, esp. pp. 342–343, 347–348, above): words alone provided a secure handhold for determining the informational contents of documents.

Kaiser's epistemological and linguistic views set the tone for his conceptualization of SI. They underpinned his assumption that terms—that is to say, verbal expressions serving as the names of things in the world and the conditions attaching to them—constituted the primary elements of analytical indexing (See Chapter 7, Section 2.2.3, above). As a rule, the terms forming part of the vocabulary of a given index were to be derived directly from the verbal texts being indexed, though Kaiser allowed for certain exceptions to this (See Chapter 7, Sections 2.2.3 & 4.2, above): they could take the form of single words—primarily, nouns—or multiword expressions—typically, noun phrases. The terms integrated into an index vocabulary were notionally integrated into two orthogonal, but partially intersecting, classificatory structures representing a system of category semantics and one of relational semantics (See Chapter 7, Section 2.2.4, above). The category semantics of SI assigned each term in an index to one, and only one, of three broad classes, or categories, of terms defined by the kind of entity to which they referred—namely, terms of concretes, terms of countries,

and terms of processes (Kaiser 1911, § 73). The relational semantics of SI, on the other hand, drew a distinction between general, or collective, terms and specific terms and so mandated the establishment of hierarchical relationships between semantically related terms belonging to a given category (§ 74): although, in principle, all three categories could encompass collective and specific terms, Kaiser limited the active use of relational semantics to terms of concretes and terms of countries alone (See Chapter 7, Section 2.2.4, above). Adhering to the view that, on the whole, specific information and information on specific subjects were more useful than general information and information on collective subjects in the business world, he urged indexers to select index terms that were as specific as was possible within the limits imposed by the texts being indexed, though he conceded that, in many cases, relatively general, or collective, terms would have to be included in an index vocabulary as well (See Chapter 7, Section 2.2.5, esp. pp. 371–372, above). A preferential option for specificity, then, was another important methodological feature in Kaiser's system of indexing.

Whereas both category semantics and relational semantics had important rôles to play in the constitution of a systematic card index, the former was arguably the more fundamental of the two. Indeed, as Kaiser (1911, § 645) himself asserted, the three categories of terms formed “the foundation of the entire index as an organisation” (See Chapter 7, Section 3). In theory, two of the term categories—namely, terms of concretes, which Kaiser alternatively defined as referring to things in general or, within the context of business discourse, to commodities (See Chapter 7, Section 3.1.2, above), and terms of processes, which he alternatively defined as signifying conditions attaching to concretes or as actions done to or by them (See Chapter 7, Section 3.3.2, above)—were primordial and primary, while the third—namely, terms of countries (See Chapter 7, Section 3.2, above)—was derivative and secondary: in this respect, it is noteworthy that the two theoretical rationales—one ontologico-epistemological and the other, logico-linguistic (See Chapter 7, Section 3.4, esp. p. 448, above)—that Kaiser offered to justify his choice of categories limited themselves to a dyadic categorial scheme consisting of concretes and processes alone. In practice, however, Kaiser—at least, in his earlier accounts of SI—tended to treat all three categories as equal members of a triadic categorial system consisting of concretes, countries, and processes (See Chapter 7, Section 3.4, esp. pp. 448–449, above), using a theoretically dubious derivation of the category of countries from that of concretes as a justification for including them in the scheme (See Chapter 7, Section 3.2, above). There was thus a tension

between the dyadic and triadic versions of the category scheme of SI that ran through Kaiser's writings on his indexing system: even in the final version of SI, in which he took the two-category version featuring terms of concretes and terms of processes as the normative one, the three-category system continued to lurk in the background and he never entirely disavowed—though he did de-emphasize—the place of terms of countries within SI (See Chapter 9, Section 4.1, esp. pp. 792–793, above).

The categories served as the building blocks for complex index terms or, as Kaiser preferred to call them, statements (See Chapter 7, Section 3, above). A statement consisted of at least two, and at most three, terms drawn from different categories, which were placed into a sequence on the basis of their category membership. In *Systematic Indexing*, Kaiser stipulated that there were three official—in fact, there were four—different permissible forms for statements (See Chapter 7, Sections 3, above, esp. Statement Forms [7.1]–[7.3], & 3.5), namely

[10.1]. [CONCRETE]–[COUNTRY]–[PROCESS]
(Variant: [COUNTRY]–[CONCRETE]–[PROCESS])

[10.2]. [CONCRETE]–[PROCESS]

[10.3]. [COUNTRY]–[PROCESS].

Of these three statement forms, the tripartite one [10.1] was the canonical form, while the two bipartite ones represented transformations thereof (Kaiser 1911, § 303; cf. Chapter 7, Section 3.5, esp. pp. 485–487, above). Interestingly, Kaiser came, over time, to reverse his thinking on this, for in his final article on SI, he presented the bipartite form [10.2] as canonical, while implicitly accepting the tripartite one [10.1] as a secondary variant (Kaiser 1926, 23, § 12, & 24–25, §§ 14–15, Points a, c, d; see Chapter 9, Section 4.1, esp. p. 793, above). Despite this shift in emphasis, the core structural feature of the statement forms remained constant: terms for concretes and/or countries always preceded the process term and the latter always was the final element in a statement. Kaiser invoked both theoretical and practical arguments to justify this sequence of categories. In theoretical terms, he argued that processes as such are always ontologically dependent upon concretes (See Chapter 7, Sections 2.1 & 3.5, esp. pp. 300 & 479, above), while, in a more pragmatic vein, he anticipated that concretes *qua* commodities and the countries with which they are associated would be subjects of greater interest to businessmen than processes *per se* (See Chapter 7, Section 3.5; Chapter 9, Section 4.1, esp. pp. 481 & 809, above). The practical con-

sequence of this was that a term for concrete or—at least in the version of SI set forth in Systematic Indexing—country was always the main filing term in a card index, while terms for processes invariably served as subdivisions of concretes and/or countries.

Statements constituted the structural linchpin of SI. Most importantly, perhaps, they served as the means by which pieces of information within a given text were identified and isolated. Kaiser expected that an indexer would read through the text, mark those terms of concretes and/or countries that fell within the subject scope of the index, and formulate at least one statement for each term selected (See Chapter 7, Sections 3 & 4.2, above). Each statement thematically demarcated a given item of information and, as such, formed the basis for the creation of an index item (See Chapter 7, Section 3, esp. pp. 376–377, above). An index item consisted of the statement and what Kaiser called its amplification—that is to say, additional data that extended and completed, so to speak, the nucleus of information that the statement represented. Typically, the data in an amplification included a very brief overview of the information in the text pertaining to the subject indicated by the statement: this overview, which could take the form of an indicative annotation about the kind of information contained in the text being indexed or an informative condense, or summary, of the information itself, was called an extension (See Chapter 7, Section 4.3, esp. pp. 520–531, above). Accompanying the extension was the date of information, which indicated the time period associated with the particular piece of information given in the extension; various data—author, title, date and place of publication—pertaining to the document from which the information was taken; and the call number of the document in question (See Chapter 7, Section 4.3, esp. pp. 531–538, above). Each index item was inscribed upon a single unit card in a highly structured manner, with each element of the statement and amplification being assigned a specific place on the surface of the card (See Chapter 7, Section 4.4, above, esp. p. 541, Figures 20–21, above). The card records formed in this way were the elementary units of the card index file.

In addition to being the nuclei around which index items were constructed, statements provided the basis for the internal structuring of card index files. Distinct index files could be created for separate classes of documents, as Kaiser seems to have done at the Tariff Commission (See Chapter 5, Section 3, esp. pp. 171–174, above); however, he assumed that, in many contexts, it would be more advantageous to set up a single index file covering items culled from the full range of an intelligence department's collection of documentary materials and, in fact, designed and implemented such a file, which he dubbed a Central

Index, at the Nobel's Explosives Company's factory in Ardeer (See Chapter 7, Section 5; Chapter 8, Section 2.1, esp. pp. 714–715, above). Whatever the extent of a file might be, statements served as the means of collocating and ordering index items within it. Card records bearing the same main filing term—the first term of a statement, which, as we have seen, could either designate a (kind of) concrete or a country—were brought together and within each set of index items so collocated, smaller sets were formed from cards sharing the same second or third terms in their statements: in this way, all index items having the same statement were ultimately concentrated at a single place in a file (See Chapter 7, Sections 3 & 5.1, above). With regard to arranging the cards within an index file, Kaiser preferred alphabetical order to subject-based classified order on the grounds that the former represented a classification of terms by their formal features and so was free of the semantic difficulties that, in his view, would inevitably beset any attempt at a classification of terms by their meanings (See Chapter 7, Section 5.1, esp. pp. 556–564, above). At the level of the index file as a whole, then, the alphabetical order of the main terms governed the sequence in which sets of cards sharing the same main filing term were arranged; within each set of cards associated with a single main term, those sharing the same subdivisions were likewise arranged in the alphabetical order of the subsidiary terms in their statements (See Chapter 7, Section 5.1, esp. pp. 580–582, above). Index items sharing the same statements were subarranged by the date of information in their amplifications and, if need be, by the date of publication of the documents from which they were taken: this meant that, for the purposes of filing, the dates of information and publication functioned as “virtual” fourth and fifth categories complementing the categories of terms contained in statements (See Chapter 7, Section 5.1, esp. pp. 582–583 with Figure 28, above).

In order to help users of an index locate the positions, within an index file, of the (sets of) cards bearing information on subjects of interest to them, Kaiser made use of a system of guide cards, or guides—that is to say, cards with projecting tabs on their upper edges (See Chapter 7, Section 5.2.1, esp. pp. 584–586, above). Employing a system of fifth-cut guides—i.e., guide cards the length of whose tabs was one-fifth the length of the card as a whole, with cards within the system sporting the tab at one of five positions corresponding to different fifths of the total length of the card—, Kaiser mapped the three terms of the tripartite statement form upon these guides so that the first, or main filing, term (either a concrete or country) would occupy the first and, if need be, second positions in the system; the second term (either a country or a concrete) would occupy the third and, if need be, fourth

positions; and the third term (always a process) would occupy the fifth and final position (See Chapter 7, Section 5.2.1, esp. p. 590, Figure 31, above). The distribution of guide cards was such that each and every first term in an index file had its own guide card, while subsidiary guides for the second or third terms were added facultatively as the number of cards of behind a first position guide accumulated and came to require subdivision (See Chapter 7, Section 5.2.1, esp. pp. 592–594, above). By virtue of their projecting tabs, guide cards functioned as visually prominent signposts allowing persons consulting an index rapidly to track down the terms of concretes and countries serving as the first terms of statements within a file and, in the case of those first terms associated with a large number of cards, to find one’s way among the subdivisions thereof: Kaiser’s (1911, §§ 433–446) protocols for searching a systematic card index were predicated on their use.

The guide cards for the first terms of statements served not only as a means of indicating the position of entries for terms for concretes and countries within an alphabetically arranged card file but also as a *locus* for indicating cross-references among semantically related, but alphabetically scattered terms (See Chapter 7, Sections 5.2.2, above). Such cross-references—or related terms, as Kaiser preferred to call them—were restricted to terms belonging to the same category, so that terms of concretes were connected with other terms of concretes and terms of countries, with other terms of countries (Kaiser 1911, § 416; 1926, 23, § 13). It was the system of related terms that embodied the relational semantics of SI. As Kaiser conceptualized it, the cross-references among concretes established hierarchical relationships between superordinate collective terms, or “higher collectives” and subordinate specific terms, or “lower specifics”, as well as equivalence relationships among synonymous terms and associative relationships in which one concrete could be said to be applied to another (See Chapter 7, Section 5.2.2.2; Chapter 9, Section 4.1, esp. pp. 796–800, above), while those among countries formed hierarchical relationships between the “collective” names of broad geographical regions, such as continents, and the “specific” names of countries forming parts thereof—what today would be called partitive relationships (See Chapter 7, Section 5.2.2.1, above). The related terms of each main filing term were listed in alphabetical order upon the face of its first (and sometimes second) position guide card(s), thus concentrating all information about its semantic linkages with other main filing terms at a single point where it could be easily scanned by the user of the index (See Chapter 7, Sections 5.2.2.1–5.2.2.2; Chapter 9, Section 4.1, esp. 801, above). In Kaiser’s view, the system of related terms served as a substitute for a “logical classification”

that allowed one readily to ascertain areas where ancillary information on a given subject might be sought (Kaiser 1911, §§ 183, 414, 416): in present-day parlance, it provided a means of navigating the index on the basis of semantic relationships among terms and so complemented the alphabetical ordering of terms in a file, which, of course, was based on purely formal, or syntactic, relations between them.

Especially with regard to terms of concretes, Kaiser considered the method of establishing (primarily) hierarchical cross-references that he prescribed for SI to be superior to the use of conventional “logical” classifications for two reasons. First, unlike a standardized bibliographical classification scheme, the structure of which predetermined the relationships of subjects to one another, a system of related terms allowed the indexer to formulate cross-referential relationships among terms on the basis of the particular perspective of the business organization for which he was working (Kaiser 1911, § 419; 1926, 26, §§ 19–20): the resultant classificatory structures thus conformed to the individual requirements of the organization in question. Second, whereas standardized “logical” classification schemes tended to be monohierarchical in structure with each class falling under one, and only one superordinate class, an indexer working within the conventions of SI had *carte blanche* to relate a single relatively specific term to several different superordinate ones: that is to say, the cross-reference structure of a systematic card index was polyhierarchical in structure (Kaiser 1911, § 183; 1926, 26, § 20; see Chapter 7, Section 5.2.2.2 & Chapter 9, Section 4.1, esp. pp. 612–619, 800–801, above). The admission of polyhierarchy into the system of related terms in SI obviously contributed to the flexibility of the latter and made it possible for the indexer to indicate the full spectrum of classificatory contexts within which information on a given concrete might be sought and found within an index: in this sense, the list of related terms upon the guide card for a given concrete could capture, for the benefit of the users of the index, the various classificatory perspectives through which that concrete was viewed within the framework of the organization for which they worked (cf. Kaiser 1926, 26–27, §§ 20–21).

Such, then, were the primary structural, methodological, and theoretical features of SI, as envisioned by Kaiser. When one considers his indexing system as a whole, two qualities, in particular, stand out. On one hand, one cannot but be struck by the architectonic systematicity of SI, as reflected in the structure of the card indexes that resulted from the application thereof (See Chapter 7, Section 6.1, above). Kaiser (1911, §§ 99, s.v. “to organise”, 629, 644–655) considered an index to be an organization that coordinated various

component systems—the statements, the structured index items, the card files, and related terms—into a single, coherent whole. The partitioning of an indexing vocabulary into a set of jointly exhaustive and mutually exclusive categories—terms for concretes, terms for countries, and terms for processes—and the formulation of complex index terms, or statements, through the combination of terms from these categories in accordance with a limited set of syntactic patterns—a process that sometimes required fairly elaborate, and not entirely unproblematic, workarounds to conform natural language to the stipulated structures of SI (See Chapter 7, Section 3.6, above)—provided the structural basis for the coherence of the index *qua* organization (See Chapter 7, Section 6.2, beginning, above). As we have seen, statements provided the means for demarcating the thematic boundaries of individual pieces of information within the documents being indexed and served as the nuclei around which highly structured unit records for recording index items were formed. Statements also served as the primary mechanism by means of which index items were arranged in alphabetical order within a card file and their structural patterns were mapped onto the system of guide cards that functioned as a visual guidepost to the alphabetical structure of the card file. Overlaying this alphabetical organization of index items on the basis of statements was a system of classificatory relationships contracted between the first, or main terms, of each statement to other, semantically related main terms belonging to the same category. If one recalls that each index item also included a call number referring to the place of the document associated with a given piece of information within the collection of an intelligence department, it becomes apparent that the structure of a card index involved nothing less than the coordination of four distinct classifications: (1) the classification of terms into terms of concretes, countries, and processes constituting the category semantics of SI; (2) the alphabetical classification of statements; (3) the hierarchical classification of terms into higher collectives and lower specifics that formed the core of the relational semantics of SI; and (4) the document classification—into a complex whole (See Chapter 7, Section 6.1, esp. pp. 663–665, above). In Kaiser’s eyes, the coordination of these different systems, or classifications, could be achieved in practice only by careful planning and by strict adherence to the particular plan of indexing adopted by the designer(s) of a given systematic card index. Outlining an orderly, stepwise procedure for carrying out the work of indexing, he recommended that the persons responsible for designing, implementing, and maintaining an index keep a written record—preferably on cards filed in a so-called “key cabinet”—of the rules that they had established as an author-

itative, central source of reference for themselves and their assistants; furthermore, he urged them to see to it that their assistants apply the rules of indexing set forth in a key cabinet as consistently as possible (See Chapter 7, Section 6.1, esp. pp. 670–675, above). As he saw it, the process of constructing a card index was to be no less systematic than the structure of the resultant index.

The other general quality that pervaded Kaiser's protocols for SI was a concern with allowing for the expression of individuality within the otherwise rigidly defined structural framework of a systematic card index (See Chapter 7, Section 6.2, above). Both theoretical and pragmatic considerations underlay this aspect of SI. Kaiser posited that businessmen sought information not because they desired knowledge for its own sake but because it served as a basis of action (See Chapter 6, Section 2.2, esp. p. 200, above). Furthermore, he held the epistemologically individualist view that each businessman had his own individual sphere of interests and interpreted the information that he received about phenomena occurring within that sphere in light of his own personal outlook on, and antecedent knowledge about, the world of business affairs (See Chapter 7, Section 2.1, pp. 308–310, above). Metonymically assimilating business organizations to the entrepreneurs who owned or managed them, Kaiser maintained that the former, no less than the latter, had their own spheres of interest (See Chapter 7, Section 6.2, above); to his mind, the purpose of a systematic card index maintained by a given organization's intelligence department, or business library, was to make accessible, in as expeditious a manner as possible, information on just those subjects that fell within the particular sphere of interest of the organization in question (See Chapter 6, Sections 2.2–2.3; Chapter 7, Section 1, esp. pp. 293–295, above). Accordingly, he built into the design of SI a number of ways in which, within the structural constraints imposed by the category and relational semantics of the system, indexers might accommodate the perspectives of their parent organizations within the indexes that they created. Thus, apart from stating that index terms were to be derived, whenever possible, directly from the text of a document being indexed and that it was, on the whole, preferable to use specific, rather than collective, terms, Kaiser left it entirely to the discretion of the designer of an index to determine its subject scope as well as the range of literature to be indexed (See Chapter 7, Sections 1 & 4.1–4.2, above). Within these basic parameters, he gave indexers the freedom to select which terms within the texts being indexed were to be incorporated into statements and, in cases of categorically ambiguous terms, to decide the categories to which they were to be assigned; by the same token, they

could choose whether the extensions of the index items within the index were to take the form of descriptive annotations or informative condenses and determine which terms were to be brought into relation with one another within the system of related terms (See Chapter 7, Sections 3.6, 4.2–4.3, & 5.2.2, above). The contents and, to some degree, the structure of a systematic card index could thus be conformed to the particular informational needs of an organization in a manner that respected the basic structural norms of SI. Ultimately, then, Kaiser’s method of indexing represented a synthesis—albeit one not entirely free of certain internal tensions (See Chapter 7, Section 6.2, above)—between the principles of systematicity and individuality.

10.3. Conclusions about Contextually Conditioned Features of Systematic Indexing

Having reviewed the course of Kaiser’s life and career and sketched out the primary features of his indexing system, we are now in a position to consider briefly how the milieu within which Kaiser operated left their imprint on his conceptualization of the primary features of SI.

Let us begin with one of the cardinal qualities of SI that we have just discussed: systematicity. In the previous section, we noted that Kaiser conceptualized an index as being an organization composed of four coordinated systems—namely, the statement, the index item, the alphabetically ordered card file with its guide cards, and the cross-referential structure of related terms. The purpose of an index *qua* organization was to allow the staff of an intelligence department and the users of an index to maintain “systematic control” over “large quantities” of information, a goal that was achieved by classifying individual index items (by means of statements) and arranging them in a way that would make them readily retrievable (by the alphabetical order of the component terms of statements), either directly (by means of guide cards) or indirectly (by means of related terms) (Kaiser 1911, §§ 15, 304, 624–625, 647, See Chapter 7, 6.1, esp. pp. 665–666, above). Now, in characterizing an index as an organization composed of coordinated systems and identifying control of large quantities of information as its aim, Kaiser echoed the discourse of systematic management and office organization that had emerged in the final quarter of the 19th century in conjunction with the advent of the large, multi-departmental industrial organization, within which coordination and control of all aspects of a business’s work processes were considered to be the key functions of the managerial

staff (Litterer 1961, 472–475; 1986 [1959], 116, 127–128, 262–263; [Untitled Editorial] 1907; Yates 1989, 9–10, 13; see Chapter 1, Section 5.2.1, above).

This was not the only point at which Kaiser drew inspiration from this discourse and its associated practices with regard to the theme of systematicity. To his mind, the card system that served as the technological substrate for systematic card indexes and related tools such as card registers reflected contemporary trends in “modern business and factory organisation”: indeed, he asserted that, insofar as it allowed indexers to handle and store large amounts of recorded information, it was nothing less than “an offspring of *manufacture in quantities*” (Kaiser 1908, § 60 [emphasis his]). His insistence that the person overseeing the maintenance of an index in an intelligence department document the rules and procedures for operating it in written form reflected the cutting-edge managerial thought of his day, as did his penchant for resolving the work of indexing and related activities into a series of consecutive operations to be performed in stepwise fashion by an indexer and his assistants (Black 2007a, 135–140; Yates 1990, 176–178; cf. Chapter 7, Section 6.1, above). To be sure, one could find the cultivation of comparable system-oriented discourse and practice in the realms of contemporary public and special librarianship as well (Black 1998, 43–44; 2001, 70–74; 2007a, 140–142): after all, no less prominent a librarian than Melvil Dewey was an indefatigable and influential advocate of the use of labor-saving devices and efficiency-promoting practices and systems not only in the library but in the business office as well (Casey 1981, 265–270; Dewey 1912), while the American special library pioneer John Cotton Dana wrote of the special libraries formed “within large industrial enterprises” as sites for “the proper control of all pertinent printed information” (Dana 1914, 76). Yet if talk of system and control formed part of the discourse of librarianship as well as that of office management and business organization, Kaiser’s primary point of reference seems to have been the latter. That this should have been the case is hardly surprising, for his first two books were directed to an audience of businessmen (See Chapter 1, Section 5.2.1, esp. pp. 36–37, above). This focus on business persisted even after he had made the transition from commercially oriented to technically oriented libraries (See Section 1 of the present chapter): in his final article, addressed to special librarians, he presupposed that the *locus* for the use of SI would be a business organization of some sort and continued to speak in terms of the organization of systems (Kaiser 1926, 26–27, §§ 18–20; 31, § 36; 32–33, §§ 39–43).

Although Kaiser's valorization of systematicity and its pervasiveness in his accounts of SI undoubtedly was rooted in his familiarity with the practices of office organization and the discourse of "system" (See Chapter 1, Section 5.2.1, above), it is likely that it also was a reflection of more personal traits on his part: after all, a man whose avocational pursuits included chess, the study of geometry, and the collection of coins and stamps was bound to have a natural inclination toward system, structure, order, and method (See Chapter 9, Section 5, esp. pp. 827–829, above) and to possess what one observer characterized as "an orderly mind" (Brooks 1913, 371). A combination of professional ideology and personal predilection also may serve to explain the other general feature that characterized his conceptualization of SI as a whole: the insistence on the need to cater to the individual informational requirements of business organizations within the design of the systematic card indexes prepared for them. On one hand, the elementary notion that each business constituted a unique corporate entity and had its own individual requirements was frequently encountered in the discourse of system within which Kaiser situated his own writing (see Chapter 6, Section 3.4; Chapter 7, Section 6.2, esp. pp. 253–354, above). It was likewise an assumption that underpinned informational activities in special libraries and information bureaux such as the one at which Kaiser began his career as librarian and indexer, the Bureau of information at the PCM, the stated aim of which was "to bring together all possible data relating to foreign commerce" and "to index and compile this information so as to be readily accessible to *each individual interest*" (Philadelphia Museums [1897], 20 [emphasis mine]). Now, the Bureau's index was a general index of foreign commerce rather than one tailored to the specific requirements of any single business organization: whatever "individualization" of the information took place did so at the level of the customized reports prepared by the researchers who made use of it (See Chapter 3, Section 3.2, above). Nevertheless, the general idea that each businessman had his own particular interests and that it was the job of an information bureau to cater to these was one that Kaiser most likely assimilated during his tenure at the Bureau and that, in tandem with his exposure to the discourse of system and his later experiences as indexer and librarian at the Publishing Department of British Westinghouse formed the basis for his belief that a systematic card index should reflect the particular requirements of an individual business organization.

Yet, if Kaiser's emphasis on the need to respect the individual requirements of a business reflected what was considered to be a best practice within the realms of office

organization and special librarianship, it was also doubtless conditioned by his own personal propensity towards individualism (See Chapter 7, Section 6.2, above). We have already noted in the first section of this chapter that, as a young man in Queensland and Chile, he had shown initiative and independence in carving out a pedagogical career for himself as a teacher of music and German, despite the fact that his formal education had prepared him for work in a trade, while, in his first year at the Bureau of Information at the PCM, a time when he had just embarked on his career as an indexer, he manifested intellectual independence in both developing a critique of the institution's current indexing practices and seeking to improve them by elaborating a new method of indexing that would, in time, become SI (cf. Chapter 2, Section 2; Chapter 3, Section 3.3, above): later in his life, he displayed the same penchant for independent thought by challenging currently accepted theories in geometry (See Chapter 9, Section 5, esp. pp. 828–829, above), an area of study that interested him greatly and upon the imagery of which he drew to illustrate such concepts as the semantic phenomenon of overlapping and underlapping or the hierarchical relations among related terms (See Chapter 7, Sections 2.2.1, 2.2.4, & 941, esp. pp. 328–330, 353, 358–360, 797–799, above). Congruent with Kaiser's (1911) temperament on this score were his epistemologically individualist convictions that "all observation is individual" (§ 57); that "generalisations ... will always show individual tendencies" (§ 79), and that "you cannot standardise the intellect" (§ 57), as well as his averrals that "individual observation is best followed by individual application of the knowledge gained" (§ 58) and that, in the conduct of business "our individuality is our greatest asset" (§ 23). All in all, it is apparent that Kaiser's insistence on accommodating the design of a systematic card index to the particular informational needs of a business organization was rooted in an amalgam of professional considerations and personal beliefs about the importance of individuality within the entrepreneurial culture of modern industrial capitalism (See Chapter 7, Section 6.2, above).

Thus far, we have seen that the general ethos of systematicity and individualism that suffused Kaiser's conceptualization of SI had its roots in his assimilation of the discourse of system and office organization; his sympathetic understanding of contemporary business culture with the central assumptions of which he, in virtue of his work for business-oriented special libraries and information bureaux, had become familiar; and his own personal valorization of system and individualism. Other, more specific features of SI appear to have borne the imprint of the specific milieux within which he developed his indexing system.

Especially important in this regard was the institution at which Kaiser first conceived of his method of indexing, the Bureau of Information of the PCM. Consider, for example, Kaiser's tenet that the units of interest in SI were not textual documents as wholes but rather those individual pieces of information within them, embodying "facts" and "opinions", that pertained to subjects of interest to a given business organization (See Chapter 7, Sections 1 & 2.1, esp. pp. 283, 311–320, above). As we saw in an earlier chapter, a very similar view of indexing *qua* information analysis can also be found in the writings of the great theorist of Documentation, Paul Otlet, who discussed it in several articles well before Kaiser published his accounts of SI (See Chapter 7, Section 1, esp. pp. 285–288, above). Yet, despite the striking similarities between Otlet's and Kaiser's notions of analytical indexing, extant evidence suggests that Kaiser did not derive his ideas regarding it from Otlet's writings, but rather from the practices of the Bureau at the PCM. There, as one of the museum's publications noted,

[b]y means of an elaborate system of card indexing, all the prominent trade journals of the world, Consular reports of the United States and foreign governments, and all trade reports of the various Chambers of Commerce and Boards of Trade of the world are carefully digested and indexed, so that every item of information bearing on a specific commercial subject is carefully noted and classified (Philadelphia Museums [1897], 20; cf. Chapter 7, Section 1, pp. 290–291, above)

Such items of information, which might range anywhere from "a couple of lines" to "a column"—presumably a newspaper column—in length (The Philadelphia Commercial Museum 1899, 128), embodied "facts" that, once they had been entered upon cards and incorporated into the Bureau's index files, could be mobilized by researchers in the compilation of regular customized reports on specific lines of trade overseas for subscribing members of the museum or special reports in response to specific queries from American manufacturers and merchants (Philadelphia Museums [1897], 20; The Philadelphia Commercial Museum 1899, 128; Wilson 1899a, 117; cf. Chapter 3, Sections 3.2–303; Chapter 7, Section 1, esp. pp. 104–105, 109, 291, above).

Not only did the program of highly detailed indexing at the PCM's Bureau of Information—which, *mutatis mutandis*, would be later recapitulated at the CIB (See Chapter 4, Section 1, above)—shape Kaiser's notion of information analysis, but the use of the card index as a resource for the preparation of reports also colored his understanding of the functions of an intelligence department: as we already noted in the first section of this concluding chapter, he considered the primary informational activities of such a

department to be filing, indexing, and summarizing, that is to say compiling reports from the information in an index (cf. Chapter 6, Section 2.2, above). Kaiser's observations of how researchers at the PCM used the Bureau's index in preparing their reports also appears to have influenced his views on subject specificity in indexing. "In reporting", he would later reminisce, "only the most specific information"—that is to say, information on specific subjects—"was of any use", while "[g]eneral subjects would practically never be called for" (Kaiser 1926, 22, § 8; see Chapter 7, Section 2.2.5, esp. p. 368, above). This experience, coupled with his partial conflation of subject specificity with inductive specificity (See Chapter 7, Section 2.2.5, above), led him to the conclusion that information on relatively specific subjects was generally more useful than information on general subjects (Kaiser 1911, § 73), which, in turn, provided the rationale for such *dicta* as "[t]he term of the concrete should always be as specific as possible" (Kaiser 1911, §320) and "[d]irect access ... means filing under specific subjects rather than under collectives" (Kaiser 1926, 22, § 9).⁶⁴⁹

Perhaps the most significant influence of the régime of knowledge organization at the PCM upon Kaiser's design of his indexing system related to the categorial scheme of SI. According to a plan devised by the founder of the museum, William P. Wilson, and the chief

⁶⁴⁹ As an aside, it may be noted that Kaiser's utilitarian rationale for the valorization of subject specificity differed markedly from the views of Charles Ammi Cutter, whose enunciation of the principle of specific entry (See Glossary, s.v. "Specific Entry") in the *RDC* had set the tone not only for catalogers but for literary indexers as well (e.g., Clarke 1905, 20–21; Nichols 1892a, 409, § 9; Wheeler 1905, 471). Basing himself on a theory of the mental habits of library users derived from the epistemological doctrines of Scottish Common Sense philosophy (Miksa 1983a, 74–77; 1983b, 115–116), Cutter (1876a, 541) had supposed that most catalog users, in public libraries at least, would be relatively uncultivated in their manner of thinking and, on the whole, uninterested in research, so that they would seek to find reading on topics of interest quickly; on the basis of these assumptions, he concluded that they would prefer searching in an alphabetically ordered catalog in which each specific subject had a main entry rather than in a classified or alphabetic-classed (See Glossary, s.v. "Alphabetic-classed") one, in which specific subjects appeared as subdivisions of more general ones. For Cutter, then, the primary reason for instituting specific entry in a catalog was that it catered to the cognitive habits of the largest segment of the general reading public. Needless to say, both the context and content of these arguments for specificity were quite unlike those of Kaiser, who assumed that the persons using a systematic card index would be businessmen or industrial researchers and who believed that, as a rule, specific information was more useful than general information because it allowed researchers to draw their own deductions from the specific to the general instead of presenting them with readymade generalizations (See Chapter 7, Section 2.2.5, above). Thus, despite some general points of convergence between Kaiser's and Cutter's accounts of specificity (cf. Sales 2012, 75–76; Sales & Guimarães 2010, 24), it is evident that they approached it in divergent ways. Given the frequent claims by KO researchers that, in the history of alphabetical subject indexing, Kaiser should be viewed as a successor to Cutter and a refiner of the notion of specificity (See Chapter 1, Section 2, above) and the uncertainty whether Kaiser drew directly from Cutter's writings or not in formulating his views (cf. Chapter 7, Section 3.1.1, end), a close comparison of the similarities and differences between their respective conceptualizations of specificity might well clarify the relationship between the two. Cf., on this score, Chapter 7, Section 2.2.5, p. 370, n. 323, above.

of its scientific department, Gustavo Niederlein, the museum's exhibits of samples of commercial products from foreign markets were organized into monographic displays—i.e., exhibits in which samples of the same kind of product from different parts of the world were collocated—and geographical displays—i.e., exhibits in which samples of different kinds of products from the same country were brought together (Niederlein, in *Philadelphia Commercial Museum 1897*, 75; cf. Chapter 3, Section 3.1, above). This principle of organization also was also, *mutatis mutandis*, applied to the structure of the card index of the museum's Bureau of Information, which was divided into three distinct sections, each of which was housed in its own separate card cabinet: an alphabetico-classed index of commercial goods; an alphabetical index of countries subdivided by products; and an index of general commercial subjects, such as imports and exports, tariffs, freight rates, the construction of public works and transportation facilities, or systems of banking (Green, in *Philadelphia Commercial Museum 1897*, 18; *A Commercial Museum 1897*, 1011; see Chapter 3, Section 3.2, above). If one recalls that Kaiser developed his indexing system in response to what he saw as insufficiencies in the PCM's index and that, in his accounts of SI, "terms of commodities" formed the core of the category of concretes (Kaiser 1908, § 366, s.v. "Concretes"; 1911, §§ 73, 299; 1926, 22, §§ 6–7), there can be little doubt that the index of products formed the *Vorlage* for his category of concretes (See Chapter 7, Section 3.4, esp. pp. 470–471, 475, above). By the same token, the Bureau's index of countries manifestly inspired his category of countries. Kaiser's (1926, 22, §§ 6–7) great innovation appears to have the category of processes, which, by his own admission, originally comprised "terms of actions or verbs" (cf. Chapter 7, Section 3.4, esp. p. 448, above). Although it is striking that some of the topics covered in the Bureau's index of general subjects, such as exports and imports of freight rates, would eventually fall under the category of processes in SI (See Chapter 7, Section 3.4, esp. pp. 470–471, above), Kaiser—a former teacher of languages—appears to have developed the category on the basis of a grammatical analogy: much as the verb in a sentence serves as a predicate to a subject, so did a term signifying an action or verb function as a subdivisionary modifier to a term denoting a commodity (1911, §§ 298, 301; See Chapter 7, Section 3.3.2, esp. pp. 430–432, above). In short, Kaiser seems to have drawn inspiration for his categories from the kinds of subjects that were covered by the PCM's card indexes, which, it may be noted, were themselves but a manifestation of a broader tendency among contemporary compilers of indexes to literature on foreign

commerce to use the categories of commercial goods and countries as the basis for subsections within their indexes (See Chapter 7, Section 3.4, esp. pp. 472–473, above).

The preceding reconstruction of the origins of the category system of SI helps to explain one of its distinctive and most puzzling features. As was noted in the second section of the present chapter, in his writings, Kaiser alternated between presenting a dyadic version of his category scheme, which consisted of terms for concretes and terms for processes alone, and a triadic one, which encompassed terms for concretes, terms for countries, and terms for processes (see also Chapter 3, Section 3.4, above). The dyadic form of the scheme served as the basis for his theoretical accounts of the categories (Kaiser 1911, §§ 52, 298), while the triadic version was the one that he actually used in practice: we have already seen that he posited that the canonical form of a statement include all three categories (§§ 301–302) and used this form as the basis for organizing the system of guides in a card index file (cf. Figure 31, above). To reconcile these two versions, Kaiser (1911, §§ 299–301) subdivided the category of concretes into movable, immovable, and abstract commodities; identified countries as a kind of immovable commodity; and promoted them from the status of being a subclass of a subclass of the category of concretes to being a category on a par with those of concretes and processes (See Chapter 3, Section 3.2, above). This elaborate, but rather muddled, attempt to give a theoretical justification for the presence of countries within a triadic categorial scheme underscores the fact that the category did *not* fit into the epistemologico-ontological and logico-linguistic rationales that he had given to explain his choice of categories (See Chapter 7, Section 3.4, esp. pp. 448, above). Both Kaiser’s use of the category of countries in practice and his inability to incorporate it in a convincing fashion into his theoretical accounts of his categorial scheme are best explained by the fact that he had inherited the category, so to speak, from the index of the PCM, which had been designed on the assumption that “persons with an interest in business required information not only about (types of) commodities but also about the geographical regions that were the sources of, and markets for, commodities” (Dousa 2011, 170). His oscillation between a dyadic and a triadic account of the categorial scheme, then, can be interpreted as the result of an attempt to overlay a set of categories inherited from the PCM—i.e., commercial products and countries—with a novel distinction between the categories of concretes *qua* commodities and processes: although commercial products could easily be equated with concretes within SI, the category of countries could not be incorporated easily into a theoretical account based on the “grammatical” analogy between concretes and processes, on one hand, and subjects

and predicates, on the other. This aboriginal tension within the categorial system of SI would never find a satisfactory theoretical resolution: in his final article on his indexing system, Kaiser accepted the presence of the category of countries but did not discuss its implications for his theory, which remained steadfastly dyadic in form (See Chapter 9, Section 4.1, esp. pp. 790–793, above).

Kaiser's definition of the categories of concretes and processes also reflected the kinds of milieux in which he worked. We have just observed that, in virtue of its having been derived from the category of commercial goods, or products, within the card index of the Bureau of Information at the PCM, the category of concretes originally encompassed terms denoting "saleable commodities", including "persons whose labour is a saleable commodity" (Kaiser 1908, § 366, s.v. "Concretes"), while the category of processes covered terms signifying verbal notions in general, and actions in particular, associated with commodities, the "process" itself being drawn from the language of factory and office management (See Chapter 7, Sections 3.3.1–3.3.2, above). Needless to say, these definitions of the categories reflected the commercial *Weltanschauung* of the PCM: they also fit well with the domains of interest covered by the libraries, or intelligence departments, of the CIB, the Publishing Department of British Westinghouse, and the Tariff Commission, each of which, in its own way, directed its activities towards the world of commerce (See Section 1 of the present chapter). By the time that Kaiser wrote *Systematic Indexing*, he had developed two-tiered definitions of these categories: concretes might be defined broadly as "things in general" or, more specifically, as "commodities having an exchange value", whereas processes either were "actions" associated with concretes or "conditions attaching to them" (Kaiser 1911, §§ 52, 73, 299; cf. Dousa 2011, 162–164; 167–168, 171; see Chapter 7, Sections 3.1.2, 3.2, & 3.2.2, above). Yet, if the broader definitions of concretes as things in general and processes as conditions of concretes allowed, in principle, for the extension of SI's categorial system beyond the domain of commerce, the more specific, commercial definition of concretes *qua* commodities was still clearly uppermost in Kaiser's mind.

As we saw in the first section of this chapter, after Kaiser published *Systematic Indexing*, he worked for organizations, such as the Ardeer factory of Nobel's Explosives Company, the ESL, and the ASME's *Engineering Index*, where the primary areas of interest were technical in nature, such as explosives technology (at Ardeer) and engineering (at the ESL and with the ASME). This move from working in libraries and information bureaux oriented primarily towards commercial subjects to institutions chiefly focused on technological and

applied-scientific ones appears to have had an effect on Kaiser's conceptualization of the categories, for, when he came to write "Systematic Indexing" in 1926, the ground of the definitions had undergone slight, but significant, shifts. Where he had previously defined concretes consisting of movable, immovable, and abstract commodities, he now viewed them as encompassing both terms denoting commodities and terms denoting forms of energy (See Chapter 9, Section 4.1, esp. p. 781, above). Despite manifesting a clear preference for terms of commodities as the primary kind of concrete terms, he reluctantly conceded that "commodities comprise latent energy" (Kaiser 1926, 23, § 10), a statement that *de facto* moved the definitional center of gravity away from commodities towards energies. As for terms of processes, whereas previously Kaiser had variously described them as signifying actions or conditions associated with concretes without characterizing them further, he now spoke of them as including two kinds of terms: terms referring to actions and terms referring to states or, as he alternatively put it, terms for dynamic conditions and terms for static conditions, respectively (See Chapter 9, Section 4.1, esp. pp. 782–783, above). Although some of their elements had been already present in Kaiser's earlier account of concretes and processes, the new definitions of these categories were redolent of technical concepts and language (i.e., forms of energy, dynamic conditions, and static conditions), whereas the earlier ones had foregrounded commercial notions (e.g., movable and immovable concretes *qua* commodities). It is difficult not to ascribe these semantic changes to Kaiser's move from special libraries oriented primarily toward commerce to those having to do with industrial technologies, especially as the information managers at Ardeer were already using a form of the "technical" definition of concretes in their writings (See Chapter 8, Section 2.1, esp. pp. 716–717, above).

In setting forth his new, more technically oriented definitions of concretes and processes, Kaiser did not believe they were definitive or, for that matter, satisfactory, and proposed that they were amenable to further improvement. On this score, he suggested that the two categories could be mapped upon the five "ultimate scientific ideas" underpinning the Synthetic Philosophy of the Victorian English engineer-turned-philosopher Herbert Spencer, with concretes correlated to force, matter, and space, and processes, to motion and time (See Chapter 9, Section 4.1, esp. pp. 784–789, above). This constituted an elaboration of the general definitions of concretes as things in general and processes as actions associated with them in a manner that foregrounded the materiality, or physicality, of the former and the temporality of the latter. However, it did not resolve what Kaiser now

considered to be a major defect in his category system and, accordingly, a “weakness” of his system as a whole: the fact that “mathematical terms such as Coefficient, Constant, Factor, [and] Ratio” could not be readily assigned to concretes or to processes (Kaiser 1926, 28, § 24). Troubled by the fact that his category system could not cope with these terms, he hoped that, ultimately, a way could be found to accommodate them within the categorial structure of SI and that, at the same time, the definitions of concretes and processes would be made “more precise” (1926, 28, § 25).

Yet, if Kaiser fretted about the imperfections and lack of precision in the definitions of his categories, the fact remains that, at a certain level, these theoretical shortcomings did not necessarily compromise the practical effectiveness of SI *qua* indexing system. This was because, as he claimed in his final article, his original motivation for partitioning an index vocabulary into categories had been, in large measure, syntactic in nature:

Let me state the original problem as it appeared to me; Given a vast number of terms; the problem is to divide them in to a very small number of classes so that there shall be no overlapping between the classes and yet so that all the terms are completely covered and if any relation can be established between the classes, so much the better (Kaiser 1926, 28, § 25).

These non-overlapping classes of terms were, of course, concretes and processes, and the relation between them was one in which terms of concretes served as the main headings of index items, whereas terms of processes functioned as subdivisions thereof (p. 25, § 16). In light of this syntactic requirement—which, it may be noted, was conditioned in large measure by the limited spatial dimensions of cards, the tabs on guide cards, and card cabinets—, it was arguably more important that, if confronted by terms that were difficult to categorize, an indexer assign them to one category or another and use them consistently within that category than that they fit the definition of either category perfectly. In *Systematic Indexing*, Kaiser had been of two minds about this very issue. On one hand, he sought to reconfigure bicategorial compound nouns (e.g., “agriculture”) that included elements construable as concretes (*in casu*, “agri-“ > “field”, an immovable concrete) and processes (*in casu*, “-culture” > “cultivation”) into bipartite statements (*in casu*, “FIELD-CULTIVATION”) that respected the definitional boundaries of his categories (See Chapter 7, Section 3.6, esp. pp. 492–495, above). On the other, he acknowledged that, whereas certain abstract terms pertaining to money (e.g., “price”) that could, in theory, be analyzed in a similar manner (*in casu*, *MONEY-EXCHANGE), they were best left untouched, since transforming them into bipartite statements would create insuperable problems for

expressing information about such subjects (e.g., “decline in prices” or “the price of commodity X”) within the structural constraints of statement forms (See Chapter 7, Section 3.6, esp. pp. 495–497, above). For such terms, he contented himself with the recommendation that they be treated *either* as concretes *or* as processes, depending upon the particular informational requirements of a given business organization (Kaiser 1911, § 325): all that mattered was that, once the indexer had decided to place a term in a given category, he be consistent in treating it as a member thereof. Thus, even if the categories of SI could not be defined with such precision so that their semantic boundaries were absolutely watertight—something that, on Kaiser’s own views about the semantics of terms, was, in any case, an impossibility (See Chapter 7, Section 2.2.1)—, it was nevertheless possible to use their definitions, in most cases, as guidelines for placing a term under one category or the other, and to give indexers discretionary powers to make decisions regarding class assignments in the truly hard cases on the basis of the individual needs of their institutions. In practice, this combination of structural rigorism and pragmatic flexibility allowed SI to be adopted and, if need be, adapted, by business libraries of institutions where the semantic boundaries of the categories were interpreted somewhat differently than they were in the specific milieux in which Kaiser had originally developed and applied it.⁶⁵⁰ Here, again, we catch a glimpse of the interplay of systematicity and individuality upon which the distinctive ethos of SI *qua* KOS was founded; it is perhaps fitting that, on this note, we bring our discussion of Kaiser’s system of indexing to a close.

10.4. Perspectives for Future Research

In this dissertation, I have sought to give a full account of SI that (1) considers its principal structural, methodological, and theoretical features *qua* system and (2) situates it and its creator, Julius Otto Kaiser, in their original historical context. To achieve these aims, I have, on one hand, attempted to set forth a coherent biographical framing of SI and its creator by reconstructing the course of Kaiser’s life and career and profiling the various institutions for which he worked and where he developed and applied his indexing system; on the other, I have examined his conceptualization of SI *qua* system by undertaking a close reading of his extant writings about it and considering the ideas that he presented in them

⁶⁵⁰ For example, Mr. Foster Sproxton, librarian for the British Xylonite Company in the mid-to-late 1920s, observed that his library used SI “with certain modifications”, among which were occasional departures from Kaiser’s original definition of the term “concrete” (Sproxton, *apud* Barbour 1925, 174).

in light of the various contemporary professional discourses about knowledge organization emanating from the fields of office organization, special librarianship, general librarianship, Documentation, and literary indexing, as well as the broader intellectual discourses of traditional logic, grammar, and other fields that formed the background to his thought. The research undertaken in pursuit of these goals has resulted in a reasonably detailed picture of Kaiser's professional career, the institutions wherein it unfolded, and the systematic method of indexing that he developed over the course of it. Nevertheless, there are a number of ways in which the work presented here could be deepened and extended yet further. In bringing this study to a close, I would like to indicate some of the *pistes de recherche* regarding SI and its creator that remain to be explored.

First of all, although the biographical framing of Kaiser offered in the foregoing pages has established the main lines of his career and examined the institutional contexts in which he worked at some depth, it is far from complete and rather uneven in its coverage. Some episodes of Kaiser's professional life, such as his tenure at the Tariff Commission, have been reconstructed in detail because of the availability of relatively abundant historical documentation regarding them; all too often, however, we have had to content ourselves with general profiles of the organizations at which he was employed without being able to say much about the particulars of the work that he did there: in the case of some organizations, most notably Vickers, Ltd., virtually nothing is known his tenure there, not even its length (See Chapter 8, Section 1, above). One would naturally like to know more about Kaiser's activities—especially as they related to the development or application of SI—not only at Vickers, but also at the PCM's Bureau of Information, the CIB, British Westinghouse, Nobel's Explosive Company, the ESL, and the ASME: since virtually all biographically relevant published sources about his career have already been canvassed for this study, only more archival research is likely to yield such information.

Here, however, one must reckon with unevenness in the survival and distribution of the historical record. With the exception of the ASME's *Engineering Index*, which has been transmogrified into a much broader-based platform for engineering information known as *Ei Engineering Village* and is currently owned by Elsevier,⁶⁵¹ none of the organizations with which Kaiser was affiliated is still in existence today and the fates of their organizational records have varied. In the case of some institutions, such as the PCM, which, after a long

⁶⁵¹ See <http://www.engineeringvillage.com/controller/servlet/Controller>. For a general overview of the history of the *Engineering Index*, see Zani 2002.

period of decline, ceased operations in 1994 and had its collections distributed across local museums in Philadelphia in 2001 and, again, in 2010,⁶⁵² and the ESL, which closed its doors in 1998 after transferring most of its collection to the Linda Hall Library of Science, Engineering, and Technology in Kansas City in 1995 (Cohen 2000; Ginanni 2005, 322), the internal records pertaining to their libraries appear to have gone missing and, indeed, may no longer be extant.⁶⁵³ The records of another organization, British Westinghouse, which today form part of the Marconi Archives in the Special Collections of the Bodleian Library University, were consulted for this study and yielded minimal, but highly valuable, information relating to library or indexing activities there (See Chapter 4, Section 2, above): unfortunately, it is highly unlikely that more evidence for Kaiser's activities there will turn up.⁶⁵⁴ To the best of my knowledge, the archival collections most likely to provide new information about Kaiser's career as librarian and indexer are the Vickers archive kept at the Department of Manuscripts and University Archives at Cambridge University Library

⁶⁵² On the decline of the museum, its associated services, and its end; see Conn 2010, 180–184; Independence Seaport Museum n.d.

⁶⁵³ In the case of the PCM, time-books, accession-books, and other internal records of the library were still extant and available in the early 1950s, when they were consulted by a student from the Drexel Institute of Technology's School of Library Science in a Master's thesis on the history of the PCM's library (Heskin 1952, 10–11). By the mid-1960s and early 1970s, this documentation seems to have no longer been accessible, for, in 1976, Metcalfe (1976, 177) could report that "[t]here seems to be no trace of what he [sci., Kaiser—TMD] did in the Philadelphia Museum. My inquiries at the Museum in 1964, and my later correspondence with the Museum revealed, if anything, less than average knowledge of him and his thinking in America, which has been low". It is unclear whether this was due to deficiencies in archival control in a moribund institution or to actual physical loss of documents. In 2010, when I posed a query about the fate of the PCM's administrative records to Mr. Matt Herbison, an expert on the archival scene in Philadelphia and, at the time, Director of Archives and Library at the Independence Seaport Museum in Philadelphia, he responded that, to the best of his knowledge, "day-to-day/administrative office records" no longer exist, though he did note that the Hagley Museum in Wilmington, Delaware, had recently acquired a run of Board Minutes from the PCM (M. Herbison, Personal Communication, August 17, 2010). In response to a further query that I sent to the Hagley, Lynn Catanese, at that time the Curator of Manuscripts and Records there, indicated that the materials in question comprised of "an incomplete run of board minutes and a number of administrative files regarding artifact loans and exhibitions", as well as "a few exhibition catalogs": she also note that "[t]here is very little in the collection from the 19th century, unfortunately ..." (L. Catanese, Personal Communication, November 10, 2010).

As for the ESL, minute books of its Library Board meetings from the late 1910s and early 1920s were still extant in the 1970s, when they were used by the author of a monograph on the history of the library (Mount 1979, 1982). Neither they nor any other administrative documents from the period when Kaiser worked there appear to have been included among the holdings transferred to the Linda Hall Library in 1995, as one of its Research Specialists informed me in response to a query that I had posed (C. Olson, Personal Communication, August 13, 2010): their current whereabouts, if they are still in existence, are unknown.

⁶⁵⁴ For a conspectus of the holdings of the British Westinghouse archives, see <http://www.bodley.ox.ac.uk/dept/scwmss/wmss/online/modern/marconi/marconi.html#marconi.P>.

(See p. 703, n. 545, above) and the W. A. S. Hewins manuscripts housed at the University of Sheffield, the correspondence books of which may shed additional light on Kaiser's tenure at the Tariff Commission:⁶⁵⁵ somewhat less promising are the collection of records from the Ardeer factory of Nobel's Explosives Company held at the Glasgow University Archive Services, the scope of which is rather limited,⁶⁵⁶ and the collection of records of the advertising agency Sells, Ltd. kept at the History of Advertising Trust in Norwich, which just might include materials pertaining to its founder, Henry Sell and the CIB (cf. Chapter 4, Section 1, above).⁶⁵⁷ Obviously, any additional information about Kaiser's works and days that can be gleaned from such sources can only serve to enrich the picture of his professional life that has been presented here; if, on the other hand, no such information were to be forthcoming from them, one would, at least, have some assurance that the limits of raw materials for reconstruction had most probably been reached. Such, then, are the prospects for future work on the biographical framing of Kaiser and SI.

Further research also remains to be done on SI as a system. Although this study has sought to present a full-scale picture of Kaiser's system of indexing, from its theoretical bases to its physical implementation(s), it has not covered all the ramifications thereof. In particular, it has restricted itself to an analytical description of SI as it was applied to the card index, the primary technological medium that Kaiser had at his disposal and for which he designed it. However, Kaiser did not confine himself to creating systematic card indexes alone: he also compiled back-of-the-book indexes for the monographic industry reports of the Tariff Commission (See Chapter 5, Section 3, esp. pp. 176–178, above) and for his own books (Kaiser 1908, § 367; 1911, § 664). A glance at the examples from one of the indexes that he prepared for the Commission given in Figures 5a and 5b, above, indicates that, at least superficially, the forms of headings and subheadings differed considerably from those that he prescribed for card indexes. For example, many headings in the book indexes lacked any subheadings (See p. 178, Figure 5a, above), while, in those that had them, prepositions

⁶⁵⁵ For an overview of the holdings of the Hewins manuscripts, see <http://www.shef.ac.uk/library/special/hewins>.

⁶⁵⁶ For an overview of the records of the Ardeer factory of Nobel's Explosives Company, see <http://archiveshub.ac.uk/features/0412nobel.html>. The description of the scope and content of this archive given at the URL cited here does not inspire confidence that it will contain documents from, or about, the works library, but it may well include photographs thereof.

⁶⁵⁷ For a description of the records of Sells, Ltd., see <http://www.hatads.org.uk/collections/agencies/24/Sells-Ltd/>. These include scrapbooks and correspondence, the most likely sources of information on the CIB, if any such is to be found within a collection devoted primarily to Sell's career as an advertising agent.

were used to indicate the relationships between a main heading and its subheadings (See p. 178, Figure 5b, above): in the card system, on the other hand, terms never occurred in isolation but always had at least one subheading, while the rules for constructing statements did not allow the use of such specific connective particles between the first term of a statement and the ones that followed. It may thus seem that Kaiser's method of book indexing was far removed from that of SI. Yet, in *Systematic Indexing*, Kaiser (1911, Chapter VII) devoted an entire chapter to outlining a method of book indexing that used the standard categories of SI to derive indexing terms from a text but gave the indexer greater leeway in arranging the main headings and subheadings than was the case with the card indexing (e.g., §§ 577–578, 591, 611). In other words, his system of book indexing was a variant form of SI.

Kaiser's account of his method of book indexing merits investigation for three reasons. First, despite the fact that some subsequent writers on literary indexing took note of his views on book indexing (e.g., Brooks 1913; Clarke 1933, 91, with note † & 101, with note *), latter-day historians of literary indexing seem to have entirely overlooked his contributions to the discourse of their domain,⁶⁵⁸ perhaps because SI was considered to be a form of "commercial indexing" (Brown 1921, 130) and so fell on the wrong side of the traditional distinction between literary and commercial indexing (on which see, e.g., Elliot 1910). A study of his method of back-of-the-book indexing can thus fill in a lacuna in the history of book indexing techniques and also provide the occasion for a comparison of his method with those presented by other contemporary treatises on the subject, including those of Nichols (1892), Wheatley (1902), Petherbridge (1904), Clarke (1905), Wheeler (1905), and others (e.g., Hewitt 2003; Robertson 1993). Second, it is likely that an analysis of Kaiser's treatment of the book index can contribute to ongoing theoretical discussions in the field of literary indexing. For example, his distinction between card indexes as "interminable" indexes and book indexes as "terminable" ones (Kaiser 1911, §§ 573–579) bears a striking resemblance to Klement's (2002) recent differentiation between "open-system" and "closed-system" indexes but also differs from the latter in some significant ways (See Chapter 7, Section 1, esp. p. 284, n. 281, above): a closer comparison of the two may allow one to refine the latter model. Finally, a study of Kaiser's application of his indexing system

⁶⁵⁸ For example, mention of Kaiser and his system of book indexing is absent from one of the few substantial monographs devoted to the history of literary indexing, Hazel Bell's (2008) *From Flock Beds to Professionalism: A History of Index Makers* and from its popular-historical predecessor, *Indexers and Indexing in Fact & Fiction* (Bell 2001).

to back-of-the-book indexing will complete the account of SI presented here by showing how its protocols could be modified to fit the requirements of book indexes, which were different from those of the card index: it will thus give us a better sense of which elements of the indexing system were truly non-negotiable and which ones were open to alteration under the right conditions.

A third line of research pertains to Kaiser's place within the history of KO. One of the aims of this study has been to inject elements of an externalist historiographical approach into the study of Kaiser and SI by considering them in light of the specific social, cultural, and technological contexts in which he worked and within the framework of which he developed his indexing system (See Chapter 1, Section 2, above). In this, it has differed from previous studies, which have tended to take an internalist approach, focusing primarily upon situating Kaiser and his indexing system within the intellectual history of KO (e.g., Batty 1976; Metcalfe 1973, 1976; Rodríguez 1981; Sales & Guimarães 2010; Straioto & Guimarães 2004; Vlasák 1967). An advantage of applying an externalist approach to the examination of a given historically-significant KOS, such as SI, is that one comes to recognize the particular conjuncture of factors that led its creator(s) to conceptualize and design it in the way that he (or they) did: this, in turn, leads to an enhanced understanding of, and appreciation for, the rationale underlying its design features. Such an understanding, in turn, may serve to allow one to incorporate the KOS more knowledgeably into internalist accounts of the history of KO. Accordingly, the present dissertation can serve as an evidentiary base for newer and better-informed studies of how Kaiser and SI fit into the disciplinary history of KO.

Traditionally, Kaiser's KOS has been integrated into the history of KO by comparing its features to those designed by other prominent pioneering figures in the field, most notably Cutter and Ranganathan (See Chapter 1, Section 2, above). Recently, this project has received fresh impetus from Sales (2012), who, commendably aware of the contexts in which Kaiser worked and the technological régime within which he was operating (pp. 49–62; 96–108), has sought to set the leading ideas of Kaiser in relation to those of Cutter, Hulme, Otlet, and Ranganathan. In his view, Kaiser shared with Cutter a concern for establishing principles and rules for determining, and expressing, the subjects of texts; Kaiser and Otlet had in common an interest in information analysis, or the enucleation of pieces of information within documents (cf. Chapter 7, Section 1, above); Kaiser's insistence on extracting terms from texts mirrored Hulme's empiricist principle of literary warrant

(See Glossary); and, last and, most important, Kaiser's utilization of categories and rules for combining terms from different categories into statements prefigured the analytico-synthetic method of facet analysis enunciated and developed by Ranganathan (Sales 2012, 178–182, esp. p. 180, Figure 2; Sales & Guimarães 2013, 3–5, with Figure 1). These are valuable points of contact to make between Kaiser and other pioneers of KO and, with the comparisons with Otlet and Hulme, Sales has laudably extended the traditional internalist linkages between Kaiser and other major figures in the history of the field. The comparisons that he offers, however, are concerned primarily with internalist theoretical features and do not fully take into consideration the externalist factors that impinged upon the persons whose ideas he otherwise collates with great perspicacity. An example—namely, that of the comparison between Kaiser to Cutter—may serve to illustrate this.

In comparing Cutter and Kaiser, Sales (2012, 68–78) rightly notes that several of the cardinal principles of subject cataloging that the former enunciated—the principles of specificity, of usage, and of the need for syndetic linkage—find their analogues in Kaiser's method of SI: indeed, Cutter and Kaiser can be seen as developing norms for the creation of alphabetic-specific (see Glossary) KOSs—dictionary catalogs in the case of the former; systematic card indexes in the case of the latter—equipped with syndetic structures (see Glossary). However, the comparison does not engage with the palpably different social, cultural, and intellectual backgrounds against which the two men formed their respective systems. A graduate of Harvard who, throughout his career, worked in academic and public libraries featuring general collections, Cutter subscribed to a form of Scottish Common Sense philosophy commonly taught at institutions of higher learning in the antebellum United States: this shaped the realist epistemological views that underlay his system of subject cataloging and influenced his model of the public *qua* catalog users, as well as his vision of the ultimate end of librarianship—namely, cultural and intellectual uplift of library patrons (Miksa 1977, 29–34; 1983a, 37–44, 74–82). Kaiser, on the other hand, was a product of German public schools whose formal education had culminated at a trades- or commercial-oriented continuation school (See Chapter 2, Section 1, above); his entire career in information work was spent in the employ of special libraries and information bureaux devoted to the domains of business or technology; his epistemological views can be justly characterized as a form of perspectivist empiricism (See Chapter 7, Section 2.1, esp. pp. 302–305, 308–310, above); and, steeped in business culture, his understanding of the rôle of the intelligence department—the ideal milieu for SI—was strictly utilitarian (See

Chapter 6, Section 2.2, esp. pp. 199–200, above). Needless to say, these differences in background, coupled with the fact that Cutter was concerned chiefly with the cataloging of books, whereas Kaiser designed his system for the indexing of information, led to differences in their respective conceptualizations of their systems: for example, Cutter’s motivation for espousing the principle of specific entry as the norm for dictionary catalogs was that most users of a library would search for specific subjects because they had not developed (or, in the case of the educated, chose not to exercise) the mental habits required for sustained research, whereas Kaiser valorized specificity on the strictly utilitarian grounds that specific information was of most use to businessmen (See p. 889, n. 649, above). Such “externalist” considerations, which can be gleaned from the evidence offered in this dissertation and from Miksa’s (1974, 1977, 1983a) authoritative studies of Cutter’s career, ideals of librarianship, and theory of subject cataloging, can enrich and extend the comparison between Kaiser’s and Cutter’s views on knowledge organization initiated by Sales: indeed, a full-scale comparison of Cutter’s and Kaiser’s conceptualizations of their respective KOSs holds out the promise of throwing into sharper relief the distinctive features of each man’s contribution to the tradition of alphabetic-specific cataloging and indexing.

In addition to supporting detailed, historically-informed comparisons between Kaiser’s KOS and those created by other pioneers of KO, the findings of the present study can also serve as a point of departure for more broadly-based thematic investigations on aspects of the discourse of knowledge organization of his day. One potentially fruitful line of inquiry would be to examine the conceptualization of language by indexers and classificationists in the late 19th and early 20th centuries. The stimulus for undertaking such an inquiry comes from Elaine Svenonius, a prominent latter-day commentator on SI and a leading proponent of an essentially linguistic approach to KO, who has stated that “Kaiser seems to have been the first to recognize indexing language *qua* a language with grammatical categories and rules of syntax” (Svenonius 1978, 134) or, again, that “[t]he act of organizing information can be looked on as a particular kind of language use. Julius Otto Kaiser, writing in the first decade of the twentieth century, was the first to adopt this point of view” (Svenonius 2000a, 6). These formulations require some modification. On one hand, Kaiser was *not* the first pioneer of KO to conceptualize a classification or indexing scheme as a particular kind of language: that distinction belongs to Paul Otlet, who, as early as the mid-1890s, had characterized the nascent UDC as “a veritable international bibliographical language” (*une*

véritable langue bibliographique internationale) (Institut International de Bibliographie 1895–1896, 163) and described its structure in expressly grammatical terms (La Fontaine & Otlet 1895–1896, 28–29; Otlet 1896, 232–234). On the other, whereas Kaiser’s conceptualization of SI certainly had strong linguistic overtones—most notably, in its emphasis upon terms as the basic building blocks of an index and in its ordered combination thereof into “statements” (See Chapter 7, Sections 2.23 & 3, above)—, he did not characterize his indexing system as a language *per se* nor did he speak of it as possessing a grammar: that is to say, he did not develop an *explicit* account of SI as a language in the way that Otlet did with regard to the UDC. Nevertheless, as this study has demonstrated, Kaiser was deeply interested in problems pertaining to language and written communication (See Chapter 7, Sections 2.2–2.2.2, above) and that the basic elements of his indexing system are best described *ex post facto* with such linguistic categories as lexicon, or vocabulary; semantics; and syntax (e.g., Chapter 7, Sections 2.2.3–2.2.4, 3.5–3.6, above): his basic approach to indexing can thus best be characterized as quasi-linguistic.

Given that both Kaiser and Otlet viewed their respective KOSs, either implicitly (as in the case of the former) or explicitly (as in the case of the latter) in (quasi-)linguistic terms and that SI and the UDC expressed subjects in very different forms—the former used natural language terms and term position within statements as a category indicator, whereas the latter employing decimal notation with special signs serving as category and relationship indicators—, it is legitimate to ask whether these formal differences reflect different understandings of language and its semantic functioning. To answer this question, it will be necessary to examine Otlet’s ideas not only about the UDC *qua* documentary language but also about language in general. Although modern commentators have addressed, to some extent, the first of these themes (Ducheyne 2005; Rayward 1967, 269–273; Smiraglia & van den Heuvel 2013, 368–370), the second has not, to my knowledge, received any attention, despite the fact that Otlet expressed himself on the general subject of language in his two *opera magna*, *Traité de Documentation* and *Monde* (Otlet 1934, 88–93; 1935, 270–274, 383, 389): thus, there is room for additional research here. Once Otlet’s views on language have been clarified, it will be possible to compare them with those of Kaiser, which have been examined in this dissertation, and to draw conclusions regarding the similarities or differences regarding their outlooks on language. This comparison, in turn, can be extended to include (near)-contemporary theorists of subject cataloging, indexing, and classification, such as Cutter (1904), Bliss (1929, 1938), and Sayers (1912,

1926), who did not envision their respective models for KOSs in linguistic terms,⁶⁵⁹ but nevertheless did discuss the function of “names” or “terms” in knowledge organization. A comparative study of the views on language held by those late 19th-century and early 20th-century pioneers of KO who interpreted their subject indexing systems in (quasi-)linguistic terms and those who did not, followed up by a similar survey of KO thought in the mid- and late 20th centuries, may well shed light on the prehistory of the distinction between “term”- and “concept”-oriented approaches to KO (See Chapter 7, Section 2.2.3), which has left its traces in the tension between the concepts of “documentary language” and “knowledge organization system” felt by some researchers today (e.g., Maniez 2007; Menon 2007).

Studies such as the one that I have just outlined center themselves primarily around what might be termed the canonical pioneering figures of KO, most of whom were active within the fields of librarianship (e.g., Bliss, Brown, Cutter, Dewey, Richardson, Sayers) or Documentation (e.g., Otlet). Kaiser differed from his contemporaries in this respect, for, although he worked in special libraries and information bureaux, styled himself as a librarian (See Chapter 1, Section 5.2.4, esp. p. 48, n. 30, above), and espoused techniques of knowledge organization that overlapped with those of Documentation (See, e.g., Chapter 7, Section 1, above), he situated his own works within the discourse of office organization (See Chapter 1, Section 5.2.1, esp. pp. 36–37, above). Now the early literature on office organization—in particular, that relating to the kinds of commercial indexing typical of the filing department (on which, cf. Chapter 6, Section 2.2, esp. pp. 203–204, above)—did not, as a rule, find a place within the canonical literature of KO and, as a consequence, has not received much attention from historians of the latter field, who have, by and large, tended to

⁶⁵⁹ In the case of Sayers, the title of one of his pamphlets, *The Grammar of Classification* (Sayers 1912), as well as the fact that his arguably most famous pupil, Ranganathan (1961, 76–77) extolled him as the inspiration behind his own development of what he called the “classificatory language” of CC (cf. Beghtol 2008, 136), may seem, at first blush, to belie the notion that his view of classification was not linguistic in its orientation. However, let us listen to Sayers’s (1912, 1) own explanation for the choice of his title: “Grammar is not, save to a privileged few, a very entertaining subject, and I have given this unattractive title to this paper to convey some idea of the concentration in thought and expression necessary to compress a large subject into twelve pages.” In his view, classification had a “grammar” insofar as it was a subject that could be expounded in a systematic and structured manner: however, his choice of the term served primarily to signal the dry and technical approach he took to his theme and did *not* reflect an linguistic conceptualization of classification as such. Ranganathan’s (1961, 76) bestowal of the title “first grammarian” upon Sayers reflects his own interpretation of CC as an “artificial classificatory language”, which dates to 1944, some twenty years after he had studied with Sayers (cf. Ranganathan 1944, 19–41), and bears some affinity to the views of Otlet: his characterization of Sayers’s thought and teaching thus represents a retrospective *re*-interpretation thereof in light of his own views (cf. Chapter 7, Section 2.2.3, esp. p. 346, n. 312, above).

restrict their gaze to the writings and doings of librarians and documentalists. In doing so, they have overlooked a professional tradition of knowledge organization that absorbed influences from general librarianship, special librarianship, and documentation, and was often fairly progressive in the practices that it adopted. Consider, for example, the following passage from a textbook on the operation and control of a filing department, in which the author, Ethel E. Sholfield (1923, t.p.), an instructor at the New York School of Filing and, formerly, a “file systematizer” at the leading explosives manufacturer in the United States, the E. I. du Pont de Nemours Company, discussed the use of structured subject headings in subject files:

[I]n many industrial organizations, th[e] multiplicity of points of view would result in large and cumbersome files and catalogs. To reduce this bulk, standard types of entries are made, assigning a definite position on the index card or label to each phase of the entry. For instance, the first position might be allotted to a product, the second to a process, the third position to apparatus, etc. For example, suppose we were indexing an article relative to the life of retorts when making sulfuric acid by the lead chamber process. We would have

Sulfuric Acid—Chamber Process—Retorts, life of
(1) (2) (3)

Or suppose we were interested in the subject of retorts for nitric acid, irrespective of any process of manufacture, we would have

Nitric Acid—.....—Retorts, life of
(1) (2) (3)

A few topics may be deemed of sufficient interest to be given first-position entries as well as subentries. Or the purpose may be served by leaving the first entry blank and beginning with the subentry. This plan of having a standard position for each type of entry saves much indexing, while leaving all material accessible.

This may be considered an elementary type of classified file, yet it is hardly even that, for where there can be no possible overlapping of interests, different types of data may have different standard entry regulations, so that first-entry position might be assigned to several kinds of topics, each of which would be subdivided by fixed types of subheadings (pp. 131–132).

Even a cursory reading of the foregoing text indicates that Scholfield was, in effect, suggesting a category-based system for indexing documents in the field of chemical research, in which the categories were those of [PRODUCT], [PROCESS], and [APPARATUS], and compound headings took the standard tripartite form [PRODUCT]–[PROCESS]–[APPARATUS], which might also be transformed into quasi-bipartite forms such as [PRODUCT]–Ø–[APPARATUS]. Despite differences in detail, this mode of constructing subject headings was virtually identical to that advocated by Kaiser, as was its underlying

rationale, which was to reduce the number of entries—and, hence cards—in a card index and so, in effect, to avoid what Kaiser called “duplication” (See Chapter 3 Section 3.3; Chapter 9, Section 4.1, esp. pp. 115–117, 779–780, 791, above). Now, insofar as Scholfield did not divulge the source from which she derived her ideas on structured subject headings, it is uncertain whether she drew inspiration from Kaiser’s writings on this score, though it is striking that, like him, she spoke with derision of “catchword headings” as an inferior means for indicating the subjects of files (Scholfield 1923, 132–133; cf. Chapter 3, Section 3.3, esp. pp. 114–117, above). What is of importance here is the fact that she was discussing the use of a category-based indexing system akin to that of Kaiser within a professional discourse that has been largely neglected by historians of KO. Further research into the kinds of subject indexing schemes discussed in the early literature on commercial filing and indexing, such as that of Kaiser and Scholfield, cannot but expand the horizons of the historiography of KO and also align it more firmly with that of IM (Black 2004c; Black, Muddiman, & Plant 2007).

Thus far, we have suggested that the study of Kaiser and SI could be extended primarily along various historical paths of research, whether by seeking to fill in gaps in his professional biography, by looking at his account of the application of SI to book indexing, by situating his thought more precisely *vis-à-vis* that of other pioneers of KO with whom he has been linked within the standard narratives of the development of KO, by taking certain aspects of SI as a springboard for carrying out broader thematic investigations on the theory of knowledge organization of his time, and by examining with greater attention the particular professional discourse of filing and indexing within which he inscribed his own works. Virtually all of these lines of investigation would serve to contribute to a better understanding of Kaiser and his system in their historical context or to the intellectual history of KO as a whole. Additional studies oriented in this direction could easily be undertaken: for example, the account of the reception of SI among British special libraries in the 1920s and its subsequent entry into the discourse of “mainstream” KO in the 1950s and 1960s given in this dissertation (cf. Chapter 8, Section 3; Chapter 9, Section 6, above) could be deepened by archival research regarding its application at such organizations as Rowntree⁶⁶⁰ or ICI⁶⁶¹ and more detailed analyses of the ways in which commentators such as Metcalfe (1957, 1959) (re)interpreted it for their own theoretical purposes.

⁶⁶⁰ The Rowntree archives, which are housed today at the Borthwick Institute for Archives at the University of York, have already been utilized as a source for studies on the history of the company’s

There is, however, another final mode of research that can be pursued as well, one that does not confine itself to reconstructing the history of SI and its place in the history of KO but seeks to relate aspects of the system to issues of present-day interest in KO. Because of the hold of the canonical profile of SI on the disciplinary consciousness of KO, modern commentators have tended to locate the theoretical interest of the system primarily in its category scheme, focusing on such themes as category definition (e.g., Dousa 2011; Svenonius 1978, 1979), which, as we have seen, was not entirely unproblematic for Kaiser (See Chapter 7, Sections 3.1.2, 3.2, 3.3.2, 3.4 & 3.6; Chapter 9, Section 4.1, above). However, as the present study clearly shows, SI *qua* indexing system encompassed much more than the use of categories to create complex index terms; there is, accordingly, ample room to foreground the relevance of other features thereof for current KO theory and method. For example, Kaiser's full-throated endorsement of polyhierarchical relationships in the syndetic structure of SI, which he saw as a replacement for standard logical classifications, cannot but resonate with KO researchers who have found, in recent years, that the electronic environment of the Web has fostered the use of knowledge organization systems employing a "liberating polyhierarchy" (Hudon & El-Hadi 2010, 29) so as to afford multiple views upon a given object or domain of interest. Although this aspect of SI has already received some scholarly attention (Dousa 2007), the results of the present study, combined with a broader study of devices for achieving polyhierarchy in current KOSs can usefully expand upon this theme. Similarly, Kaiser's views on information analysis as a means of extracting pieces, or chunks of information from documents (Dousa 2009–2010; Sales 2012, 63–64; see Chapter 7, Section 1, above) align them with present-day interests in the "componentization" of digital documents and texts on the Semantic Web by means of metadata and markup (cf. Fast & Campbell 2002, 12–16) and with ongoing calls to rethink the scope of subject access in online public-access catalogs (OPACs) so as to cover not only the subjects of "whole items", such as books, but also the subjects of "bits and pieces of items" that do not coincide with the subjects of books as wholes (Miksa 2012, 27–28): here, too, discussions of his version of information analysis can be set into a wider theoretical frame

special library provision; see, e.g., Black 1994, 2004b, 2007b. For a guide to the archives, see Burg 1997, esp. p. 54 for information on materials pertaining to the "technical library".

⁶⁶¹ The ICI archives have served as a source for studies on the history of this mega-corporation's policies *vis-à-vis* the libraries attached to its different branches; see Black 2004b, 2007c. Until 2008, when the company was taken over by the Amsterdam-based firm AkzoNobel, its archives were located at the company's London headquarters (see Black 2004b, 281, n. 2): I do not know whether they have remained in London, been transferred to Amsterdam, or deposited into an archival collection.

that takes account not only of Otlet's ideas on this subject (See Chapter 7, Section 1, esp. pp. 285–289, above) but also of later developments as well (Dousa 2009–2010, 19, Sidebar). Kaiser's valorization of polyhierarchy and his doctrine of information analysis become especially piquant if one keeps in mind that he was operating within a vastly different—and, to the eyes of the present-day observer, much more cumbersome—technological régime than the one dominating the current digital dispensation: as such, they serve as potent reminders that technologies enable the implementation of ideas but do not determine them.

Another area in which SI has hitherto largely unrecognized relevance to current discussions of KO has recently been indicated by Tennis (2005, 71), who recently characterized Kaiser's indexing system as “an example of a domain analysis” but did not elaborate further on this. In invoking domain analysis, he referred to what has become, in the first years of the 21st century, an increasingly popular approach to the theory and practice of KO. The fundamental tenet of this approach is that designers of KOSs should eschew designing and constructing universal systems of classification and indexing in favor of creating ones associated with specific domains—that is to say distinct regions of knowledge and practice that are of interest to particular groups or communities (Hjørland 2008, 95–96; 2010, 1650–1651; Hjørland & Hartel 2003; Mai 2005, 605–607; Stodola 2012, 21–29). Needless to say, Kaiser's (1926, 40) belief that any given business organization had its own distinctly individual sphere of interests covering “a well-defined field of knowledge” and that the scope and contents of a systematic card index must represent the particular domain of subjects constituting this field concurred perfectly with the domain-analytic imperative of designing KOSs to conform to the sphere of interests of particular groups of people or communities. It is perhaps not surprising that this should be the case: after all, Kaiser's career unfolded in special libraries, the notion that classification and indexing of (sources of) information should be customized to fit the informational needs of a given organization has long been an underlying assumption within special librarianship (Black 2007b, 184), and latter-day proponents of domain analysis have cited “the specialist library approach” as a source of inspiration for their view (Hjørland 2002, 422). Nevertheless, the fact remains that Kaiser was arguably one of the first modern writers on knowledge organization to take the notion that an indexing system must be designed in accordance with the informational needs of the particular organizations that it was supposed to serve as a central feature of KOS design and, in that respect, his general approach to KO can be considered as a significant precursor to that of domain analysis. A comparison of what

might be called Kaiser's version of domain analysis with that of present-day theorists may prove quite revealing, especially as the individualist epistemological considerations upon which he based his arguments for customization are not entirely congruent with the generally much more socially oriented epistemological orientations of modern proponents of the domain-analytic approach (e.g., Hjørland 2011; Hjørland & Albrechtsen 1995).

All in all, then, it is apparent that, although Julius Otto Kaiser and his method of indexing were very much children of their time and the central design features of the latter bore the imprints of the particular milieu—above all that of the PCM—in which he developed it, there are multiple ways in which consideration of those design features can continue to serve as a point of reference and, perhaps, a source of inspiration for ongoing discussions of the theory and methodology of KOS design. That the theoretical interest of SI transcends the particular historical circumstances of which it was the product is a testimony to the insight and originality of its creator, who with it has erected his own *monumentum aere perennius*—a modest one, to be sure, within the overall landscape of KO, but nevertheless a theoretically notable one that all serious students of the field will do well to mark.

Appendix 1. A Glossary of Miscellaneous Technical Terms

Most of the technical terms relating to SI in particular and KO in general have been defined either in the main text or in the footnotes thereto. The explication of some terms, however, requires a longer gloss than could be incorporated into the main text without leading to a serious derangement of the flow of the narrative or argument or than is convenient to formulate as footnote: accordingly, those terms have been placed into the present glossary, with references of the form “(See Glossary)” inserted in the main text to direct the reader to them.

Alphabetic-classed: Coined by Cutter (1869, 107), this term originally referred to a form of catalog in which the main headings were listed in alphabetical order, with general headings subdivided by more specific ones, each series of subdivisions likewise being arrayed in alphabetical order (Cutter 1876a, 540): as he defined it in the fourth and final edition of *Rules for a Dictionary Catalog (RDC)*, it was “[a]n alphabetic subject catalog in which the subjects are grouped in broad classes with numerous alphabetic subdivisions” (1904, 13, s.v. “Alphabetic-Classed Catalog”).

The difference between an alphabetic-classed catalog and an alphabetic-specific catalog (See following entry) is best seen in the following example. Suppose that one has the following terms: COPPER, GOLD, HEIRLOOMS, MACHINES, METALS, SILVER, TOOLS. In an alphabetic-specific catalog, each of these would serve as a main heading and would be listed in the preceding, alphabetical order, with items pertaining to these subjects entered under the most specific term that applies to them (e.g., a book on metals in general would be entered under METALS, while one on gold would be entered under GOLD, not METALS). In an alphabetic-classed, catalog, on the other hand, certain of these these terms (*in casu*, COPPER, GOLD, and SILVER), would not be main headings but would become subdivisions of the more general term METALS. Thus, the file order would be: HEIRLOOMS, MACHINES, METALS, METALS–COPPER, METALS–GOLD, METALS–SILVER, TOOLS. In this catalog file, the series of main filing terms HEIRLOOMS, MACHINES, METALS, TOOLS is in alphabetical order, as is the series of subdivisions under METALS, namely COPPER, GOLD, and SILVER: in this respect, it is alphabetical. On the other hand, insofar as copper, gold, and silver are all kinds of metal and thus COPPER, GOLD, and SILVER denote subclasses of METALS, then the subdivided forms METALS–COPPER, METALS–GOLD, and METALS–SILVER are, in essence classified: hence the name “alphabetic-classed”. It is important to note that the subdivided headings in an alphabetic-classed catalog can be as specific as those in an alphabetic-specific one: for example, METALS–GOLD is no less specific than GOLD. Nevertheless, whereas GOLD can be *directly* looked up as a main heading in the alphabetic-specific catalog, the searcher in an alphabetic-classed catalog can only get to it through the main term METALS: hence, alphabetic-classed entry is also sometimes called “classified entry” or “specific, indirect” entry. For discussion, see Browne 2010, 7; Coates 1960, 10; Foskett 1982, 143–144; Horner 1970, 100; Metcalfe 1957, 50; Shapiro 1989, 100, s.v. “*alphabetic-classed*”.

In *Systematic Indexing*, Kaiser (1911) employed the term “alphabetic-classed” with respect to the classification of names, or terms, in two senses. On one hand, he used it in the conventional sense to refer to classed indexes in which “both the classes and the members in each class are arranged alphabetically”, though he also stipulated that it could cover ones in which “the classes are arranged alphabetically and the members of each class logically [sci., in classified order—TMD]” (§ 213; cf. §§ 206–207). On the other, in Kaiser’s parlance, “alphabetic-classed” could also apply to the method of word-by-word alphabetization of multiword-terms, in which word boundaries are respected so that spaces between words

have an ordinal value in filing (See Chapter 7, Section 5.1, pp. 568–570, above). This latter sense of “alphabetico-classed” is, so far as I know, unparalleled in the contemporary, and subsequent, literature on knowledge organization. Although highly idiosyncratic, it can be viewed as a derivation of the first more conventional sense, for if one uses the word-by-word sequence COPPER COINS, COPPER KETTLES, COPPER WIRE, COPPERSMITH, COPPERHEADS (instead of the alternative letter-by-letter sequence, which would be COPPER COINS, COPPERHEADS, COPPER KETTLES, COPPERSMITH, COPPER WIRE), then one is, in effect, classifying under the initial word COPPER words denoting the different kinds of things—in *casu*, coins, kettles, and wire—that are made of copper and so constitute the domain of copper things; on this principle and some complicating factors, see Chapter 7, Section 5.1, p. 571, nn. 481–482, above.

Alphabetico-specific: This term refers to subject indexes or catalogs in which (1) the component index terms are listed in alphabetical order, (2) the items being indexed are entered under the most specific index term that applies to them, and (3) all main entry terms are subdivided only by terms that denote aspects of the subject in question, not those that denote concepts standing in a class-subclass relationship to the subject denoted by the main entry term (e.g., CATS may be subdivided by DISEASES to form CATS–DISEASES, since diseases can form an unfortunate aspect of feline life, but not by “Siamese Cats” to form *CATS–SIAMESE CATS, since Siamese cats are a subclass of cats). Because conditions (2) and (3) conjointly ensure that indexed items are entered directly under the main entry term applying to them, the stipulation of specific entry is sometimes also known as “direct entry” or “specific, direct entry”. For discussion, see Browne 2010, 6–7; Coates 1960, 10; Foskett 1976, 78–79; Metcalfe 1957, 51–52; 1959, 266, § 1.11.

Knowledge Organization (KO): The term “knowledge organization” and its abbreviation “KO” are used, in the literature, in at least three related, but distinct, senses as:

(1). the activity of organizing knowledge—or, more precisely, organizing documentary representations of knowledge—such as, e.g., classification and indexing (Anderson 2003, 471; cf. La Barre 2006, 5);

(2). the field within library and information science (LIS) that studies the theoretical and methodological grounds of the organization (of documentary representations) of knowledge (e.g., Broughton et al. 2005; Dahlberg 2006; Hjørland 2008; Tennis 2008, 103);

(3). a broader society-wide set of activities having to do with the organization of knowledge in fields outside of the traditional LIS context, such as, e.g., the social division of intellectual labour into disciplinary fields; the concomitant formation of institutions for the creation, diffusion, and intergenerational transmission of knowledge; the creation and/or use of conceptual systems (e.g., “schools of thought”); symbolic systems (e.g., languages); and the development of literatures and genres (e.g., Gnoli 2008b, 137–139; Hjørland 2003, 88; 2008, 86–87; La Barre 2006, 5–6; cf. Andersen & Skouvig 2006, esp. pp. 302–303, for an attempt to unify the three senses into a single definition).

For a brief history of the term and discussion of the conceptual presuppositions underlying its use, see Gnoli 2006. Of the three senses enumerated above, (1) and (2) are of especial relevance to this dissertation. In order to reduce equivocation between them, I shall use the term “knowledge organization” or its variant, “organization of knowledge”, to refer to the sense (1) and shall reserve the abbreviated form “KO” for sense (2).

Knowledge Organization System (KOS): The term “KOS” has come to be used over the last twenty years to refer to bibliographical classifications and subject heading lists, as well as a host of other, more recent types of mechanisms for knowledge organization in the Web environment, ranging from synonym rings and pick lists, through folksonomies and taxonomies, to ontologies and folksonomies. For discussion, see, e.g., Broughton et al. 2005, 142; Gnoli 2008a, 69–77; Hjerpe 1990; Hjørland 2007a, 368–369; La Barre 2006, 6; Souza, Tudhope, & Almeida 2012; Vickery 2008; Zeng 2008.

Some commentators within LIS define KOSs to be “tools that present the organized interpretation of knowledge structures” for the purpose of aiding storage and retrieval of information-bearing entities within information systems (Zeng & Chen 2004, 377). A survey of the literature reveals that, in many cases, this definition is understood to encompass tools that possess (1) a mode of structural organization; (2) a determinate semantic content in the form of a scheduled controlled vocabulary, the component terms of which are interrelated to one another by means of the structural organization; and (3) rules for applying this controlled vocabulary; see, e.g., the examples of KOSs given in Hodge 2000, 3–9; Soergel 2009, 26–28. Such a definition, however, seems overly restrictive, for, by virtue of criterion (2), it excludes indexing systems such as Kaiser’s SI, Jean-Claude Gardin’s SYNTOL, and Derek Austin’s PRECIS, all of which consist of methodological protocols and structural templates for the creation of controlled vocabularies, but are not themselves associated with a specific predetermined controlled vocabulary (Gardin & Levy 1963; Austin 1984, esp. pp. 3–4, 6). Such protocol-based systems, however, are no less implicated in “the organized interpretation of knowledge structures” than, say, subject heading lists are: the only significant difference is that each practical implementation of the former generates its own controlled vocabulary while those of the latter are, in large measure, dependent upon a pre-selected vocabulary. For this reason, I consider SI and its congeners to fall within the category of KOSs.

Although applying the term “KOS” to the classification and indexing systems developed by Kaiser and his contemporaries may savor of anachronism, it is a useful blanket term for indicating that a system that supports the organization of information-bearing objects, be it historical or contemporary, falls within the purview of interest of KO and I shall use it as such, when appropriate, in this dissertation.

Literary Warrant: A principle of knowledge organization according to which the inclusion of a semantic unit within a KOS—be it a class in a bibliographical classification or a term in a verbal indexing system—is justified by the fact that appears in the literature being indexed or classified. The original formulation of the principle by E. Wyndham Hulme, longtime librarian at the British Patent Office, classification theorist, and pioneer of statistical bibliography, applied exclusively to the derivation of subject classes in bibliographical classifications from the subject matter of books *qua* bibliographical units. In his words, the definition of such classes must be based “upon a purely literary warrant. According to this principle definition is merely the result of an accurate survey and measurement of classes in literature. A class heading is warranted only when a literature in book form has been shown to exist, and the test of the validity of a heading is the degree of accuracy with which it describes the area of subject-matter common to the class” (Hulme 1950 [1911–1912], 9). This is literary warrant in the strict sense of the term; for discussions thereof, see Beghtol 1986, 111–113; 2010, 1049–1050; Lee 1976, 102–103; Olding 1966, 105–107; 1968, 4–10; Rodríguez 1984b, 17–20.

Later authors would extend the concept to cover not the derivation of class headings from the subjects of books *qua* bibliographical units but to that of any subject terms from literature: thus, for example, Svenonius (2000a, 135) characterized it in general terms as a

“principle of representation” that “enjoins that the vocabulary of a subject language be empirically derived from the literature it is intended to describe”, while Vickery (1960a, 20) considered the selection of terms for a faceted classification from the literature of the domain for which the classification was being designed to constitute a form of literary warrant. Beghtol (1986, 113) has argued that these later interpretations of literary warrant are better characterized as forms of “terminological warrant”—a distinction that is justified if one wants to reserve the designation “literary warrant” for Hulme’s purely book-oriented formulation. For further discussion of the distinction between the later interpretation of literary warrant and that of Hulme, see Olding 1966, 107; for general surveys of literary warrant and discussion of its methodological potential for present-day KOSs, see Barité 2009; Barité, Fernández-Molina, Guimarães, & Moraes 2010.

Within a historically-oriented dissertation such as this, it is most appropriate to reserve the term “literary warrant” for Hulme’s specific interpretation: accordingly, following Beghtol (1986, 113), I use the term “terminological warrant” to designate the principle that a KOS’s terms are to be derived from the literature of the domain with respect to which the KOS is serving as a tool for classification or indexing (See Chapter 7, Section 2.2.3, above).

Peek-a-boo System: A system of coordinate indexing developed by W. E. Batten. It involved the use of cards representing simple subject terms, or, as he called them, “aspects”, with each card representing one aspect. Every aspect card contained a field of numbered boxes, each of which, in turn, represented a document to which the corresponding number had been assigned. When, in the course of indexing a document, an indexer had determined the various subject terms to be assigned to it, a hole was punched in the appropriate box in a card for each of the aspects in question; thus, each aspect card had perforations only in those boxes corresponding to the documents to which it related. Searches were typically involved queries on complex subjects comprising several aspects. To determine which documents dealt with all the aspects of a given complex subject, the relevant aspect cards were selected out of the card file and superimposed upon one another: if any document pertained to all of the aspects being sought, the corresponding box would be completely perforated upon superimposition and, the numbers corresponding to all the perforated boxes at the end of the search indicated which documents were to be consulted. It was as a consequence of its use of perforations in superimposed cards as a diagnostic for relevant “hits” that Batten’s system came to be known as the “peek-a-boo” system. For discussion, see Batten 1947; Holmstrom 1948b, 513; Kilgour 1997, 343–345.

Specific Entry: A fundamental rule of subject cataloging, originally formulated by Charles A. Cutter (1876b, 37, Rule 66; 1904, 66, Rule 161) within the framework of the dictionary catalog (i.e., an alphabetically arranged catalog consisting of entries by authors, titles, subjects, and bibliographic forms) that enjoins the cataloger to “[e]nter a work under its subject-heading, not under the heading of a class which includes that subject.”

To understand the import of this rule, one must consider the wider context in which it was enunciated: the following constitutes a very partial and extremely simplified overview of the most basic features thereof. As its wording suggests, the rule for specific entry presupposes a distinction between *subjects* and *classes*. According to Cutter (1876b, 12, s.v. “Class”; 1904, 16–17, s.v. “Class” [emphases his]), the difference between the two is this: “*Subject* is the matter on which the author [sci., of a book—TMD] is seeking to give or the reader to obtain information. *Class* is ... a grouping of subjects which have characteristics in common”. From these statements, two important conclusions can be drawn. First, subjects and classes stand in a hierarchical, classificatory relationship to one another in which the former are subordinate to the latter and, conversely, the latter are superordinate to the

former: in this respect, at least, the relationship between a subject and a class is roughly analogous to, but not identical with, the relationship between a species and a genus. Second, as the mention of authors and readers indicates, subjects not only stand in relation to their superordinate classes in a conceptual hierarchy, but they also stand in relation to books: indeed, elsewhere, Cutter (1876b, 15, s.v. "Subject"; 1904, 23, s.v. "Subject") defined "subject" as "the theme or themes of the book, whether stated in the title or not". On this view, a book may be said to have its own "special" subject (Cutter 1876b, 15, s.v. "Specific Entry"; 1904, 22, s.v. "Specific Entry"), which, in turn, can be situated within a classificatory hierarchy of subjects; any other subjects that are superordinate to it within the hierarchy are classes with respect to it. According to Cutter (1876b, 37–38; 1904, 67), every subject must have a name: once taken up by a cataloger and used within the framework of the catalog is an index term, the name becomes a subject heading—that is to say, "the name of a subject used as a heading under which books relating to that subject are entered" (1904, 23, s.v. "Subject Heading").

During cataloging, then, a book may be entered (i.e., its author, title, and imprint information may be recorded) under a subject heading. If the book is entered under a subject heading that denotes the special subject of which it treats, then *specific entry* has taken place. If, on the other hand, the book is entered under a subject heading that denotes one of the classes under which the book's special subject falls, then *class entry* has occurred. An example adapted from Cutter (1876b, 37; 1904, 66) may serve to clarify this. If a book about cats is entered under the subject heading CATS, we have to do with a case of specific entry, for the subject heading CATS denotes the special subject of the book—namely, cats. On the other hand, if the same book were to be entered under a subject heading such as MAMMALS, DOMESTIC ANIMALS, ANIMALS, and so on, we would be dealing with class entry, since the subject heading, be it MAMMALS, DOMESTIC ANIMALS or ANIMALS denotes a class under which the specific subject CATS falls. Whereas specific entry is typical of dictionary catalogs, in which terms are ordered in alphabetical sequence, class entry is typical of classed or alphabetic-classed (See entry above) catalogs, in which subdivided entries such as MAMMALS—CATS or DOMESTIC ANIMALS—CATS may be found. In the case of subdivided entries typical of class entry, subject access to specific subjects is indirect (i.e., through the superordinate term), whereas in specific entry, subject access to specific subjects is direct.

Cutter's rationale for preferring specific entry to classed entry was that, within the context of an alphabetically arranged catalog, it provided the most direct form of subject access for what he assumed would be the most numerous class of catalog users, "desultory inquirers" who wanted to find books on particular subjects quickly and expeditiously, and who were likely to experience difficulties with negotiating a classified catalog (Miksa 1974, 315–316; 2012, 10).

For further discussion of specific entry as formulated by Cutter, see Coates 1960, 31–34; Metcalfe 1959, 164–165; 1965, 29–36; Miksa 1974, 315–322; 326–339; 1977, 53–54; 2012, 10 & 29, n. 5; Svenonius 1976, 171–177; 2000b, 26, and, especially, the subtle and comprehensive treatment of Miksa 1983, 25–71, 127–133.

Syndetic: Derived from the Greek verb *sundeîn* "to bind together", this term, which can be glossed as "connective", was introduced into the discourse of librarianship by Cutter (1876b, 12, s.v. "Syndetic"; 1904, 23, s.v. "Syndetic") to refer to "that kind of dictionary catalog which binds its entries together by means of cross-reference so as to form a whole ...". The essential idea of *syndesis* was that, in alphabetically arranged catalogs, cross-references would form links between main entry terms that were semantically related but

separated in their filing order by the accident of alphabetical form: such an arrangement would complement the primary alphabetical arrangement with a secondary classificatory overlay and so transform the atomized “mob” of alphabetically-ordered main entry terms into a well-ordered “army, of which each part is capable of assisting many other parts” (1904, 79). Originally, the adjective “syndetic” was used to characterize alphabetically arranged catalogs or indexes containing cross-references between hierarchically related or coordinate subjects (Cutter 1904, 23, s.v. “Syndetic”, 79–80; cf. Vickery 1950a, 43). I use the term “syndetic structure” in a somewhat broader sense to refer to the network(s) of cross-references between synonymous, as well as hierarchically and associatively related, terms. For a related, but more expansive, definition of syndetic structure, see Milstead 1984, 67–70.

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