Subject Analysis: An Interpretive Survey

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CHANGING PATTERNS OF SUBJECT ANALYSIS

THE YEAR 1876 marked the publication in the United States of Charles Cutter's *Rules for a Printed Dictionary Catalogue*[1] and, to some minds, the beginning of an inevitable dichotomy between the development of rules and procedures for the descriptive identification of library materials and the evolution of principles and practices of subject analysis. For the better part of the ensuing century, even the field of subject analysis divided itself into two essentially separate disciplines: subject cataloging and classification. Because subject cataloging involved the selection of terminology to describe the content of the material, it was regularly and quite logically associated with the descriptive cataloging effort; the process of classification however, was seen basically as an attempt to group materials in meaningful ways and thus formed a separate operation.

As library collections grew and efforts to centralize the cataloging operation intensified, selection of subject terms became a larger problem than Cutter had perhaps anticipated. Whereas this pressure resulted in the elaboration of rules and examples in the area of descriptive cataloging, it eventuated merely in the development of lists of subject headings. Meanwhile, classification established itself as primarily hierarchical and enumerative, also taking on—especially with the appearance of the Library of Congress Classification—the characteristics of a list rather than a code. Indeed, it is somewhat astonishing that there is still no comprehensive set of rules for the application of the Library of Congress Classification.

After World War II, the inadequacies of lists without codes in the area of subject control of library materials began to be felt in significant ways. Prosperity, accompanied by a startling increase in the number of materials being published and the size of library acquisi-

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tion budgets, introduced two strong trends: (1) to reduce the amount of time devoted to the selection of subject headings and classification symbols, and (2) to increase the precision of subject analysis while maintaining a greater consistency among materials. Unfortunately, these trends frequently contradicted each other. Some librarians, particularly administrators of large library systems, argued that precision was a chimera and consistency an unreasonable dream; they contended that only a reliable bibliographic identification was really important, and that subject analysis of any value should be left to the subject bibliographers and information specialists. In contrast, many catalogers and reference librarians argued that general bibliographic control in the subject areas was a shambles, requiring that the libraries take the initiative in producing the depth and consistency of analysis desired. The growing number of information scientists, meanwhile, looked to the computer for the needed speed and accuracy to provide an acceptable level of subject control, and rejected the library efforts as misguided.

Because of these often conflicting trends, the once-honored effort to provide subject control through traditional library cataloging and classification procedures has fallen into disrepute as shallow, imprecise, and time-consuming beyond its worth. Specialized, computer-based bibliographic data banks offer better subject access, but their growing size often precludes comprehensive search except at great expense.

GENERAL PROBLEMS IN SUBJECT ANALYSIS

Part of the dilemma of modern subject control of library materials stems from certain basic problems which were present when Cutter formulated his rules. There are fundamentally divergent purposes in performing a subject analysis of any material: (1) to identify its content so that it can be retrieved uniquely according to its particular aspects, and (2) to identify its content so that it can be related to other materials and retrieved in conjunction with them. It might be argued, simplistically, that subject heading work serves the first purpose of providing unique identification, while classification work serves the second. An examination of the subject cataloging effort as it has evolved in libraries reveals, however, the fallacies in this oversimplification. Subject heading lists include both "separating" and "grouping" devices, that is, specific headings which may apply to very few materials, and general headings designed to create large groups of

related materials. Similarly, classification can be used to delineate unique characteristics of materials, or to bring quantities of materials together in an undifferentiated array.

A second type of dilemma has been occasioned by the rather loose use of the term *subject.* Traditional library practice in the United States has glossed over the distinction among various aspects of materials. Such characteristics as authorship, title and series statements, publication data, and format have been assigned to descriptive cataloging.

Most of the other characteristics have been assigned to subject analysis: topic, form, level, geographical coverage, and time factors. Falling between the cracks are such characteristics as association (e.g., the identification of the person honored by a *festschrift*), which are neither subject nor descriptive in nature. Again, both the subject heading lists and the classification schemes include these types of analysis which are not, strictly speaking, subject in nature.

The lack of a clear set of principles governing the subject analysis of library materials has produced a third problem; namely, the reliance upon lists of headings and classificatory divisions, centrally issued and updated. Although there have been a number of attempts, usually originating outside the United States, to establish a set of principles or at least a code for subject analysis, the American librarian has delegated responsibility for the construction of lists and classification schemes largely to the Library of Congress, partly monitored by such library organizations as the American Library Association. Since the Library of Congress has only infrequently published any official explanation of the principles underlying the maintenance of its list and schemes, it is not surprising that most librarians are unable to state with any assurance the basis for selection of subject terms and classification symbols beyond the general rule of "specificity."

An additional problem is the paucity of information concerning the effectiveness of the subject analysis systems which have developed over the past one hundred years. Catalog use studies seem to indicate a better-than-haphazard level of user satisfaction with subject retrieval devices in libraries. The uneasiness of many reference librarians persists, however, as they observe the relatively unsophisticated demands which catalog users place upon the subject control mechanisms available to them in the majority of libraries. They reason, along with many catalogers, that an unknown number of library users is satisfied too quickly and too superficially by a likely looking book title or a common classification number which seems to appear in

frequent association with likely looking titles.[2] The construction of a reliable instrument to measure and separate all of the variables involved in a library user's subject approach to the catalog is, however, extremely difficult; securing a set of reliable conditions under which to administer such an instrument is even harder. Thus, it is not surprising that most of these studies are either shallow or highly specialized.

It may be helpful to consider these four major problems against the general trends in the development of the two devices most familiar to library users who seek to use the subject approach to materials: classification systems and subject headings. The following sections will attempt to provide an interpretive review of the history of these two devices in the United States from 1876 to 1976.

CLASSIFICATION SYSTEMS

The year 1876 marked not only the publication of Cutter's *Rules* but also the appearance of the first edition of Melvil Dewey's *Decimal Classification.*[3] Destined to achieve a popularity among libraries which was not seriously challenged until the 1950s, the Decimal Classification (DDC) began its history modestly enough as a system for solving the problems of a college library. Dewey attempted to make utilization of materials simple even for the relatively untutored library clientele, although it assumed a level of literacy and general familiarity with the structure of knowledge not uniformly shared by library users.

Dewey's various library activities often pushed the classification system aside, but he continued to revise it and supervise its development for the next fifty years. His unwillingness to make the radical adjustment required for the handling of the Library of Congress collection resulted in the inception of a new scheme based to some degree upon Cutter's *Expansive Classification.*[4] The Library of Congress Classification (LC) evolved more slowly, with editions of various sections appearing at irregular intervals. It began with the Z schedule at the turn of the twentieth century, and is still being completed with the issuance of the K schedule, along with the numerous revised editions and reprints of other sections.

Meanwhile, some of the larger research libraries, having had no opportunity to wait for the development of DDC and LC, continued to utilize various forms of arrangement of materials: fixed location, broad subject groupings, and local classification schemes. Early suggestions for the standardization of the development and application

of classification schemes eventually bore fruit as libraries gradually phased out the localized systems and adopted DDC. Not until the post-World War II period did any system offer a significant challenge to DDC; that which did was the centrally maintained and applied Library of Congress scheme.

The pressures of handling large quantities of materials in the 1950s, accompanied by a shortage of qualified personnel in libraries, occasioned a crisis resulting in a flight from DDC to LC. Critically read, the literature shows all too clearly the economics of the library classification policies. Much space was devoted to often incomplete and inaccurate summaries of the advantages and disadvantages of the two major systems; at the heart of the movement away from DDC, however, was the simple fact that LC symbols appeared more consistently and completely on Library of Congress printed cards. The centrally applied scheme of a nationally recognized library was obviously more economical to use than one which existed essentially as a private enterprise; the fact that LC also enjoyed the somewhat ill-deserved reputation of a "scholarly" system provided a respectable justification of a cost-based decision.[5]

The process of reclassification from DDC to LC deserves considerable attention, for it tended to overshadow another trend which had more impact in Great Britain and the Commonwealth nations than it did in the United States. This latter trend, had it really affected American libraries, might have obviated the need for switching to LC and propelled the United States into faceted and synthetic classification. This did not happen, however; indeed, the major discernible effect of faceting upon the American scene is its influence upon the Decimal Classification Division of the Library of Congress under the administration of the DDC editor Benjamin Custer.

Several historical factors combined to propel libraries to reject further use of DDC and accept LC. The first factor was the methodology used for revising DDC. The editions which appeared while Dewey was still alive reflected a reasonably consistent editorial policy and a relatively conservative approach to drastic change. The appearance of the unabridged DDC 15 (which looked more like an abridged edition in size), severely shocked the library world.[6] Classes were moved and rearranged, seemingly without regard to the effect upon existing collections. Since DDC was basically a shelf classification, it was incredible that the editor and the publisher of the system could expect librarians to react favorably to so drastic a revision, however intellectually defensible it might be. Interestingly, DDC 15

was not a particularly bad effort; it was simply radically changed and created chaos.

Once "betrayed," the American classifiers were not likely to be so naïvely trusting again. The groundwork was laid for considering other kinds of drastic change if DDC could be so irresponsible. With the rapid growth of library collections, it was imperative to make quick decisions about the future of DDC in large libraries. The erosion of trust in the integrity of the system thus set the stage psychologically for the later movement to LC.

The sixteenth edition was received with a collective sigh of relief, but the damage had already been done. The Dewey office established at LC was unable to secure the facilities and staff to keep up with the expanded acquisition program of what was becoming, in fact if not in name, the national library of the United States. Programs for bringing in foreign materials, such as the Farminton Plan, the P.L. 480 plan, and Title II-C of the 1965 Higher Education Act (National Program for Acquisitions and Cataloging), increased the pressure on the Dewey office. DDC numbers appeared on cards for English-language materials and, where possible, on cards for items in major European languages; little else was covered.[7] Missing numbers and the ever-present possibility of further alterations in DDC combined to convince many library administrators that the time to change classification systems had arrived. The literature of the 1960s erupted with arguments for and against DDC, descriptions of "how we switched in our library," and bibliographies of materials dealing with reclassification.[8]

Although the editorial work on DDC had been centralized at the Library of Congress since 1927, the percentage of materials covered by numbers on LC printed cards had steadily dropped, in terms of the total quantity of cards issued.[9] Furthermore, because LC did not arrange its materials in DDC order, the "book numbers" (devised by Cutter to provide an alphabetical order within classes) were not included on the cards. LC classification symbols did, however, provide a complete and unique designation for each item. The final blow was perhaps cast by the elaboration of DDC numbers associated with edition 17 as reflected on the LC printed cards. Despite the introduction of segmented notation which would allow the logical truncation of a classification number to fit the needs of the local library, the strings of ten to fifteen DDC digits appearing more frequently on LC cards only hastened the switch to LC.

Looking back on the almost fifty years of the appearance of editions

of DDC under the direction of Dewey's hand-picked assistants,[10] it is hard to comprehend the atmosphere of near-panic which surrounded the issue of each new edition after the fifteenth. The total lack of satisfaction with DDC 17's index certainly did not allay these fears,[11] although the editor's efforts to update the scheme through phoenix schedules and additional expansions were regularly applauded. The nagging question persists, however: Would the large libraries have been so ready to abandon DDC if the economic affluence of the 1960s had been replaced by the recession of the 1970s?

While the controversy concerning the desirable classification system dominated the literature, other voices raised basic questions about the validity of any enumerative classification system. As has already been noted, the challenges presented by faceted and synthetic classifications can be discerned at least partially in the development of DDC under the editorship of Benjamin Custer. The familiar Table of Form Divisions in DDC—which some view as a basic, although perhaps accidentally introduced, synthetic device—became in DDC 16 the Table of Standard Subdivisions. In DDC 17, it was joined by a Table of Areas; the eighteenth edition carried the possibility of synthesis even further by establishing an additional five tables to permit the uniform expression of literary form, language, and racial/ethnic/national divisions within a class.

The concept of subject analysis logically implies a breakdown of a field into its component parts. The hierarchical classification systems did not, however, make explicit the fact that a number of subject fields are interrelated in ways inappropriate to such a hierarchy. Some library historians have seen in Henry Bliss's *A Bibliographic Classification*[12] the basics of a synthetic approach, but more authorities cite S.R. Ranganathan's *Colon Classification* as the first self-consciously faceted scheme.[13] The number of U.S. libraries using Bliss has never been large, even though periodic attempts have been made since the 1950s to issue a revised edition and cumulated additions and corrections. The *Colon Classification* attracted even fewer devotees in America, but its impact on library education, and especially on the teaching of subject analysis, is yet to be explored fully.

Another system which has been called synthetic is the Universal Decimal Classification (UDC).[14] Under the aegis of Paul Otlet and Henri La Fontaine, UDC progressed from its DDC base to an elaborate and detailed set of multilanguage schedules, begun in the late nineteenth century and issued at irregular intervals through the sponsorship of the International Federation for Documentation

(FID). The complete English version is still to appear, and there are frequent rumors that its continued updating is threatened by the precarious financial structure which supports it. Called by one scholar "a hybrid," UDC gained its reputation as a synthetic system under the interpretation of S.C. Bradford in England, who explained the "auxiliaries" which can be used with UDC to indicate facets.[15] Most of the facets are now at least partly expressible through the DDC tables, but the direction of the expansions adopted for UDC is often quite different from that in DDC. Despite their common heritage, there appears to be little hope that the two systems will be united any time in the near future.

General American disinterest in the theory of library classification has puzzled many and elated a few. The great American library iconoclast, Ralph Shaw, expressed open disgust at the vagaries of classificatory analysis. His maxim was that "the intensity of interest in classification theory is in direct inverse ratio to the level of library service" in a given country.[16] The evidence provided by American library literature tends to support the contention that Shaw's attitude was fairly typical.

There has nonetheless been a relatively small but quite influential group of American members of the British-based Classification Research Group (CRG),[17] and a chapter of CRG has operated in the United States for nearly twenty years. Few effects of CRG have been discernible in the traditional American library; however, the theorists have found a more hospitable reception among the growing numbers of information scientists and "documentalists" in the United States. It would be improper to conclude a survey of classification developments within the United States without noting the attempts of information specialists outside of libraries to discover faster and more accurate means of classifying. The thrust of their efforts has been directed toward the classification of ideas or of knowledge; it is in this regard that they often differ from the librarian, who is interested almost exclusively in the arrangement of materials on the shelves. It is important to understand that the American library tradition has moved consciously away from the display of subject relationships through a card file (the classed catalog) or a printed list. More recent attempts to reintroduce the classed catalog[18] seem to have had little effect on the more institutionalized library services, although the use of a classified approach to periodical indexing and information retrieval is receiving a more positive response.

Contemporary attitudes toward classification appear to be po-

larized. Faced with reduced budgets and staff limitations, libraries support the development of simple systems which can be easily—preferably centrally—applied, and result in a notation string of reasonable length which can be used effectively to arrange materials on the shelves. Information specialists and subject bibliographers, faced with a seemingly endless publication effort, support the development of highly analytic knowledge-classification schemes which can reveal salient information on both broad and narrow topics; the arrangement of the materials on shelves or in files or on computer has, to their minds, no necessary relationship to the classification notation.

Those who reject traditional shelf location systems such as DDC and LC as inadequate for their requirements are generally faced with the challenge of developing their own systems. Specialized schemes for medical and law libraries have long been recognized, although it was only with the advent of the computerized MEDLARS (Medical Literature Analysis and Retrieval System) of the National Library of Medicine that medical libraries were able to agree upon a single classification plan, namely that of NLM itself.[19] The multiplicity of essentially enumerative schemes for the control of special subject fields is easily observed from the literature; however, the rise of strong, centralized libraries and the recognized cost of local maintenance and application of special systems have effectively eliminated further development of new enumerative classifications.

There persists the hope that the computer will provide the answer. Especially during the 1960s, information scientists looked to the possibility of "automatic classification"[20] as a means of avoiding the pitfalls of both enumerative and faceted schemes. Early experiments seem to demonstrate the probability of at least limited success with the computer-grouping of documents or their abstracts on the basis of the similarity of language used in them. However, the costs of translating the small successes achieved with document collections numbering under 10,000 in highly defined technological fields into successful manipulation of a million-document collection on more diverse topics are staggering. Investigation of automatic classification on a large scale has not materialized.

Despite the seeming preoccupation of American librarians with shelf arrangement, it is clear that subject control cannot be achieved at such a superficial level. Attention is being focused increasingly on the improvement of subject bibliography, although it has not held so high a priority as the achievement of descriptive control.[21] American preference seems to be, however, for the use of subject terms rather

than classification symbols as the primary means of achieving the desired level of subject control.

SUBJECT HEADINGS

Classification does not necessarily involve the use of numbers to express relationships; words themselves provide a form of notation which can be arranged to display the topical interconnections of library materials. The subject cataloging practice which formed Cutter's heritage as he compiled his rules of 1876 was primarily classificatory in nature. While he advocated the specific entry of materials under headings expressing the topics as directly as possible, those libraries utilizing his rules followed an older practice of entering materials specifically by working down from the general discipline to the narrow topic. Cutter's preference for direct, specific headings did not, however, override his belief that some of the library's clientele might conceptualize their needs in hierarchical fashion rather than directly. Few studies were available to indicate precisely how people think about their subject needs, and the tradition of the classed and alphabetico-classed catalogs suggested that Cutter's argument might be defensible. In any case, he contributed to the library world a "code" for selecting topic words which were sometimes direct and sometimes hierarchical. It is perhaps no wonder that successive librarians found themselves unable to maintain consistent form in the subject headings used. By the turn of the century, the need for standard lists of acceptable headings was firmly established.[22]

Librarians turned to the American Library Association for aid in obtaining a list of subject headings. The early ALA lists were eventually superseded by the work of the Library of Congress, although the lists were published concurrently during a short period.[23] With one or two exceptions, no one seriously tried to explain the theory underlying the selection of subject headings to be included in the LC list.[24] Substituted for the theory was an ever-growing, elaborate syndetic structure built into the lists to aid the subject cataloger in selecting the authorized heading. Remnants of the alphabetico-classed approach, such as inverted and subdivided headings, could remain so long as appropriate cross-references were constructed. Neither library user nor librarian thus needed to know *why* a particular heading was chosen for inclusion in the list, only which version of it was acceptable to the system and which was not.

The major issue dominating the 1920s and 1930s was the im-

provement of the LC list and the publication of the syndetic structure.[25] By the early 1950s, the strains noted earlier, occasioned by the expanded publication activities of the postwar period, also began to highlight the weakness of the LC list. When Sears's *List of Subject Headings* first appeared,[26] it was evident that a number of librarians had given up any hope of being able to understand the LC list and were doubtful that their clienteles, especially in small libraries, would do any better.

David Haykin's attempt to explain the logic of LC headings, published in the 1950s,[27] was reassuringly clear, but even Haykin admitted that LC often failed to follow the principles which supposedly governed the selection of new headings. His work summarized many of the challenges directed to the LC staff, and he offered cogent responses. He tried to explain why some headings were inverted, why some were provided with topical as well as general (usually "form") subdivisions, why geographic names were sometimes the main heading and at other times used as subdivisions, and why some headings could be divided chronologically while others could not. Despite Haykin's efforts, dissatisfaction with the inconsistencies of the LC list continued; unfortunately, few viable options to the LC system emerged.

Those who were concerned about the need for simplified headings for children and young people attempted to issue their own lists for use in elementary schools and in the children's departments of public libraries.[28] Essentially, these lists served the same purpose as did the Sears list, namely, to help an untutored user to find appropriate subject matter more easily by employing simpler and more familiar terminology. Common (rather than scholarly) names appeared in these lists, and fewer subdivisions were added than ordinarily would be available to users of the Sears and LC lists.

Each of the attempted substitutes for the LC list had one major deficiency: the terms which users employ to search for materials in library collections do not remain constant over more than a few years. In the 1960s, another challenge was leveled at the lists, and to some degree at the traditional classification schemes as well: bias. Outdated and inaccurate terms, occasionally with racial, ethnic, religious, or sexual slurs, were still much in evidence in many lists; they had not been purged, it was argued, because they had been correct when they were adopted and change was too costly.[29]

Although the Processing Department of LC established a research unit to investigate, among other things, the various alternatives to the

LC list, no significant, nationally applicable program for the development of new subject headings has yet been proposed. As in the field of classification, the major viable alternatives to traditional lists of subject headings have appeared in special, nonlibrary situations.

The most popular alternative of the 1950s achieved almost the status of a fad. Promoted by Mortimer Taube, the Uniterm system was sold to special libraries and business/industrial concerns as a means of bringing file information under subject control. The work done by Taube was imitated by a number of enterprising colleagues, to the extent that *uniterm* became almost a generic word for an open-ended list of single-noun headings.[30] The genius of Taube's system was its apparent simplicity; it is interesting to note, however, that uniterms were designed for machine manipulation. Taube's studies in coordinate indexing, often unread by his imitators, prescribed the ways in which simple nouns could be joined to identify documents dealing with quite specific pieces of information.

While uniterms, and later "descriptors," were being introduced into the subject processes of special libraries and information systems, others were advocating a machine-based procedure which bypassed the problem of establishing standard terminology: the keyword index.[31] Although the keyword approach to subject indexing was certainly not new—it had been used in German catalogs for over a century—its combination with the peculiar capabilities of the electronic computer made it more attractive. By a relatively simple process of comparison, the computer could ignore common words and prepare an alphabetical listing of content words, in complete or partial context, reflecting the topical import of the material. The limitations of the method were recognized immediately: keywords taken from a title or abstract do not always reflect the true subject of the work; no procedure is available for providing links between synonymous terms and between terms with a common root but appearing in different forms; keywords in different languages are not collocated. The proponents of the system argued, often convincingly, that keyword indexes were not designed to replace more careful assignment of standard subject terms, but rather were constructed to provide what is sometimes called "quick and dirty" access. Thus the keyword approach acquired popularity as a "current awareness" process, quickly available at relatively low cost.

The currency of the keyword index and the simplicity of the Uniterm system were clearly desirable, although neither device was fully satisfactory. The predictable outcome of experiences with both

systems was the emergence of a hybrid: the thesaurus. Offering the control provided by traditional subject headings, but with the greater flexibility characteristic of the open-ended keyword system, thesauri quickly gained favor among special librarians.[32] The thesaurus did, however, depend on a carefully stated code of rules for the addition of new headings and the establishment of relationships among headings. In new information fields, it proved difficult to establish the basic consistency of terminology which a successful thesaurus presupposes. In such cases, the keyword index was sometimes employed to establish the terminlogical frequencies and boundaries of the new field; then, on the basis of research into the keywords, a preliminary thesaurus could be constructed and tested.

There were, of course, questions concerning the effectiveness of these various methods of subject analysis. The American scene watched and occasionally produced critics of the Cranfield comparative evaluation of traditional and newer subject control devices in the field of aeronautics.[33] No clear evidence has been uncovered, however, to demonstrate the superiority of one system over another. Furthermore, the use of terms such as *thesaurus* has been clouded by the release of subject heading lists which seem merely to have been called thesauri in order to make them sound modern.[34]

The search for a general-purpose subject analysis pattern continues, but the impetus has shifted from the United States to England. There, particularly represented in the work of Derek Austin,[35] an approach called PRECIS is being perfected. To some Americans it is quite disappointing that the century of experience in the United States with developing and testing subject heading lists has eventuated in so little progress toward a satisfactory resolution of the discerned problems.

FUTURE OF SUBJECT ANALYSIS

The history of subject analysis in the United States reflects an intensive initial effort by Cutter and others to establish viable principles for classification and selection of subject headings. The latter part of the nineteenth and the first one-third of the twentieth centuries witnessed the solidification of shelf classification schemes which suffered from inconsistencies and bias, and subject heading lists that tended to stifle creativity in the interest of standardization. The past twenty-five years have offered challenges to the traditional systems of subject control, but they have failed to stimulate the development of

significant alternatives. Librarians regularly bemoan the inadequacies of DDC, LC, and the LC and Sears subject lists, while continuing to defer to the Library of Congress and, more recently, to the Ohio College Library Center to provide the answers to problems which have been recognized and documented for the last forty years.

It may be that the failure of Americans to concentrate attention on the theory of subject analysis and control has produced the current dilemma. If so, it could be resolved by a concerted effort on the part of library educators and administrators to re-examine the goals of subject analysis and to encourage the invention of more effective systems operable in both a network context and as part of a national subject bibliographic control program.

The trends leading to the development of special schemes and lists for individual subject fields appear to have resulted in costly processes no more satisfactory than those carried out by the Library of Congress. Nor have the information indexing and thesaurus-based techniques practiced by special librarians and information scientists proven to be extendable to large collections of the dimensions of those housed in the modern research library. In sum, the old procedures are failing, but the new ones are not yet capable of reliable performance.

The future of subject analysis does not loom bright, especially since current library attention is focused on basic descriptive control, where the issues are more clearly defined and perhaps more crucial. Current trends indicate that the future of subject analysis will depend largely on forces either outside of libraries or outside of the United States.

In the United States, the initiative in devising subject bibliographic control seems to have passed to the information specialists. In the 1950s and 1960s, most of their efforts were directed toward the creation of separate plans for each subject area, no matter how specialized. The current spirit appears to move in the direction of amalgamation, although merging of individualized systems has undoubtedly been slowed by the economic reversals of the 1970s. In contrast, the library-based information systems have often tried to begin with a large discipline and "spin off" continuing bibliographies in the narrower areas.[36] Markets for both the general subject bibliography and specific area bibliographies clearly can be stimulated. Because experienced librarians understand more readily the complexities of large cumulating data bases, the possible movement of qualified library personnel from traditional library classification and

subject heading work into major continuing bibliographic programs is an attractive prospect.

Outside the United States, only the relatively new and—in America at least—largely unknown PRECIS system holds significant promise as a "universal" approach to subject analysis. It remains to be demonstrated that PRECIS can operate effectively in languages other than English and can adapt itself to emerging fields of investigation. The search continues for a universal subject-analytical process which can transcend the limitations of language and national differences to enable human beings of all backgrounds to share information effectively. Whether PRECIS is a reliable step in that direction is uncertain, but it is one of the few operational systems having such potential.

Will the enumerative classification systems and subject lists survive? Shelf classification is quite likely to persist, but the illusion that such classification work is highly professional is rapidly being dispelled. Furthermore, a growing demand for a dual structure of subject control in libraries is emerging. At the level of stack arrangement and rapid identification of broad subject areas for browsing, there is a need for a notation which many have characterized as "something between the abridged and the unabridged Dewey." If DDC's numerical notation could be kept to six or seven digits, if it were coupled with a flexible book-numbering system, and if it were centrally applied to all new materials as they are published, it would be well received by librarians. Attention could then be safely redirected to the creation of a detailed national (and international) subject bibliographic structure utilizing computer techniques and appearing regularly in a variety of formats.

Little attention has been paid in this discussion to the phenomenon of the "subject catalog," that is, the creation of a separate library card file or printed list for the subject approach. During the 1950s and 1960s, the so-called divided catalog (subject cards separated from author and title cards) became popular. While studies of catalog use have never established the superiority of either the dictionary or the divided catalog, it should be acknowledged that the modern version of the subject catalog exists primarily to benefit libraries by reducing the complexity of a large card file.

The prime benefit of the separate subject catalog may prove to be the ease with which it can be discontinued. The relationship between general subject bibliographies and the shelf arrangement of libraries needs to be established clearly. At present, it appears that the most

natural link is created by the movement of the information seeker from (1) the national or international data bank (or printed bibliography), to (2) the library's "finding list" (its holdings list, arranged by author, title, series title, etc.), to (3) the library's shelves. If the search fails at the third step—that is, if the material is not on the shelves—then the library's shelf classification system comes into play as a means of scanning other library holdings on the same general topic.

As a final note, it might be argued that the problems of attaining effective subject analysis in the United States are basically the result of too much affluence. Another of Ralph Shaw's aphorisms was that it does not matter what scheme is used to classify a collection that is small, for the entire library can be memorized if it is under 10,000 items. Whether Shaw's simplistic statement is accurate is unimportant; its value lies in the fact that it suggests a more radical solution to the problem of subject control, namely, the creation of a series of relatively small libraries for those who want general and popular information and materials. In these libraries, the subject systems would be relaxed and as nearly self-explanatory as possible, to stimulate browsing. To serve the more sophisticated, the library staff would be available to search bibliographic data bases and to refer the client to research-oriented library collections.

The anxieties and confusions associated with subject analysis in the United States stem from the fact that American librarians have developed no clear philosophy of subject control. The result, well known to the ancients as the bursting phenomenon associated with the pouring of new wine into old wineskins, is predictable: the 1876 philosophy of Charles Cutter cannot accommodate the requirements of 1976.

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28. *See, for example,* Rue, Eloise, and LaPlante, Effie. *Subject Headings for Children's Materials.* Chicago, ALA, 1952; and Cavender, Thera P. "Subject Headings for Children's Materials," *Journal of Cataloging and Classification* 10:197-202, Oct. 1954. The urge to simplify began to affect a number of areas during the 1950s, including classification. This was the period which saw the

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