Exploring New Approaches to the Organization of Knowledge: The Subject Classification of James Duff Brown

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Abstract

James Duff Brown was an influential and energetic librarian in Great Britain in the late nineteenth and early twentieth centuries. His Subject Classification has characteristics that were unusual and idiosyncratic during his own time, but his work deserves recognition as one of the precursors of modern bibliographic classification systems. This article discusses a number of theories and classification practices that Brown developed. In particular, it investigates his views on the order of main classes, on the phenomenon of "concrete" subjects, and on the need for synthesized notations. It traces these ideas briefly into the future through the work of S. R. Ranganathan, the Classification Research Group, and the second edition of the Bliss Bibliographic Classification system. It concludes that Brown's work warrants further study for the light it may shed on current classification theory and practice.

Introduction and Background

Any research field is enhanced by inquiring into its intellectual history and background, both by increasing our comprehension of the past and by refining our understanding of the activities of the present. The creation of present from past is both linear and cyclical: linear because of the passage of time and cyclical because of the potential for rediscovering ideas that were not recognized as seminal in their own time. Deepening our understanding of the past can thus help us discover practices and trends that came to fruition only in what would be the future for their original creators. This article concentrates on the thought and work of James Duff Brown (1862–1914) in his writings and in his Subject Classification

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(SC).[1] Specifically, it emphasizes Brown's recognition of the importance of the complicated interrelationships among subjects and the need for composite and interdisciplinary subject access, and it describes his invention of technical methods of achieving certain kinds of interdisciplinary subject specification. These ideas and methods were unusual in his day, and their idiosyncrasies and faults make them unlikely to be adopted now, but Brown's thinking about the prevalence of the complicated and varied interconnections among topics and disciplines gives him a strong claim to the respect of later classification theorists and classificationists. As McGarry suggested, the "creditors of our profession" might not have expressed their ideas in the terms we would use now, but the "embryonic ideas are there," awaiting rediscovery (1991, p. 45). On this basis, Brown can clearly claim to be one of the creditors of our profession.

Interdisciplinarity was not an accepted or even well-known concept in the intellectual world of librarianship in the late nineteenth and early twentieth centuries.[2] Indeed, only fairly recently has the concept begun to be studied in its own right and to be advocated as an end in itself (Dogan and Pahre, 1990). Modern classification researchers and classificationists have suggested various terms for the ways in which disciplines can be combined and connected. For example, Dahlberg (1994) considered cross-disciplinarity to contain four subgroups: interdisciplinarity, transdisciplinarity, pluridisciplinarity, and syndisciplinarity. Earlier, S. R. Ranganathan had enumerated eleven methods that could be used to combine subjects: loose assemblage (two types); lamination (two types); fission; dissection; denudation; fusion; distillation; clustering/subject bundle; and agglomeration/partial comprehension (Binwal, 1992). The problems these kinds of scholarly research and activities (however they may be defined) pose for modern general bibliographic classification systems are described in Beghtol 1998. The same kinds of problems existed, although to a lesser extent, in Brown's time. With the exception of the Universal Decimal Classification (UDC), however, these problems were not commonly recognized or provided for in bibliographic classification systems.[3] Thus, Brown's thought on the issues these kinds of works created for classification in libraries is important, and his views and the techniques he invented to deal with these kinds of documents warrant study.

Brown's Career in Librarianship

James Duff Brown was born in Edinburgh, Scotland, and completed his formal schooling when he was twelve or thirteen. After finishing school, he became something of an autodidact who read widely, particularly on librarianship, music, and literature. He worked for publishers and booksellers until he began library work as a junior assistant in the Mitchell Library, Glasgow. In 1888 he moved to the Clerkenwell Public Library in North London. From this position, he gained considerable influence and prestige

in the world of libraries and librarianship in late nineteenth-century Great Britain.

Like other influential librarians such as Melvil Dewey in Brown's own time and later S. R. Ranganathan, Brown was energetic, committed, and intensely interested in all aspects of libraries and librarianship. For example, his *Handbook of Library Appliances* (1892) described his and others' new inventions for library equipment, and his *Manual of Library Classification and Shelf Arrangement* (1898) is reputed to be the first book on classification read by W. C. Berwick Sayers (Malhan, 1978, p. 54).[4] In 1906, the same year Brown published the first edition of SC, he was also able to produce *A Manual of Practical Bibliography* (1906a). The second edition of SC identified Brown as the "Author of 'Manual of Library Economy'; 'Library Classification and Cataloguing'; 'Biographical Dictionary of Musicians'; 'Characteristic Songs and Dances of all Nations', etc., etc." (1914, title page).[5]

In addition to his writings on these varied topics, Brown founded a school of library architecture, designed the interior layout of the Clerkenwell Public Library,[6] set and marked Library Association examinations for aspiring librarians, founded the Pseudonym Dining Club in Clerkenwell, and started the journal *Library World: A Medium of Intercommunication for Librarians* in 1898.[7] He was active in the Library Association and in other professional associations until his death. He was one of the chief advocates of open access to the stacks for patrons in public libraries, and, like Dewey and Ranganathan, he strongly advocated the classified catalogue as the best method for helping library patrons find the materials they needed. Brown had strong views on every subject in which he took an interest. Through these wide-ranging activities and publications, he became one of the foremost and most highly respected librarians of his age.

The Subject Classification

According to Sayers (1967, p. 166), Brown's interest in library classification may have resulted from his realization that systematic classified arrangement would enhance the success of open access to library materials by patrons, for which Brown fought unstintingly.[8] Brown's first foray into library classification occurred in partnership with J. Henry Quinn, his assistant at Clerkenwell. Together, they wrote the Quinn-Brown scheme (1894), but that effort was quickly shown to be inadequate.[9] Brown revised Quinn-Brown as the *Adjustable Classification* (1898), but, according to Sayers, this "title, alas, is a misnomer"(1967, p. 137) because the *Adjustable Classification* was not, in fact, adjustable.[10] The first edition of SC appeared in 1906, the second edition was published in 1914 before Brown's death, and the third was published in 1939 by Brown's nephew, J. D. Stewart. Except for some expansions and additions, the three editions of SC are essentially the same, and Brown's introduction to the second edition was reproduced verbatim in the third. The first edition was reviewed more favorably in Great

Britain (e.g., T. W. L., 1906) than it was in the United States, but even there it was considered "a welcome addition to the literature of classification" (Bishop, 1906, p. 838). Excellent detailed descriptions of the whole of SC are available in, for example, Mills (1964) and Sayers (1967). This article concentrates only on those aspects of SC that give it some claim to current study and only a cursory discussion of the rest of the scheme is provided.

Subject Classification: Theory and Analysis of Document Topics

Brown's view of classification theory was based on his opinion that classifications of knowledge were developed by thinkers who inevitably placed their own "pet subject of study in the forefront of the sequence" of the classes of knowledge (1914, p. 7).[11] As a result, Brown believed, no classification could be permanent or useful for everyone and all classifications of knowledge are therefore failures to some extent. In his opinion,

> There are dozens of rational systems to choose from, each capable of infinite adjustment to suit the views, or knowledge, or the want of it, possessed by the librarian. The system of Francis Bacon, dating from 1623, can be made just as elastic and comprehensive as the more elaborate and modern systems of Edwards, the British Museum, Dewey, Cutter, Perkins, Fletcher, or Sonnenschein. There is not the slightest difficulty in working out a complete scheme from any basis, nor does it matter much into what main divisions specific subjects are put, provided always they are kept together on the shelves. (1897, p. 149)[12]

For his own classification, Brown divided the general outline of knowledge into a sequence of classes that were meant to represent—after Generalia (Class A)—Matter and Force (Classes B–D), Life (Classes E–I), Mind (J–L), and Record (M–X) as follows:

A	Generalia
B C D	Physical Science
E F	Biological Science
G H	Ethnological and Medical Science
I	Economic Biology and Domestic Arts
J K	Philosophy and Religion
L	Social and Political Science
M	Language and Literature
N	Literary Forms
O–W	History, Geography
X	Biography

This order, Brown claimed, was "a logical order, or at any rate, according to a progression for which reasons, weak or strong, can be advanced"(1914, p. 11). The rather odd wording of this rationale for main class order indicates Brown's views on the variability and impermanence of classifications of knowledge. Huckaby (1972, p. 101) derived this outline from Comte, and Sayers considered it "evolutionary" in the sense of a "progression from simple to complex things" (1967, p. 171). But Brown himself had an off-

hand attitude toward this main order on the basis of his belief, quoted above, that any order of main classes could be made into an acceptable classification system.

Brown believed that all subjects arose from a specific source and should not be divided into "purely artificial divisions [such as that between the pure and the applied sciences] because tradition or custom has apparently sanctioned such usage"(1914, p. 11). The opinion that using traditional categories and academic disciplines as the basis for a bibliographic classification system was a mistake indicated Brown's belief that the Dewey Decimal Classification (DDC), which was the major system used in Great Britain and the United States at the time, was unsuitable for British libraries.[13] Brown objected to the sharp distinction between theory and practice on which DDC and other classification systems relied because that distinction is "gradually disappearing from all modern text-books" (1914, p. 11). The SC, therefore, is designed so that the applications of a science follow that science in the schedules and a science and its technology(ies) are thus shelved together.

In cases where a scientific theory gave rise to more than one technology, Brown explained, "composite applications of theory have been placed with the nearest related group which would take them without strain" (1914, p. 11). Brown's phrase "composite applications of theory" has no examples attached to it, but the idea that the applications of a science can be "composites" is one indication of Brown's understanding of the complex relationships that may arise among different subjects. In his view,

> The departments of human knowledge are so numerous, their intersections so great, their changes so frequent, and their variety so confusing, that it is impossible to show that they proceed from one source or germ, or that they can be arranged so that each enquirer will find the complete literature of his subject at one fixed place. Subjects overlap and qualify each other in every conceivable manner, and they are further complicated by considerations of literary form and the points of view from which they may be studied. Every 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. (1914, p. 8)

Brown's conviction that knowledge could combine and recombine in innumerable ways was unusual in his age. He was aware that his decisions to place a science and its applications together and to make other departures from classificatory convention might invite criticism, and this realization led him to point out that some provisions "may at first sight appear a little drastic. The alliance of Architecture and Building, Acoustics and Music, Physical electricity and Electrical Engineering, and other groupings of a similar kind are departures from the convention" (1914, p. 11).

This reasoning led Brown to ask, "is it better to assemble at a specific

place, or at a more general place, the literature of a concrete subject?" (1914, p. 8). His answer to this question was that "in book classification, the constant or concrete subject should be preferred to the more general standpoint or occasional subject" (1914, p. 9). Using the example of the Rose as a concrete subject, he pointed out that the Rose could be considered from such different standpoints as "Biological, Botanical, Horticultural, Historical, Geographical, Ethical, Decorative, Legal, Emblematical, Bibliographical, Poetical, Musical, Sociological, and so on to any extent" (1914, p. 8).

In addition, he demonstrated the scatter that would result if, to use his example, a book entitled "The Bibliography of the Rose" were placed under Bibliography or Biology. In contrast, he preferred Rose to be at a constant place subdivided by, for example, Bibliography, Periodicals, History. Similarly, at E917 for Coffee "must be collected everything related to coffee, regardless of standpoint, form or other qualification . . . but it must not be put under such headings as Tropical Agriculture, Beverages, Crops, Foods, Drugs, Ethics, Bibliography, Customs, or any other general head" (1914, p. 20). Likewise,

> Such special works as books on the architecture of libraries, churches, slaughter-houses, barracks, hospitals, baths, etc., have therefore no special right to be arbitrarily placed under the general class of architecture, but should be put with their actual subjects, where they would be in comparatively constant demand, and close to all relative aspects of this topic. (1914, p. 10)

These discussions are reminiscent of Cutter's Rule 161 for the dictionary catalogue, which contained the admonition "Put Lady Cust's book on 'The cat' under **Cat,** not under **Zoölogy** or **Mammals,** or **Domestic animals**" (Cutter, 1904, p. 66, boldface in the original).

These views meant that Brown advocated a "one place" classification, in which every concrete subject had only one constant place and would subsequently be subdivided by its various aspects. He did not define a concrete subject, and the term seems to mean somewhat different things in different places. Nevertheless, Brown bowed to current practice to the extent of suggesting that someone who wanted to take a more conventional route could achieve the conventional collocation by synthesizing notations (described more fully below). In addition, Brown was not always successful in implementing these ideas in the SC, and scattering of a topic inevitably appears in SC as it does in all other bibliographic classifications.

Brown's view of classification, then, did not depend on philosophy, the conventional view of how subjects occur in recorded documents (literary warrant), how documents had previously been classified in other systems, or how scholars and educators viewed their subjects (consensus). Instead, he saw the world of knowledge as relatively impermanent, flexible, and

changeable depending on what topic was placed at the forefront of one's interest at the moment. The future importance of these kinds of ideas was not, of course, recognized by Brown or his contemporaries, and they were not always well received. Still, more criticism arose because of the placement of specific subjects than because of Brown's views about classification in general. For example, Foskett found that grouping sciences with their technologies seemed useful, although somewhat controversial, but that "linking music and acoustics, horseracing and zoology . . . is clearly unhelpful" (1981, p. 179). Nevertheless, the general concept of interdisciplinarity can be discerned in Brown's discussion of the phenomenon of scatter that arose from the placement of a concrete subject in different classes and in his views on the need for the ability to combine and recombine topics as they occurred in specific documents.

Subject Classification: Methods and Techniques for Synthesis

Despite his view that each concrete subject should have one constant place, Brown was well aware that different subjects might need to be combined with each other and that provision would also need to be made for new topics. For these reasons, he preferred a mixed notation because the alphabet provided a large notational base and thus would be more flexible and more hospitable than a pure notation. It is unnecessary to describe the notation fully here, and I will discuss only those notational devices that allowed SC to notate composite and interdisciplinary topics. Three of these devices are discussed below: (1) synthesis of notations from the same main class (intraclass synthesis); (2) synthesis of notations from different main classes (interclass synthesis); and (3) synthesis involving the use of the Categorical Table.

Intraclass Synthesis Notations from different parts of the same main class and its subclasses can be built up by using the plus (+) sign between numbers, and in some cases this device is suggested in the schedules. For example, A639 is the number for Landscape Painting, and the schedules direct one to "Divide by Methods and Mediums." This instruction allows one to notate Landscape Painting in Water Colours as A639 + 616, when A616 is the notation for Water Colors.[14] In this case, the main class letter A can be omitted from A616 for Water Colors.[15] Even without an explicit direction for intraclass synthesis, one can use this notational device whenever it is needed. For example, one can notate the title *Heat and Sound* as C200 [heat] and C300 [sound], that is, C200 + 300 (Brown, 1914, p. 19). Similarly, *Cats and Dogs* can be notated as F952 [Felis Domestica (cats)] and F918 [dogs], that is, F952 + 918.[16] Brown did not discuss the problem of citation order in his introduction, but presumably *Cats and Dogs* could be notated either as F952 + 918 or as F918 + 952, depending on where one wanted it to appear on the shelves of an open access library. In a classified

catalogue, of course, both notations could be provided as access points, even though the book would be shelved at only one place.

Interclass Synthesis Notations from different main classes can also be combined by using the plus (+) sign. Brown calls books or subjects for which this kind of synthesis is necessary "composite books" or "composite subjects." For example, a composite book on Logic and Rhetoric can be notated with A300 [logic] and M170 [rhetoric], that is, A300 + M170 (1914, p. 19). Similarly, a composite book on Gambling and Dog Racing would be L933 [gambling] and F944 [dog racing], that is, L933 + F944. The same problem with citation order occurs here that occurred in notations from the same main class, and the same remedy is available in a classified catalogue.

For geographical subdivisions, one takes the notation for the topic and adds the notation for the place (for example, D398 for Geology and V222 for Arran) without the plus (+) sign or other indicator to create D398V222, the geology of Arran (1914, p. 19). In this situation, Brown advocated a citation order decided by answering the question "Where will it be most constantly useful?" (1914, p. 19). In general, Brown expected this question to be answered by [topic] + [place] except for items of local interest, such as the architecture of the city where the library is located. In that case, [place] + [topic] may be preferred and can be used.

The Categorical Table The "Categorical Tables and Index: Tables of Categories, Forms, Etc., for the Subdivision of Subjects" (1914, pp. 37–59) is usually called the Categorical Table and appears to be unique in bibliographic classification. Brown stated that the Categorical Table is "a table of forms, phases, standpoints, qualifications, etc., which apply more or less to every subject or subdivision of a subject" (1914, p. 15). Although many of its entries would actually be appropriate only for a narrow range of topics, its basic purpose was to avoid repetition of these subdivisions under different subjects in the schedules. The Categorical Table has a pure numerical notation and is always preceded by a period [.]. The Categorical Table consists of two parts: (1) the Categorical Table itself in notational order (for example, .25 Diaries); and (2) an Index to the Categorical Table in alphabetical order (for example, Art .116).

The Categorical Table is essentially a list of topics without scope notes or other instructions, and each of the items in the list can be added to any number from the main schedules as needed. For example, the economics of universities would be A180 [Universities] and .760 [Economics], that is, A180.760. Similarly, the economics of musical competitions would be C798 [Musical Competitions. Festivals] and .760 [Economics], that is, C798.760. The period [.] is a dot, not a decimal point, and the numbers that follow it are not decimal numbers and cannot be expanded. In the case of the

Categorical Table, citation order is fixed as [main schedule topic] . [number from the Categorical Table].

In the third edition of SC there are 980 entries in the Categorical Table, but it appears to have no discernible internal order. Sometimes related terms appear sequentially, for example in the sequence

.41 Biography, Necrology
.42 Genealogy, Family history
.43 Heraldry
.44 Crests
.45 Badges and Devices
.46 Medals

There is no clear reason, however, for

.60 Programmes, Playbills, etc.
.61 Recipes
.62 Inventions, Origins

to appear together. The qualifications from the Categorical Table can be added to any of the schedule notations, but, apparently, only one number from the Categorical Table can be used at a time. Brown did not mention this topic in his introduction, but all his examples contain only one number from the Categorical Table. The lack of synthesis within the Categorical Table limits its ability to express the full character of the book. For example, if we assume no fixed citation order for interclass synthesis, a book of artworks featuring the solar system would be C850 [Solar System] and .116 [Art], that is, C850.116. Since there is no number for Solar System in the Categorical Tables, C850.116 is the only choice and Art—Solar System is not possible. If the same book were also a bibliography [.1], however, one would have to choose between A601 + C850.1 [Fine Arts—Solar System—Bibliography] and C850 + A601.1 [Solar System—Fine Arts—Bibliography]. At the main schedule number for Bibliography (M760), one is instructed that, except for Universal Bibliography, a subject bibliography should go at the main schedule number with the Categorical Table number for Bibliography (.1). Thus, the option of using the Categorical Table to subdivide Bibliography by topic is not available. In a classified catalogue, however, both these notations could be used as access points.

The examples of these three kinds of notational synthesis make it clear that there are a number of flaws in SC's notation and notational devices. As discussed, no citation order is established for a single notation, no filing order is established for multiple synthesized notations, only one number from the Categorical Table can be used, and numbers from the Categorical Table cannot be expanded or synthesized within the Categorical Table itself. Nevertheless, these devices achieve considerably more flexibility than could be achieved by any other classification system of the time (again with the exception of UDC). The first two kinds of synthesis are essentially a way

of subdividing each class by the rest of the same class or by the rest of the entire classification.[17] The third kind of synthesis, the Categorical Table, produces similar subdivisions, but it includes not only categories from the main schedules but also "forms, phases, standpoints, qualifications" (1914, p. 15) that do not necessarily appear in the main schedules (for example, .189 Nuisances; .202 Sea Marks; .957 Table Talk). The invention of these capabilities for notational synthesis in SC arose from Brown's understanding of the complexities of interdisciplinary works and from his effort to achieve a classification in which each concrete subject would be at one constant place, subdivided by other notations from the main schedules and from the Categorical Table.

Modern Developments in Classification

The history of classification research and systems in the twentieth century is complex, and all the relationships of SC to later work cannot be discussed here. It seems most useful to discuss two interrelated areas in which Brown's work and the work of later classification theorists and researchers have coincided. The first of these is the general problem of how to express interdisciplinary topics in a classification system. The second is the establishment of a one-place "phenomenon class" in the second edition of the Bliss Bibliographic Classification (BC2) (Mills and Broughton, 1977–). These two examples show how Brown's ideas on combining topics and the need for a one-place system have been expanded and become more common in later classification theory and research.

Interdisciplinarity

Brown's thinking about what we would now call interdisciplinarity was ahead of his time. Although interdisciplinary work combining any group of fields is now routine (Klein, 1993), two examples show that Brown's ideas about relationships among different fields still are not always accorded the respect that Brown gave them. First, in the 1930s, the Rockefeller Foundation could not find assessors for biochemist Joseph Needham's proposals for research in physio-chemical morphology and therefore could not fund his work (Abir-Am, 1988).

Second, we may compare the views of Brown and much later writers on the discipline of anthropology. Brown's view of classification was based on the premise that workers in each field regarded that field as the primary field. As examples, he noted that sociologists, jurists, theologians, mathematicians, logicians, and chemists all believed their field to be the most important. He continued: "Finally, the anthropologist will come along and sweep every one of the preceding claimants, and all others, into his capacious net, and calmly assert that his study is Man in all his aspects, and that every human science is, therefore, but a branch of Ethnology" (1906b, p. 8).

In our own time, despite the spread of interdisciplinarity throughout

scholarship and society in general, anthropology was called "an intellectual poaching license" by prominent sociologist Clyde Kluckhohn (quoted in Geertz 1980, p. 167). This view provides evidence for Brown's claim that each field considered itself more important than any other. In the case of anthropology, then, Brown's thoughts about interdisciplinarity and the flaws inherent in discipline-based bibliographic classification systems were more intellectually advanced than some current opinions.

Wilson viewed the history of classification in the first half of the twentieth century as a transition from top-down "universe of knowledge" systems to bottom-up "universe of concepts" schemes (1972). The universe of concepts view of the classification of knowledge came to fruition in the work of Indian librarian S. R. Ranganathan in his Colon Classification[18] (first published in 1933) and of the Classification Research Group (CRG) from the 1950s to the present in Great Britain. Since then, classification research and theory have been dominated by Ranganathan's analytico-synthetic view of classification. The analytico-synthetic view is that the process of classification takes place when a document is analyzed in order to discover its concepts and a notation is then synthesized to express those concepts. In the case of the Colon Classification, the notations are combined in the order of the famous PMEST [Personality, Matter, Energy, Space, Time] facet formula.

The work of Ranganathan and the CRG is highly sophisticated in comparison to Brown's work, but, like Brown, they argued that the ability to specify document topics through synthesized notation for individual concepts created a flexible and hospitable classification system. As Sayers noted, Brown's Categorical Table does not contain facets in the strict sense of analysis by only one characteristic of division at a time (1967, p. 173 n. 1). Nevertheless, if the concepts in the Categorical Table were sorted into a systematic order, a number of common facets could be formed. For example, a form facet could contain such forms as

.00	Catalogues
.1	Bibliography
.2	Encyclopædias, Dictionaries
.3	Textbooks, Systematic
.23	Calendars
.25	Diaries
.40	Maps
.41	Biography, Necrology
.52	Directories
.954	Essays

In addition, SC has the ability to create both interclass and intraclass notational synthesis. Devices that could mechanically synthesize notation from different classes and different facets became one of the desiderata of later classificationists who wanted to be able to deal with interdisciplin-

ary topics when they arose and to express complex topics without doing violence to the basic structure of the classification. Brown's view was that any topic, standpoint, qualification, or form might need to be combined with any other topic, and his notational devices for facilitating these kinds of combinations can be characterized as one of the sources for current views about interdisciplinarity and about how to deal with its existence in bibliographic classification systems.

Phenomenon Classes in BC2

BC2 (Mills and Broughton, 1977–) is still in the process of development. BC2 is generally regarded as a system with a strong footing in the advances classification theory and practice have made during the twentieth century. Its main class order is based on the scholarly work of H. E. Bliss, who originally created the Bibliographic Classification.[19] BC2 employs the analytico-synthetic method based in facet analysis as the main process for extracting the major concepts from a document and for the creation of notational access point(s) for the document. BC2 has a retroactive notation that allows intraclass, interclass, intrafacet, and interfacet notational synthesis. One BC2 provision, the "phenomenon" class, is discussed here because it is of particular interest to this study of James Duff Brown.

The introduction to BC2 discusses the relationship(s) among disciplines and phenomena. According to the introduction, most general bibliographic classifications are based initially upon the academic disciplines, and BC2 follows this convention. Nevertheless, it is also clear that a major literature may be based upon

> a given concept (entity, attribute, process) which treats it from the viewpoint of *several or all disciplines.* An example would be a work on the Horse, treating it from the zoological, equestrian, agricultural, military, artistic, etc. viewpoint; or, a work on Colour, treating it from the viewpoints of optics, biology, photography, painting, decoration, etc. (Mills and Broughton, 1977– , vol. 1, p. 52, underlining in the original).

This view is the same view Brown took about interdisciplinary works and the need for the Categorical Table, although the examples are different. The introduction to BC2 sees these kinds of literatures growing "at a relatively slow rate," but its authors believe that provision should be made now for these works because they will increase in the future (Mills and Broughton, 1977– , vol. 1, p. 52).

BC2 provides three options for dealing with the contrast between disciplines and phenomena. Thomas refers to Brown's idea of a concrete subject in his discussion of these three options, and we may use Thomas's example of the Horse as the phenomenon under discussion (1991, p. 204). Option 1 contains variations of the way interdisciplinary works are handled in other general bibliographic classifications. That is, it suggests that the Horse be placed in a discipline class for both single-discipline and mul-

tidiscipline treatment of a phenomenon. Option 2 would allow different treatments of works on the Horse according to the nature of the work (that is, single-discipline works in the appropriate discipline and multidiscipline works in a special phenomenon class developed especially for works on the Horse). Option 3 allows a library to choose to create a phenomenon class for all works on the Horse, whether they are single or multidiscipline. The choice of this option should be based on the patrons and collection of the library.

The authors of BC2 decided not to enumerate all phenomena but instead to allow them to be created through notational synthesis as needed (essentially similar to Thomas's Option 2). The exception to this decision is the special Phenomenon Class in the Generalia Class 4/7 for phenomena that are "made up of human knowledge and information, and its communication" (Mills and Broughton, 1977– , vol. 1, p. 55). This exception was made because of H. E. Bliss's views on the importance of communication and because the BC2 classification system itself is viewed by its authors as a communication device. The BC2 use of Option 2 and of the special Phenomenon Class is thus an attempt to establish one place in the classification for works on a certain phenomenon, regardless of how it may otherwise be scattered among different disciplines.

In BC2, both the one place idea and the concrete subject idea are renamed, more highly developed, rationalized, and theoretically driven than they are in Brown's SC. It seems clear, however, that Brown's initial work on these ideas has influenced these specific elements of BC2.[20] The contributions of Brown's theoretical ideas and the practices he invented in SC have not been sufficiently studied to allow us to decide how much credit he might be given for later developments. Debates about the existence of the phenomenon of interdisciplinarity and about how to place it in discipline-based bibliographic classification systems are still going on (Beghtol, 1998). The problems these issues raise have not yet yielded to a consensus about solutions, but it is important to realize that they are not new problems. Instead, Brown analyzed them and suggested solutions in the vocabulary that was available to him at the end of the nineteenth century and the beginning of the twentieth century.

Conclusion

Leide, et al. (2003) are currently investigating visualization schemes for exploring a topic in an electronic environment such as the Internet. Their series of articles is consciously based on Cutter's 1904 objectives of the catalogue. In this, Leide, et al. have acknowledged directly the influence of an important historical figure for current work. James Duff Brown has not yet received the kind of reputation and recognition Cutter still enjoys. Nevertheless, the relatively brief analysis in this article shows the influence Brown's ideas and his idiosyncratic classification system have had

on twentieth-century classification theory and research. His unconventional thinking about the foundations of bibliographic classification systems, about notational devices that might express myriad combinations and recombinations of the topics in documents, and about the needs of the patrons of public libraries for specific kinds of knowledge representation have all become constant themes in later classification theory and research. A more detailed rediscovery of Brown's work than is possible here is a potential route to deeper and more comprehensive understanding of present issues and problems for twenty-first-century scholars and classificationists.

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Notes

1. McGarry (1991, p. 45) gives Brown's birth date as 1856, and Taylor (2000, p. 335) gives it as 1864, but other sources agree on 1862.
2. In this article, the term "interdisciplinarity" is used to describe any of the myriad ways in which disciplines, topics, or subjects can be combined in written documents. What we now may think of as multiformat, multimodal, or multimedia documents that can be accessed electronically were not an issue in Brown's time and are not considered here.
3. For example, how to treat interdisciplinary works was not mentioned in DDC until 1965 in the 17th edition (Dewey, 1965, vol. 1, p. 30). The publishing history of UDC is complex and presents "something of a bibliographical nightmare" (Rayward, 1975, p. 110, n. 58). The edition I examined (*Manuel,* 1907) contains seven auxiliary tables:

   I Subdivisions de formes et de génèralités (0)
   II Subdivisions de lieu (2 à 9)
   III Subdivisions de langue (= 2 à 9)
   IV Subdivisions de temps ((. . .))
   V Subdivisions de points de vue . . . 000
   VI Subdivision de relation :
   VII Subdivision de noms propres (A – Z).

   Except for the last, these common subdivisions are still used in UDC. Thus, UDC allowed far more notational synthesis than DDC, on which it was based, allowed at that time. There appears to be no evidence showing whether or not Brown knew about UDC, but further research may provide such evidence.
4. Sayers was a highly influential teacher of classification. His most famous pupil was S. R. Ranganathan, and he also taught many of the original members of the Classification Research Group (CRG). His *Manual of Classification for Librarians* served through five editions between 1926 and 1975 as a basic text for library classification.
5. Brown's publications are an excellent source of information on various library practices, on special devices in classifications, and on some relatively obscure classification systems. For example, *Manual of Library Classification and Shelf Arrangement* (1898) discusses philosophical schemes by Bacon, Bacon-D'Alembert, Locke, and Coleridge, and, in addition to the Quinn-Brown scheme, bibliographic schemes by Garnier, Horne, Garnett's British Museum Scheme, Schleiermacher, Vincent's Royal Institution Scheme, Trübner, Edward, Sonnenschein, Hartwig, and Bonazzi, among others.
6. The plan of the first floor of this open access library is reproduced in Baker (1990, p. 15).

7. According to Munford, Brown founded *Library World* "primarily to assure himself of a continuing and regular journalistic medium" (1983, p. 157).
8. An interesting and valuable research contribution could be made from an analysis of different editions of Sayers's *Manual* from the point of view of the different opinions about the purposes and qualities of library classification in the twentieth century. Such a study would include the different conclusions Sayers came to about the virtues and vices of each classification system. Brown's enthusiasm for open access led him to suggest that an extra advantage might be gained for the open access system by rebinding all the books in specific colors for different classes, such as orange for the Fine Arts, black for Theology, and red for Poetry (Brown, 1903, p. 334).
9. The Quinn-Brown scheme appears in *Manual of Library Classification and Shelf Arrangement* (1898, pp. 60–61) and may also be available elsewhere.
10. The Adjustable Classification is available in Brown's *Manual of Library Classification and Shelf Arrangement* (1898, pp. 97–160) and may also be available elsewhere.
11. Quotations from the introduction are taken from the second edition, and examples are taken from the first, second, and third editions. The ideas in all the editions are the same, but in the second and third editions they are more carefully worked out.
12. This thoroughly practical discussion of main class order is reminiscent of Melvil Dewey's statement in the introduction to the first edition of DDC that "theoretical harmony and exactness have been repeatedly sacrificed to the practical requirements of the library. . . . Theoretically, the division of every subject into just nine heads is absurd [that is, 9 classes plus the 0 class]" (1876, p. 4).
13. Brown provided a complimentary discussion of DDC in *Manual of Library Classification and Shelf Arrangement* (1898, pp.67–70). In addition, Brown praised Dewey's relative index as "particularly elaborate and useful" (1898, p. 84). He also, however, believed that "certain American [classified] catalogues, compiled on the Dewey or Dewey-Cutter plan, [that is, DDC with Cutter numbers] look like cunning cryptograms" (Brown, 1898, p. 75). An interesting research project would be to follow Brown's opinion of DDC from its first edition until Brown's death in 1914 and relate it to the developments in cataloguing that took place on both sides of the Atlantic (Sweeney, 1990).
14. For all quotations from the schedules, British spelling has been retained.
15. The provision for omitting the first part of the second notation from the same main class also appears in the second edition of the Bliss Bibliographic Classification (BC2).
16. Examples for which a page reference is provided are Brown's examples. If no page reference is provided, the example was invented for this article by the author.
17. The ability to subdivide by the entire classification appears in other systems. For example, the DDC class 016 Bibliographies and catalogues of works on specific subjects or in specific disciplines allows one to add from 001–999 to specify a bibliography on any subject.
18. The name of the Colon Classification came from the use of the colon [:] to join different facets into a synthesized notation.
19. The first edition of the *Bibliographic Classification* by H. E. Bliss was published between 1940 and 1953.
20. Brown is not mentioned in the BC2 introduction's discussion of the relationships among disciplines and phenomena. He is, however, listed as an index entry on two pages (Mills and Broughton, 1977– , vol. 1, p. 109). First, Bliss is cited as claiming that his own notational devices "were more efficient and economical than the number-building of Dewey, UDC and Ranganathan and the auxiliary tables of Cutter and Brown" (Mills and Broughton, 1977– , vol. 1, p. 11). Second, Brown's SC appears in the glossary as the second of two meanings of "*One-place System*: . . . (2) Used by James Duff Brown to describe his 'Subject Classification' (190[6]) which collected in one place many aspects of a given phenomenon (Brown called it a 'concrete')" (Mills and Broughton, 1977– , vol. 1, p. 104, underlining in the original).

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