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Categories in Charles A. Cutter's Systems of Subject Cataloging and Bibliographical Classification

Abstract
Categories are considered to be an essential element in the design of many knowledge organization systems (KOSs), particularly those following the categorial approach of faceted analysis. Standard narratives of knowledge organization (KO) identify S.R. Ranganthan as the founder of the categorial approach to KO. However, they also acknowledge that elements of a categorial approach to KO can be found in a number of earlier KOSs created in the late 19th and early 20th centuries by such pioneers of KO as Paul Otlet, James D. Brown, and Julius O. Kaiser. This paper seeks to expand the list of precursors to the categorial approach by examining the rôle of categories in two KOSs created by Charles Ammi Cutter: the system of subject cataloging outlined in the *Rules for a Dictionary Catalog* (RDC) and the bibliographical classification known as the Expansive Classification (EC). In the RDC, Cutter divided subjects into three categories—concrete individual, concrete general, and abstract general—which were articulated into a classificatory, hierarchical structure that provided the framework for his principle of specific entry. Cutter also established a "significance order" of precedence for these categories, which functioned as a decision tree for selecting the most specific subject headings under which books treating of complex subjects should be entered. In the EC, Cutter divided the classification into schedules for subjects, a list of bibliographical forms, and an auxiliary table of place names (the Local List), with each of these divisions sharply distinguished from the other by notational means; moreover, he established a mechanism for class synthesis, whereby classes in the classification could take the forms Subject–Place or Place–Subject. Both KOSs were designed to allow maximal treatment of concrete, specific classes and so manifest the underlying unity of Cutter's vision of KO. The pervasive, but implicit and untheorized, use of categorial structures in both the *RDC* and EC justifies the inclusion of Cutter among the precursors of the categorial approach to KO.

1. Introduction

Categories—that is to say, concepts of a high level of generality (Barite 2000, 5; Bertram 2005, 33; Stock & Stock 2009, 57)—are a basic structural feature of many different kinds of knowledge organization systems (KOSs), from classifications, subject headings, and thesauri to search interface structures (e.g., Hearst 2009, 174-198) and ontologies (e.g., Herre 2010, esp. 333–335). Within the field of Knowledge Organization (KO), the use of categories has traditionally been strongly associated with, and considered in relation to, facet analysis, an influential, widely diffused method for designing classifications and indexing languages (e.g., Broughton 2013, 743; Lima & Raghavan 2014, 88; Vlasák 1967, 151–152). In classifications and indexing systems constructed according to the tenets of facet analysis, categories typically serve as a means of partitioning, and organizing, the universe of concepts represented by the terms in an index vocabulary and as the foundation for determining the citation order of component terms within the compound index terms used to express complex subjects (Dousa 2014, 160; Svenonius 2000, 139–140).

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It is generally agreed that the tradition of facet analysis, with its *categorial approach* to classification and indexing, received its first full theoretical articulation at the hands of S. R. Ranganathan (1892–1972), who is accordingly viewed as the initiator of that tradition (e.g., Beghtol 2010, 1052-1054; Broughton 2013, 736; Lima & Raghavan 2014, 90; Vickery 1966, 10). Nevertheless, as students of KO have long recognized, intimations of a categorial approach to KO are already discernible in the subject access systems developed by earlier theorists and practitioners of indexing and bibliographical classification active in the late 19th and early 20th centuries (e.g., Batty 1987, 486; Beghtol 2006, 161). Commentators have noted categorial features in the Universal Decimal Classification (UDC) designed by Paul Otlet (1868–1944) in the 1890s (e.g., La Barre 2007, 131–132), the Subject Classification (SC) published by James Duff Brown (1861–1914) in 1906 (e.g., Beghtol, 2004), the Bibliographic Classification of Henry E. Bliss (1870–1955) first outlined in 1910 (e.g., Broughton 2013, 736), and the method of Systematic Indexing (SI) elaborated by Julius Otto Kaiser (1868–1927) at the turn of the 20th century (e.g., Dousa 2014; Sales 2014; Svenonius 2000, 173–174).

It has become standard practice among historically-minded KO researchers to acknowledge the presence of elements of the categorial approach in the aforementioned subject access systems and so to regard them as precursors to the tradition of facet analysis (Broughton 2004, 259; 2013, 736; La Barre 2010, 243). Yet, these systems do not exhaust the list of late 19th and early 20th century KOSs in which categories played a prominent rôle. An older contemporary of Otlet, Brown, Kaiser, and Bliss who made significant use of categories in the design of subject access systems was Charles Ammi Cutter (1837–1903). Best known today as the codifier of the highly influential *Rules for a Dictionary Catalog* (henceforth *RDC*; first edition in 1876; final edition in 1904) and the creator of the so-called Expansive Classification (henceforth, EC; developed throughout the 1890s), a bibliographical classification that, although fallen into desuetude today, exercised a notable influence on the sequence of main classes in the Library of Congress Classification (Chan 1999, 7–12; Miksa 1984, 19), Cutter generally adhered to the norms of discipline-based enumerative classification and the conventions of subject cataloging characteristic of the regnant "traditional approach to KO" (Hjørland 2008, 88-90) of his day. Perhaps because the *RDC* and the EC are the products of what is considered today to be a largely superseded theoretical approach to KO,[1] latter-day students of the field have paid relatively little attention to the categorial aspects of these subject access systems. The sole exception to this current of benign neglect has been the work of Miksa (1983a), who devoted a penetrating study to Cutter's rules for subject cataloging, in the course of which he presented a careful analysis of the function of categories in the *RDC*. The purpose of this paper is to build upon, and extend, Miksa's groundbreaking work by reexamining Cutter's use of categories in the formulation of both the *RDC* and the EC and assessing his contribution to the

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[1] For a thoughtful discussion of this point that ventures a historical explanation for this attitude, see Miksa 1992, 103–104, n. 4. For an example of a latter-day evaluation of the theoretical limitations of the "traditional" approach, see Hjørland 2008, 88–90.

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development of a categorial approach to KO. As we shall see, category-based structures occupied an important place in both of Cutter's subject access systems and some of the uses to which they were put were quite striking, meriting greater attention than they have hitherto received.

2. General and Individual, Concrete and Abstract: The Fundamental Categories for Subjects in the *RDC*

We begin by considering the rôle of categories in the mode of subject cataloging that Cutter outlined in the *RDC*.[2] To get full purchase on this, it will be helpful to recall a few elementary facts about the broader systemic context in which he embedded the practice of subject cataloging. As its name suggests, the *RDC* provided guidelines for the construction of *dictionary catalogs*, which Cutter expected would take the form of either printed volumes or card files.[3] Cutter (1904, 19, s.v. "Dictionary Catalog") defined the dictionary catalog as one in which the headings under books might be entered "are arranged, like the words of a dictionary, in alphabetical order". He envisioned that such a catalog would ideally have four kinds of headings—author, title, subject, and form (pp. 19, 24).[4] Although conceding that these different kinds of headings might be kept distinct within a given catalog, Cutter assumed that, as a rule, they would be "all interwoven into one alphabetical order" (p. 24). In his eyes, then, subject headings formed but one element within a broader ensemble of headings among which they would be interspersed.

The notion of subject heading, of course, is intimately related to—indeed, is dependent upon—that of subject. What, then, did Cutter understand by "subject"? In the *RDC*, one finds various definitions or characterizations of this term: "the theme or themes of the book, whether stated in the title or not"; "the matter on which the author is seeking to give or the reader to obtain information"; an "object of investigation"; a "matter[] of investigation"; or

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[2] All citations of, and quotations from, the *RDC* in the following pages shall be from the fourth, posthumous edition of 1904, which presents Cutter's final word on subject cataloging.

[3] The title of the first edition of the *RDC*—*Rules for a printed dictionary catalogue*—amply indicates that Cutter originally formulated his rules for the construction of printed catalogs. However, the fourth edition was "enlarged … to include the needs of a card catalog" (Cutter 1904, 24): this alteration reflect the fact that, by the turn of the 20th century, the card catalog had become prevalent in the American library world (cf. Fletcher 1894, 58; Lane 1896, 836).

[4] It may be noted that in 1876, the year of the publication of the first edition of the *RDC*, Cutter (1876, 561-563) considered the prototypical dictionary catalog, as exemplified by earlier and contemporary catalogs of this kind, to consist only of author, title, and subject entries—what he called a "triple dictionary" catalog. However, he noted the increasing presence of form entries in such catalogs, a trend that he found acceptable, and styled this new variety of dictionary catalog the "quadruple dictionary" catalog. Of course, other, simpler types of dictionary catalog consisting of a single kind of heading or various permutations of two or three kinds of heading were possible (p. 562).

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an "object[] of inquiry" (Cutter 1904, 23, s.v. "Subject"; 16, 67; Miksa 1983a, 24).[5] Taken at face value, these lapidary formulations reveal little about Cutter's conception of what a subject is. However, their import becomes somewhat clearer when one takes other statements in the *RDC* into account. For one thing, Cutter (1904, 16, s.v. "Class") observed that subjects can be "treated … in books or only in thought": this implies that subjects have both a cognitive—or, more precisely, a conceptual—dimension (i.e., they can be "treated … only in thought") and a discursive one (i.e., they can be "treated … in books", in which an author "give[s] … information" on a given subject through the act of writing and a reader "obtain[s] information" about it through the act of reading). Moreover, he stipulated that, for "matters of investigation" to be "raised … to the status of … subject[s]", they must not only attain "a certain individuality as objects of inquiry", but also "be given some sort of *name*" (Cutter 1904, 67, observation to Rule 161): in other words, they must have become stable, distinctively recognizable parts of the universe of knowledge as expressed in public discourse (Miksa 1983a, 60). Now inasmuch as Cutter (1904, 23, s.v. "Subject heading") considered any given subject heading to be "the name of a subject used as a heading under which books related to that subject are entered"—that is to say, to constitute the linguistic, or discursive, expression of a subject within a dictionary catalog—, it is reasonable to conclude that, for him, subjects were the objects of thought to which subject headings refer.[6]

It is at this point that categories come into play. Cutter (1904, 23, s.v. "Subject") divided subjects into two broad classes: *individual* and *general* subjects. According to this distinction, which had its roots in traditional logical and metaphysical lore, individual subjects encompass particular persons (e.g., "Goethe" or "Shakespeare"), countries (e.g., "England"), events (e.g., the "French Revolution"), temporal epochs (e.g., the "Middle Ages"), or, for that matter, any other particular thing viewed as singular and unique (Cutter 1904, 23, s.v. "Subject"; Miksa 1983a, 29). Such objects of thought comprise "singular notions", which cover "an[y] object considered as a single object" unto itself (McCosh 1883, 18). General subjects, on the other hand, are concepts, or "general notions", formed by the abstraction of attributes, or clusters of attributes, from individual things and serve as bases for the formation of classes (McCosh 1883, 18-23), such as "Man", "History", "Horse", or "Philosophy" (Cutter 1904, 23, s.v. "Subject"). Needless to say, the class corresponding to a given general notion consists of just those particular things that possessed the attribute, or cluster of attributes, defined by the notion (McCosh 1883, 23): to take one of Cutter's examples, the individuals Goethe and Shakespeare both fall under the general notion of "man"—that is to say, "human being"—in virtue of their humanity.

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[5] Note also the definition given in Cutter 1876, 523, n. 2: "[T]he word subject is used … to indicate on the side of the book the theme, whether special or general, on which the author wishes to give information, and on the part of the inquirer the matter on which he is seeking information". This unifies the definitions found at Cutter 1904, 23, s.v. & 16.

[6] For a more detailed discussion of Cutter's understanding of the nature of subjects, see Miksa 1983a, 26, 58-61, who prefers to speak of "intellections" rather than "objects of thought".

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Cutter interlaced the twofold division of subjects into individual and general subjects with a second division into *concrete* and *abstract* subjects. The categories of the concrete and the abstract were also anchored in traditional philosophical discourse, according to which "concrete notion[s]" are notions of objects as they present themselves in perception—that is to say, as individual wholes possessing their full panoply of attributes— while "abstract notion[s]" refer to qualities, or clusters of certain qualities, that form part of an object but are considered in isolation from other aspects of the object (McCosh 1883, 8-9). Cutter stipulated (1904, 23, s.v. "Subject") that all individual subjects are concrete, while general subjects are either concrete or abstract. Although he did not give an explicit explanation for this division, the underlying philosophical basis for it is not hard to discern. Any single object perceived as an individual is viewed as possessing a full set of attributes that, taken together, constitute its individuality: that is to say, it is considered as a whole and so the notion of it *qua* individual is concrete (McCosh 1883, 30). In the case of general notions, on the other hand, some result from the abstraction of a cluster of attributes that are diagnostic of the kinds of things that the various objects perceived to possess those attributes are (pp. 32, 48-49): to revert to Cutter's example, the notion of "Man"—or, better, "Human Being"—indicates the kind of thing that Shakespeare and Goethe are. Such notions are concrete general notions. Other general notions, however, do not express what kinds of things individual objects are, but rather are pure abstractions derived from particular qualities of these things, abstractions such as "Wisdom" or "Life", or, to cite Cutter's examples, "History" or "Philosophy" (pp. 31-32). These notions are abstract general notions. Based on considerations such as these, Cutter's cross-classification resulted in a division of the universe of subjects into three categories: *concrete singular*, *concrete general*, and *abstract general* subjects (Miksa 1983a, 25–26).

As Miksa (1983a, 37–44) has convincingly argued, the foregoing threefold distinction appears to have been based upon the Scottish Common Sense version of a traditional model of philosophical psychology, to which Cutter had been exposed during his education and employment as librarian at Harvard University in the 1850s and 1860s (cf. Miksa 1977, 32–34; Olson 2004, 609–610). According to this model as adapted by Cutter, concrete individual subjects derived from notions of particular objects directly apprehended in perception; concrete general subjects were formed through the processes of abstraction, generalization, and conception—a process that could be iteratively repeated at different levels of generalization—; and abstract general subjects represented the highest levels of abstract thought, namely the sciences and other departments of knowledge (Miksa 1977, 53–54; 1983a, 41–44; cf. McCosh 1883, 27-28, 30-33). The upshot of this theory was that Cutter's categories stood in hierarchical relationships to one another, which were determined by degrees of abstraction: concrete singular subjects were included in concrete general ones (e.g., the concrete singular subject of "Socrates" falls under the concrete general subject of "Greek Philosopher," which, in turn is a subclass of the higher-level concrete general subject "Philosopher"), while concrete general ones were situated within abstract general ones (e.g., the concrete general subject of "Philosopher" falls within the purview of the abstract general subject of "Philosophy") (Miksa 1983a, 35). On this view,

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the universe of subjects was, in virtue of the derivation of the categories used to articulate it, hierarchical in structure and classificatory in nature (43, 61).[7] Inasmuch as the hierarchical relationships between the three categories were based on a gradation from most concrete to most abstract, they were correlated with a parallel gradation from most specific to most general, with concrete individual subjects being more specific than concrete general subjects and concrete general objects, in turn, being more specific than abstract general subjects (Miksa 1983b, 116; 2012, 29, n. 5).

3. Subject Categories and the Entry of Books in the *RDC*

Such, in outline, was the category system that underlay Cutter's understanding of the universe of subjects. To understand its significance for Cutter's rules of subject cataloging, we must consider it in relation to one of the cardinal principles that he articulated in the *RDC*: that of *specific entry*. This principle is embodied in his instruction that catalogers are to "[e]nter a work under its subject-heading, not under the heading of a class which includes that subject" (Cutter 1904, 66–67, Rule 165; cf. 22, s.v. "Specific entry"). According to this rule, a book on the life and philosophy of Socrates would be most appropriately entered directly under the heading **SOCRATES,** not under headings representing broader classes under which the subject of Socrates could plausibly fall, such as **PHILOSOPHER** or **PHILOSOPHY**; while a general treatise on philosophy would find its rightful place under the heading **PHILOSOPHY**. By contrast, if a book on Socrates were entered under **PHILOSOPHY**, this would constitute what Cutter called *class entry*, since

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[7] The observant reader will immediately notice that, on Cutter's model, not all hierarchical relationships are the genus-species—or, in modern parlance, "is a"—relationships of class inclusion posited by logicians as the standard form of classificatory hierarchical relationship. The relationship between an individual subject (e.g., Socrates) and the concrete general subject that is immediately superordinate to it (e.g., Greek philosopher) is one of membership (i.e., Socrates is a member of the class of Greek philosophers) and the relationship between subordinate and superordinate concrete general subjects is one of strict class inclusion (e.g., the class of Greek philosophers is a subclass of the class of philosophers *tout court*) and so the relationship between the two is akin to that of a genus-species relationship. However, the relationship between a concrete general object and its super-ordinate abstract general object is most decidedly not akin to that of a genus-species relationship (e.g., a philosopher is not a kind of philosophy but rather a person who pursues an activity within the domain of philosophy). This form of structure, in which an abstract general subject—typically a department of knowledge or discipline—encompasses concrete general subjects linked among themselves in genus-species relationships, with concrete individual subjects being members of the classes correlated with concrete general subjects—constitutes what Svenonius (2000, 151–152) has termed "perspective hierarchies". The hierarchy of subjects envisioned by Cutter took the form of such a perspective hierarchy. Thus, as Miksa (1983a, 28) has aptly put it, "Cutter's sense of classificatory relationships is not technical in the sense in which a logician might have explained the terms involved or in the sense that modern mathematical logic might approach the same ideas. Cutter's sense of classificatory relationships appears much more akin to the common-sense logic of the man in the street".

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the book would then be placed under a heading representing a broader class than the subject of which the book treated (p. 17, s.v. "Class entry").

To Cutter's mind, the consistent application of specific entry was a *proprium* of dictionary catalogs (Cutter 1904, 19, s.v. "Dictionary and other alphabetical catalogs"; cf. 1876, 540) that distinguished them from the two other kinds of catalogs that he identified as having some vogue in the American libraries of his day: the *classed catalog* and the *alphabetico-classed catalog*. As its name implied, a classed catalog was one in which the subject headings were organized in accordance with a more-or-less "philosophical system of classes, with divisions and subdivisions arranged according to their scientific relations" (Cutter 1876, 529), with departments of knowledge, or disciplines, typically serving as their main classes. A consequence of this mode of organization was that every subject that was located below the array of main classes in the classificatory hierarchy could only be entered as a subdivision, be it proximate or distant, of the main class under which it fell: thus, for example, books on Socrates would be entered under the appropriate subdivision of the main class **PHILOSOPHY**. This entailed that, apart from books on the broadest subjects represented by the main classes, the overwhelming majority of books in a classed catalog would receive class entry (Cutter 1904, 17, s.v. "Classed catalog").

An alphabetico-classed catalog, on the other hand, represented a *via media* between classed and dictionary catalogs (Cutter 1876, 540). On one hand, it arranged subject headings in alphabetical, rather than classificatory, order: in this, it shared a feature with the dictionary catalog. On the other, it did not array all subject headings, general and specific alike, in a single alphabetical sequence as the dictionary catalog did, but subdivided broad subjects—again, typically departments of knowledge or disciplines—by the specific subjects falling under them, which were, in turn, arranged into a secondary alphabetical series (Cutter 1876, 540; 1904, 13, s.v. "Alphabetico-classed catalog"). The presence of subdivisions, which aligned the alphabetico-classed with the classed catalog (Cutter 1904, 17, s.v. "Classed catalog"), meant that only the subjects in the primary alphabetical series could be given specific entry, while all those subjects serving as subdivisions could only receive class entry. This was the primary point of distinction between the alphabetico-classed and the dictionary catalogue: As Cutter (1876, 540) put it, the "differentiae" of the former were "class entry and alphabetic order", while the "differentiae" of the latter were "specific entry and alphabetic order".

Cutter (1876, 541) considered classed and alphabetico-classed catalogs to offer advantages to certain kinds of users of the catalog, namely those "who want to make a thorough study of some specific subject" and "those who want to study fully some general class of subjects". Inasmuch as these forms of catalogs collocated related subjects under their main classes, they gave such scholarly users a means to survey readily the library's holdings not only on the immediate subject of their interest but also on hierarchically related subjects that might prove germane to their inquiries. However, Cutter believed that the classificatory—or, in the case, of alphabetico-classed catalogs, semi-classificatory—structures so helpful to such earnest and scholarly inquirers would be a stumbling block to a third class of catalog users: "desultory readers", or "those who want something quickly"

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(pp. 530, 541). In his estimation, this class of users, "the largest and loudest of our readers" (p. 540), would have neither the patience nor the intellectual inclination to negotiate the hierarchical relationships among subjects embedded in the structures of classed and alphabetico-classed catalogs: rather they would be most likely to search for specific, concrete subjects directly under the names of those subjects.[8] The relatively simple structure of the dictionary catalog—after all, as Cutter remarked, "everyone knows the alphabet" (p. 543)—and the direct access to each subject that its inclusion of all subject headings within a single alphabetical series afforded made it ideal for such users. Inasmuch as the loss of classificatory structure in the dictionary catalog could be compensated, at least in part, through the mechanism of cross-references (Cutter 1904, 79, observation to Rule 186, end; cf. Section 4 below), it was the form of catalog that could best serve the widest range of users and so was the one that Cutter selected as the basis for his system of subject cataloging.

When one considers the (ideally) flat file structure of a dictionary catalog, one may well wonder what concrete rôle, if any, the hierarchically organized category system of concrete individual, concrete general, and abstract general subjects could play within it. The answer is that the gradation of broad subject categories informed Cutter's rules for dealing with books treating of certain kinds of complex subjects. Consider, for example, a book dealing with a complex subject such as the "ornithology of New England" which is composed of two distinct subjects, "ornithology" and "New England" and so could conceivably be appropriately entered under the heading **ORNITHOLOGY** or under the heading **NEW ENGLAND**.[9] Cutter (1904, 68, Rule 164) held that, in an ideal world, "[t]he only satisfactory method" would be "double entry under the local and the scientific subject" alike. However, he conceded that such a policy would swell the size of the catalog—a not inconsiderable factor at a time when printed catalogs were still fairly common. In such cases, then, a choice had to be made. Now as Miksa (1983a, 30-35) has demonstrated, Cutter drew upon his subject category system as a guide to selecting the most appropriate heading. In consonance with the principle of specific entry, he applied the criterion of

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[8] It should be noted that Cutter's assumptions about the different needs, inclinations, and capacities of desultory readers and scholarly inquirers were strongly conditioned by Scottish Common Sense views on mental development and cultivation. These posited that, whereas all persons are capable of perception and the formation of lower-level abstractions, the more mentally developed and cultivated a person is, the greater a capacity for abstraction and a knowledge of, and appreciation for, classificatory relationships he or she possesses. Such a view of mental cultivation, of course, dovetailed with Cutter's schema of a gradation between concrete individual subjects (≈ the immediate objects of perception), concrete general subjects (≈ concepts formed by abstraction situated in the lower and middle reaches of a classificatory hierarchy) and abstract general subjects (≈ concepts formed by abstraction situated in the higher reaches of a classificatory hierarchy). For exemplarily thorough and lucid discussions of Cutter's user categories and their intellectual background, see Miksa 1977, 36–37, 54–55; 1983a, 41-44, 72–86; 1983b, 114–117.

[9] This example is taken from Cutter 1904, 68, observation to Rule 165, who cited "Flagg's 'Birds and Seasons of New England'" as a book on the ornithology of New England.

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selection based upon "the order of significance that he attached to subjects" (p. 31). According to this "significance order", 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 (pp. 31-35). Thus, for example, a book on the subject of ornithology of New England would be entered under **NEW ENGLAND** because New England, a uniquely determinate geographical region located in the Northeastern United States, is a concrete individual subject and so takes precedence over ornithology, which, as the department of knowledge pertaining to birds, is an abstract general subject: as Cutter (1904, 68, observation to Rule 165) put it, "the dictionary catalog in choosing between a class [sci., a concrete general or an abstract general subject—TMD] and an individual [sci., a concrete individual subject—TMD] chooses the latter".[10]

Although Cutter did not further discuss the mechanism of significance order in the *RDC*, several of his other rules for cataloging were implicitly based upon it (Miksa 1983a, 127–131 & 132–133, Figure 8). What is more, examples from the Boston Athenaeum catalog, which he was compiling at a time when he was developing the rules set down in the *RDC*, show that he applied the rules for significance order in his own cataloging practice (Miksa 1983a, 47–49). For example, in the fourth volume of that catalog, we find a book on "Poisons in relation to medical jurisprudence and medicine" entered under **POISON** rather than **MEDICINE** or **MEDICAL JURISPRUDENCE** (Catalogue of the Library of the Boston Athenaeum, 1880, Vol. 4, 2386a) and an essay on the "natural history of parrots" entered under **PARROT** rather than **NATURAL HISTORY** (p. 2256a). Now poison and parrots are concrete general subjects whereas medicine, medical jurisprudence, and natural history are abstract general ones; thus, Cutter's choice of subject headings for the former rather than those for the latter as the headings under which those books were entered implicitly followed the rules of precedence set down by his significance order.

From a practical point of view, Cutter's use of a significance order for subjects as a decision tree for determining which element of a complex subject was the most concrete— and hence the most specific—was not without limitations. For example, if the competing elements in a single complex subject belonged to one subject category—i.e., both were concrete individual or abstract general subjects—, then a decision had to be made on the basis of which of the two subjects seemed to preponderate in the book in hand (Cutter 1904, 67, Rule 162 & 69, Rule 166; cf. Miksa 1983a, 33, Figure 2, nos. 4, 6, 7; 130, 132, Figure 8, Section II). Yet, despite such limitations, Cutter's significance order is of considerable theoretical interest for two reasons. First, insofar as it established an order of precedence among elements of a complex subject on the basis of their membership in a category, it is highly reminiscent of the principle of citation order that governs the sequence of terms in

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[10] On the distinction between "classes" as a catchall term for concrete and abstract general subjects, see Cutter 1904, 17, s.v. "Class", end: "[G]eneral subjects [are] classes and the classes [are] subjects, but the individual subjects never [are] classes".

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complex subject strings within faceted classifications and indexing systems (Broughton 2004, 10, 271–275, 296, s.v. "citation order"; Svenonius 2000, 184–187; cf. Miksa 1983a, 31). To be sure, there are crucial differences between the two: whereas Cutter employed his significance order as a criterion for selecting which of two elements in a complex subject would serve as the basis for the subject heading under which books treating of the subject would be entered, designers of faceted indexing languages use them to synthesize compound index terms that then serve as headings. Nevertheless, insofar as significance order in Cutter's subject cataloging system and citation order in faceted systems are both founded on the notion of an order of precedence among the categories forming part of a category system, the former can, perhaps, be considered as a precursor to the latter. Interestingly, Cutter's use of significance order as a means of choosing among different candidates for assigning a subject heading to a book represents a use of categories that would not be taken up by contemporary and later theorists of the categorial approach to KO, who would pursue the path of index-term synthesis instead (cf. Svenonius 2000, 173–175).

The significance order limned by Cutter possesses theoretical significance not only because it prefigures the categorial approach to KO but also because the categorial system that it embodied informed his own conceptualization of the dictionary catalog. This system formed the indispensible background to his notion of specific entry, which, as we have seen, was predicated on a direct correlation between degrees of specificity and concreteness. Moreover, the distinction between individual and general subjects, which was central to the category system, deeply colored Cutter's view of the ideal structure of a dictionary catalog. In his eyes, a cardinal difference between dictionary and alphabetico-classed catalogs was that the former permitted entry under the names of individual subjects and the latter did not: as he put it, "the alphabetico-classed catalog enters a life of Napoleon and a history of England under **BIOGRAPHY** and **HISTORY**; the dictionary enters them under **NAPOLEON** and **ENGLAND**. This is the invariable and chief distinction between the two" (Cutter 1904, 19, s.v. "Dictionary and other alphabetical catalogs"). Of these two different approaches to the treatment of individual subjects, he strongly preferred that of the dictionary catalog, declaring himself to be a partisan of "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, [iv], n. * [emphasis his]).[11] Underlying this assertion of ideals was the idea that a distinction was to be drawn between concrete individual subjects (i.e., "what relates to a thing, a country, a period") and general subjects (i.e. "a class or form such as Geography, History") and that the former were to be given precedence over the latter—that is to say, the very idea exemplified in significance order. It

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[11] It is noteworthy that, already in a discussion of alphabetico-classed catalogs that he presented in the course of an extensive survey of contemporary cataloging practice published in the same year as the first edition of the *RDC*, Cutter (1876, 539, 545–546) singled out for praise those catalogs that deviated from the norm and allowed direct entry for individual countries and persons.

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is thus apparent that Cutter's category system and its significance order underpinned what he took to be key design features of the dictionary catalog.

4. Cross-References and the Categorial Approach in the *RDC*

Intimations of a categorial approach in the *RDC* were not confined to the system of subject categories that we have considered above. A somewhat different manifestation of such an approach can also be found in Cutter's treatment of cross-references. As we have already noted in the Section 3, an important structural consequence of the strictly alphabetical arrangement of subject headings in the dictionary catalog was the lack of any indication of the classificatory relationships among subjects. This, in Cutter's eyes, entailed the atomization of the universe of subjects in the dictionary catalog; as he eloquently put it, such a catalog's "subject-entries, individual, general, limited, extensive, thrown together without any logical arrangement in most absurd proximity … are a mass of utterly disconnected particles without any relation to one another, each useful in itself but only by itself" (Cutter 1904, 79). Cutter's solution for coping with the semantic formlessness of alphabetical arrangement was to institute "well-devised net-work of cross-references" whereby "the mob becomes an army, of which each part is capable of assisting many other parts" (p. 79). The system of cross-references that he envisioned was primarily (though not exclusively) a hierarchical one in which references were to be made from "the most comprehensive subject to those of the next lower degree of comprehensiveness, and from each of these to their subordinate subjects" (p. 23, s.v. "Syndetic"; cf. p. 79, observation to Rule 187). The result of this would be "a pyramid of references" running from the most general subjects down to the most specific ones (p. 79, observation to Rule 187).[12] Because cross-references served as a means of "bind[ing] … together" the entries of a dictionary catalog "so as to form a whole", Cutter designated dictionary catalogs possessing them as "syndetic"—that is to say, "connective"[13]—catalogs (Cutter 1904, s.v. "Syndetic"; cf. 1876, 536, n. 1).

Now many subject headings in a syndetic dictionary catalog would need only a few cross-references. However, Cutter recognized that some subjects might require a fairly large number thereof and so in cases "where there are many cross-references", he counseled the cataloger to "classify them" (Cutter 1904, 125, Rule 342). To illustrate what such a classification might look like, he gave the following example (p. 125, observation to Rule 342):

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[12] Although Cutter thought that, ideally, references should also be made upwards from more specific subjects to more general ones, he considered the number of possible upward references to be too multitudinous to be easily captured by catalogers: in his estimation, "it is out of the question to make all possible references of the ascending kind (Cutter 1904, 80, observation to Rule 188). Accordingly, he contented himself with counseling catalogers to "[m]ake references occasionally from specific to general subjects" (p. 80, Rule 188).

[13] The term "syndetic" derives from the Greek adjective συνδετικός "conjunctive, connective", a formation from the verb συνδέω "to bind or tie together" (Liddell & Scott 1990, 1701b, s..v.).

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Ex. **ARCHITECTURE**. *See also* **ARCHES**; —**BATHS**; —**BRIDGES**; —**CATHEDRALS**; —
    FONTS;—[and many other things built];
   also **CARPENTRY**; —**DRAWING**; —**METAL-WORK**; —**PAINTING**; —[and many
    other means or methods of building];
   also **ATHENS**; —**BERLIN**; —**BOSTON**; —**MILAN**; —**ROME**; —**VENICE**; —**VER-**
    ONA; —[and many other cities whose buildings are described]
   also **ARABIA**; —**ASSYRIA**; —**EGYPT**; —**FRANCE**; —**GREECE**; —**INDIA**; —**ITALY**;—
    [and many other countries whose architecture is described];

The structure of this sample classification deserves attention, for it is of considerable theoretical interest. The subject heading in question is **ARCHITECTURE**, which represents an abstract general subject, namely, the domain of human activity concerned with the design and construction of buildings. This domain, in turn, is related to four broad classes of subjects with which it is to be related by means of cross-references—"things built", "means and methods of building", "cities whose buildings are described", and "countries whose architecture is described"—each of which, in turn, contains numerous subjects expressed as headings to which reference is made. Each of these classes can be characterized in terms of Cutter's categories: the subjects falling under the class of "things built" are concrete general in nature; those under "means and method of building" are primarily abstract general, while the cities and the countries, of course, represent concrete individual subjects. More significantly, perhaps, these four classes can themselves be inter-preted as categories of subjects pertaining to the domain of architecture: "things built" represent the *products* of architectural processes; "means and methods of building" seem to encompass primarily the various *processes* involved in the making of these products; while the cities and countries represent *places* and *areas* in which the products of architectural processes are situated. Viewed in this light, the structure of Cutter's sample classification of cross-references for **ARCHITECTURE** bears an uncanny resemblance to the ideal form of a faceted classification in which a given domain of knowledge is divided into a series of categories, under which the various terms representing concepts are placed (e.g., Stock & Stock 2008, 273).

    To be sure, one should not press the foregoing comparison too far. In the passage in question and, indeed, throughout the *RDC*, Cutter did not speak in terms of categories but rather invoked the more traditional language of classes.[14] Furthermore, he did not attach

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[14] In this, his manner of speech was comparable to that of his younger contemporary Kaiser, who, in his writings on the much more thoroughgoingly category-based method of Systematic Indexing, likewise used the term "classes" rather than "categories" (Dousa 2013, 373, n. 325). Failure to speak of categories does not, of course, preclude the *de facto* use of categories in the design of a KOS. However, it does indicate that the designer is not operating with an *explicit* theory of categories of the sort that later proponents of facet analysis would invoke for the design of faceted classifications and indexing languages.

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any special significance to the mode of classification in the example. He presented it as an illustration of a rather general point—to wit, that, if a subject heading has many cross-references, these should be classified—and did not comment further on the manner in which the classification had been carried out. Thus, it is evident that Cutter's division of subjects allied with architecture into facet-like categories was not rooted in an explicitly articulated proto-theory of facet analysis. Indeed, he does not seem to have been aware of the theoretical potential of the kind of category-based classificatory structure that it exemplified. Nevertheless, the fact remains that the structure of the sample classification does reflect an *implicitly* category-based approach to classification and that it prefigures some of the basic lineaments of later facet-based classificatory structures. Here, it seems, Cutter built better than he knew.

5. Categories and Class Synthesis in the EC

Having examined the use of categories in the *RDC*, let us now consider briefly the categorial aspects of the other major subject access system that Cutter created, the EC. This bibliographical shelf classification derived its name from the fact that it consisted of "seven tables of classification of progressive fullness designed to meet the needs of a library at its successive stages of growth" (Cutter 1898, 84). The size and complexity of the schedules increased with each table in the series, the notation of each new schedule being correlated to that of its predecessors in the series so as to obviate the need for reclassification. Thus, as Cutter put it,

> 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).

By and large, the EC embodied the standard elements of design for bibliographical classifications of its time: that is to say, it was an enumerative scheme that took the broad departments of knowledge, or disciplines, as its main classes. The classes for the subjects listed in its schedules, the sequence of which followed what Cutter (1897, 198; 1898, 86; 1899, 86) claimed to be an evolutionary order (cf., however, Dousa 2009, 80–83), were expressed by means of a notation composed of the letters of the Roman alphabet (Cutter 1891–1893, 7; 1897, 196; 1898, 84). For example, in the sixth expansion of the schedules, "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]xtractive 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).

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Alongside the tables for general subjects, the EC included two lists, a short one of bibliographical forms and another, more extensive one enumerating geographical regions, continents, and countries (Cutter 1891–1893, 7, 8, 130). The list of forms corresponded to the mnemonic series of form subdivisions that Melvil Dewey (1876, 5) had built into the schedules of his Decimal Classification (DC) and later elaborated into a separate table (1891, 580, Table 2). Cutter (1891–1893, 130; 1899, 43) considered this list to have a fairly circumscribed role within the EC and accorded it minimal attention. By contrast, he lavished considerable care on the elaboration of the list of geographical entities, which he dubbed the "Local List" (Cutter 1891–1893, 8). This list bore some analogy to the series of mnemonic class numbers for geographical places that Dewey (1876, 5; 1891, 15–16, 29) had incorporated into several sectors of the DC—in particular, those dealing with philology, literature, history, and geography (Dousa 2013, 453–455; Smiraglia, Van den Heuvel, & Dousa 2011, 32–34). However, unlike Dewey's mnemonic series, which were firmly embedded within the Decimal classification's schedules for general subjects and so limited to certain main classes (Dousa 2013, 455–456; Smiraglia, Van den Heuvel, & Dousa 2011, 34), Cutter's Local List constituted an auxiliary table distinct from the tables for general subjects (Cutter 1891–1893, "Local List"). In this respect, the EC was formally divided into two broad categories of classes—those for the *Subjects* listed in the main schedules and those for the *Places* given in the Local List—or, if one includes the list of forms, three categories: *Subjects*, *Places*, and *Forms* (Cutter 1891–1893, 7; Vickery 1958, 13).

The distinction between Subjects, Places, and Forms found notational expression in the EC. In his fullest exposition of the classification, Cutter (1891–1893, 7–8, 10, 160) considered no fewer than three alternative systems of notation for the Local List. However, the one that he favored and that he came to espouse in his other published accounts of the classification scheme 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 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, and "896" for Illinois. The numbers between 1 and 9, on the other hand, were reserved for members of the list of bibliographical forms, wherein, for example, "2" indicated bibliographies; "5", dictionaries, and "7", periodicals (Cutter, 1891–1893, 130). The use of two or more numerical digits to designate members of the Local List distinguished them sharply both from the subjects given in the main schedules, which, as we have just seen, were symbolized by means of letters, and from the members of the list of forms, which were represented by means of single digits. In this respect, the EC differed sharply from Dewey's DC, in which numerical digits served as the notation for all subjects, including those that fell within the mnemonic series of class numbers associated with particular forms and localities. Cutter (1897, 197; 1898, 85), who considered the DC to be the primary competitor to the EC in the hearts and minds of contemporary librarians, set great store by the notational distinctions that he had built into

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his classification, touting them as a "unique" and "original" feature thereof. Laying particular emphasis upon the difference between the notational treatment of subjects and places, he averred that, in his system, "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 1897, 197; 1898, 85)—a point not lost on other contemporary commentators (e.g., Kaiser 1911, § 277).

An important consequence of the notational distinction between subjects and places was that classifiers had somewhat greater latitude in using geographical entities in the EC than in the DC and other traditional bibliographic classification. 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 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 that specified the classes to which elements from the Local List could be applied. The upshot of this was that, for all practical purposes, the classifier could use geographical subjects as elements of subdivision only in certain sectors of the classification. In this, the EC imposed limitations on the classifier comparable, in their effect, to those imposed upon users of the DC, which, as noted earlier, restricted its mnemonic class numbers for countries to certain portions of the classification.

It was the second use of the Local List that enlarged the classificatory possibilities of the EC. This use, which Cutter (1891–1893, "Subject divisions under countries", 1; 1899, 48–49) expected to occur 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 Subjects from the main tables. Thus, for example, if one wished to collocate books dealing with England, one could simply invert the class-marks cited earlier in the previous 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; as he put it,

> 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 not merely Language and Literature, but also Art, Commerce, Geography, History, Law, the Natural sciences, the

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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 placed great 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). 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* (cf. Cutter, in A Committee of the American Library Association 1895, [iv], n. * [emphasis his]; Cutter 1904, 68, observation to Rule 165; 127; Section 6 below).

Viewed from the perspective of the categorial approach, the uses for the Local List outlined by Cutter are noteworthy because they entailed a simple form of category-based class synthesis. Founded on a distinction between two categories—those of Subject and Place—, they involved the combination of these categories into two sequences: Subject–Place and Place–Subject. The capacity for such combination was rendered possible by the formal separation of Subjects and Places into a main schedule and an auxiliary table, respectively, by the differential notation assigned to each and, by the stipulation of the syntactical rule that, within a given classmark, Subjects could be preceded by Countries or, conversely, Countries could be preceded by Subjects, depending upon the needs of a given library. The broad categorial structure of the classification was thus fully immanent in, and expressed through, its notational system. In this respect, the EC may be said to have marked a step, however rudimentary, in the direction of the categorial approach. It would soon be overtaken by others: within a decade and a half of its appearance, other bibliographical systems with more elaborate structures and facilities for class synthesis would emerge, such as Otlet's UDC (Smiraglia, Van den Heuvel, & Dousa 2011, 34–36; Dousa 2013, 456–459) and Brown's SC (Beghtol 2004, 708–711; Dousa 2013, 463–466). Compared to these KOSs, the EC's use of categories and class synthesis may seem elementary. However, its simplicity in this regard does not vitiate, and should not obscure, its place among the precursors of the categorial approach to the number of which it decidedly belongs.

6. Conclusion

In the foregoing pages, we have considered the rôle of categories in two historically important subject access systems elaborated by Charles Ammi Cutter: the model of the dictionary catalog set forth in the *RDC* and the bibliographical classification known as the EC. Our survey has shown that, although Cutter did not develop an explicit theory of categories in his writings, categories played a significant part in the design of both of these KOSs. Let us briefly sum up the results.

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In the *RDC*, Cutter made use of categories derived from contemporary philosophical psychology and logic—those of concrete individual, concrete general, and abstract general notions—as a framework for structuring the universe of subjects according to a scale of abstraction extending from the most concrete and specific to the most abstract and general. The model of the universe of subjects that he envisioned was a classificatory one, in which concrete individual subjects—the most specific subjects of all—were included within concrete general subjects, which, in turn, were included within abstract general subjects— the most general subjects of all (Section 2 above). This hierarchical structure served as the implicit backdrop against which Cutter developed his principle of specific entry. We have also seen that, in developing guidelines for dealing with books treating of complex subjects involving two or more simple subjects, Cutter drew upon the three categories to decide under which heading the book should be entered. To choose between different candidate terms, he employed a "significance order", according to which concrete specific terms were always to be accorded precedence over concrete general terms and concrete general terms over abstract general ones (Section 3 above). Although closely akin to citation order as understood in facet analysis, significance order differed from it in that it functioned not as a syntactic template to create compound index terms, but rather as a decision tree for selecting the most specific subject from several candidate "simple" subjects. This con- stituted a deeply innovative early use of categories, albeit one that would not be taken up by later theorists of facet analysis.

Cutter's general category system and its rôle in determining significance order was the primary practical manifestation of a categorial approach in the *RDC*. However, it was not the only one. As have seen, in his discussion of a rule to classify cross-references if they were numerous, Cutter set out an example of classification that related the subject heading **ARCHITECTURE** to other subject headings, which were grouped into classes for "things built" (i.e., the products of architecture) "the means and methods of building" (i.e. the processes of architecture), and countries and cities in which buildings are located (i.e., geographical locations) (Section 4 above). Insofar as this classification related a subject heading for a given domain to semantically related groups of subject headings pertaining to this domain, its conceptual structure bore a close resemblance to what would later come to be known as faceted classifications. It is important to note that Cutter did not comment on the categorial nature of the classification's structure but simply instantiated it in his example: his use of categories here, as elsewhere in the *RDC*, was implicit and was not intended to illustrate a distinctively categorial approach to KO, even though, with historical hindsight, it is readily apparent that, in fact, it did embody such an approach.

A categorial approach also figured prominently in the EC, though there the categories took a somewhat different form. As we have seen, Cutter established three different tables for his classification: the main schedules for subjects; an auxiliary table for places to which he gave the name of Local List; and a short list of bibliographical forms (Section 5 above). He also distinguished subjects, places, and forms notationally: subjects were expressed by letters (or combinations of letters) of the Roman alphabet; geographical entities, by combinations of two or more Arabic numerals; and forms, by the single digits from 1 to 9.

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In brief, Cutter established three categories of elements that might be incorporated into the designation of a class in the EC. Revealingly, he discussed these categories primarily through the prism of notation, as components of the class-marks of books (Cutter 1891–1893, 7; cf. 1899, 43). Cutter also established conventions for combining the elements from the different tables with one another, especially with regard to the main schedules of subjects and the Local List. He stipulated that, within limits, subjects could be subdivided by places while places could be freely subdivided by subjects: this meant that, if one wished to collocate books by subject, classmarks could take the form Subject-Place (e.g., "F45" = "History of England") whereas if one wished to collocate books by country, classmarks would take the form Place–Subject (e.g., "45F" = "English history"). In other words, Cutter incorporated conventions of class synthesis into the EC, prefiguring what would become a fully theorized practice in the facet-analytic tradition.

Such, then, were the forms of categorial approach that Cutter used in his subject access systems. At first blush, it may seem that there was a gulf between the categorial system in the *RDC* and that of the EC, for the former had to do primarily with the articulation of the universe of subjects and was concerned primarily with the selection of specific subject headings, while the latter dealt with the relations between subjects, places, and forms, and concerned itself primarily with the formation of class-marks made of elements from different categories. However, there was an important point of convergence between the two. As we have already noted, the categorial system of the *RDC* served as the conceptual framework within which Cutter developed the principle of specific entry. One aspect of this principle upon which he laid considerable stress was that of favoring concrete individual subjects over more general subjects as points of entry: this approach to cataloging, we have seen, he called "concrete cataloging" (Section 3, end, above). A consequence of Cutter's adherence to concrete cataloging was that he favored the entry of books on subjects involving countries under subject headings for the country involved rather than under the subject heading for the general subject connected to the country: in his words,

> 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 (Cutter 1904, 127).

Now the very same principle animated the provisions that Cutter made for collocating books under countries in the EC through the use of classmarks of the form Place-Country. In fact, as observed earlier, Cutter viewed such "classification by countries" as a core component of what he considered to be "a tendency towards the concrete and the individual" in the EC (Cutter 1899, 48, 47; Section 5 above). It is thus evident that the theoretical ideal of privileging the concrete over the abstract and its practical expression in encouraging "national classification" or "classification by country" enjoyed a prominent place in Cutter's design of the *RDC* and the EC. This betokens a profound unity of vision in his approach to KO.

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In conclusion, there can be little doubt that the discussion of the prehistory of the facet-analytic tradition, which has hitherto tended to focus on the figures of Otlet, Brown, and Kaiser (Section 1, above), must be revised and expanded to include Cutter among the ranks of KO pioneers who developed a categorial approach to KO. To be sure, he did not articulate a full-blown theory of categories and, to judge by his writings, he does not seem to have contemplated the possibility of doing so. Rather, like the other major pioneers of KO of his time, he developed categorial structures organically in the course of the practical work of designing KOSs. Miksa (1992, 110) has observed that the achievements of library classificationists in "the period up to World War I" included the initiation of "the development of devices that would accommodate special book characteristics, including form and geographical subdivision practices and the beginnings of provisions for compound and complex subjects", as well as the creation of "notations for the categories" and experimentation "with different degrees of expressiveness, hospitality, and synthesis". These germinal efforts in KOS design provided the preconditions for the later development of a full-blown categorial approach to KO in the guise of facet-analytic theory; it is evident Cutter's subject access systems made a substantial contribution to the formation of these preconditions.

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