SUBJECT RETRIEVAL IN THE SEVENTIES

CONTRIBUTIONS IN LIBRARIANSHIP AND INFORMATION SCIENCE

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   Hans (Hanan) Wellisch and Thomas D. Wilson, Editors

SUBJECT RETRIEVAL IN THE SEVENTIES

NEW DIRECTIONS

PROCEEDINGS OF AN
INTERNATIONAL SYMPOSIUM
HELD AT THE
CENTER OF ADULT EDUCATION
UNIVERSITY OF MARYLAND
COLLEGE PARK
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HANS (HANAN) WELLISCH
AND
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SUBJECT RETRIEVAL IN THE SEVENTIES

OPENING ADDRESS

DR. JAMES W. LIESENER, *Acting Dean*
School of Library and Information Services

The faculty of the School of Library and Information Services here at Maryland has been interested in the area of classification and the organization of knowledge from the beginning of the school in 1965. We have also been very lucky in being able to attract a continuing series of outstanding visiting faculty members from a number of different countries.

In conjunction with this emphasis in the school and this representation on our faculty, in the past few years we have conducted a number of conferences and institutes focusing on developments in the area of classification and the organization of knowledge. Some of you may have attended some of those or be aware of them through reading the proceedings. This present symposium is the second international symposium conducted in the area by the School; the first being held in 1966.

Again, this time, we feel very fortunate that we were able to attract such an outstanding group of speakers with international reputations and internationally representative, and also, we feel very pleased and encouraged at this time of restricted travel funds that we have had so much interest expressed in this conference and that we have a very broad range of institutions, agencies and areas represented.

On behalf of the University, and on behalf of the faculty and staff of the School of Library and Information Services I would like to welcome you to this Symposium: I hope that you will find the next two days rewarding and interesting and I hope that you will feel free to call on any of us for any assistance which you may need.

SUBJECT RETRIEVAL IN THE SEVENTIES — METHODS, PROBLEMS, PROSPECTS

HANS (HANAN) WELLISCH
School of Library and Information Services
University of Maryland

The subject approach to books in national, academic and public libraries is difficult and no more than about 30% of all subject searches in catalogs are successful. The present system of subject retrieval by means of Library of Congress (L.C.) *Subject Headings* is critically examined and found to be not effective because there are no firm principles to guide their formation or application. However, the system is believed to be highly reliable because it is linked to the bibliographical description of books which is indeed highly accurate. Librarians are generally able to use L.C. subject headings because they know their pitfalls, but library users find them frustrating. The MARC project simply mechanizes the existing system but does not improve it conceptually.

The formation of subject headings should follow strict rules, derived from General Systems theory and the principles of subject analysis developed during the last 30 years. L.C. *Subject headings* should be augmented by terms taken from specialized thesauri, when terms on a certain level of specificity could be linked to those at other levels (and in other thesauri) by means of common classification codes (possibly UDC). Only the principal subject headings for a book would be displayed on cards, more specific ones being stored in a computer for future retrieval purposes (similar to MEDLARS procedure). Subject headings should be applied so as to generate a co-extensive string of descriptors (as in the PRECIS system), leaving the degree of specificity of indexing terms to individual libraries. The L.C. *Subject Catalog* would then truly serve as a national subject catalog and would make individual subject cataloging largely redundant. Subject catalogs must be geared to the real needs of the user. These needs should be studied in order to create systems that respond to human beings as library users, not those of imaginary "scholars".

The title of this symposium implies some questions: Should subject retrieval in the seventies be different from what went on in previous decades? Is there anything basically wrong with subject retrieval as we know it? Are the users of information in the seventies a breed different from those which librarians have served in the past? If so, are there really new directions? And is there a new panacea for the ills that beset our systems for provision of information?

RECENT RESEARCH TRENDS IN THE FIELD OF INFORMATION RETRIEVAL LANGUAGES

by ERIC DE GROLIER
Instituts Universitaires de Technologie
Tours, France

(The following text is an edited version of a tape transcript.)

In discussing research trends in the field of information retrieval languages we must first define what we mean by the term and, since there is no clear, internationally standardized definition I will adopt that given by J.-C. Gardin: any set of symbols used for expressing certain characteristics of data on which data processing is performed, in whatever field. Gardin adds that the data are frequently verbal data and, in this case, what is envisaged is the data from the point of view of meaning or content. Generally these languages are organized on the paradigmatic plane, i.e. they are presented in the form of a classification system. Furthermore, these languages are often accompanied by rules which determine the permitted syntactic links, or, in other words, they possess some form of organization on the syntagmatic plane. In 1967, Gardin introduced a differentiation which is now generally adopted in France: he said that information retrieval languages are part of the larger class of semantic meta-languages oriented towards applications in the field of retrieval of scientific and technical information. This definition, therefore, excludes meta-languages which are constructed to describe objects, for example archeological objects.

Some idea of the historical background to information retrieval and the emergence of principles is also essential for an understanding of recent developments. The first of these principles, the principle of specific entry, was discovered by C. A. Cutter and a little later Wyndham Hulme enunciated the principle of literary warrant which had already been put into effect by the Library of Congress in making its classification scheme. Even earlier Melvil Dewey had invented a principle which the Bibliothèque Nationale in Paris had been striving to achieve for over two centuries, that is the principle of the independence of classification and notation. Dewey was also responsible for the principle of common

A GENERAL MODEL FOR INDEXING LANGUAGES: THE BASIS FOR COMPATIBILITY AND INTEGRATION

DAGOBERT SOERGEL

School of Library and Information Services
University of Maryland

Classification theory is divided into two areas: analysis of conceptual structure and file organization. The primacy of the first is stressed. A model for conceptual structure in terms of concept coordination and polyhierarchy is sketched. Some problems of file organization, namely post-coordination vs. pre-coordination and synthetic vs. enumerative schemes are discussed in relation to this model. A model for a classification scheme for different kinds of file organization is then proposed. The scheme would consist of a "core classification scheme" made up of elemental concepts and an "extended classification scheme" made up of combinations of elemental concepts. While the core scheme would be universal, extended schemes would be developed as needed in a specific application. This would make for flexibility while maintaining inter-system compatibility.

0 *Introduction*

The purpose of this paper is to give a perspective, not new results. It tries to put into perspective the problems of classification theory. These problems can be divided into two major areas: conceptual structure and file organization. It seems to this writer that classificationists have concentrated too exclusively on file organization and have looked too often on conceptual structure from the point of view of file organization and not as an area to be considered independently. This imposed many restrictions on the consideration of conceptual structure, and many aspects important for information retrieval have not been brought out. This might be one of the reasons why the results of classification theory have been neglected or sometimes reinvented in a rather amateurish manner in mechanized information retrieval systems where the restrictions imposed by file organization are by far less severe than in manual systems.

Contrary to this attitude we take the following position: the primary and basic task is to understand conceptual structure and its functions in the retrieval process. We say again that this task should be performed

THE WORK OF THE BRITISH CLASSIFICATION RESEARCH GROUP

T. D. WILSON

School of Library and Information Services
*University of Maryland**

Outlines the work of the CRG paying particular attention to the period since 1962. The intention is to emphasize theoretical concerns and their impact and also to provide background information for the papers by Austin and Aitchison.

The word "classification" is one which, in relation to information retrieval, seems to evoke a curious range of responses from wholesale acceptance of the validity of the idea that the two concepts are compatible, to utter incomprehension. This, it seems, is due to the fact that "classification" evokes at least three images:

(a) that of a system for arranging books on shelves. Traditionally this is the aspect of classification which has been emphasized in the U.S.A. and which is still considered by many to be its only function;

(b) that of a basis for the subject analysis of documents, i.e. the exact specification of the subject content of documents within the framework of a classification system. This aspect has been strongly emphasized in Europe since the development of the Universal Decimal Classification scheme. In the U.S.A. this function has been performed through the use of alphabetic subject heading lists and, more recently, through the development of "thesauri";

(c) that of an aid to information retrieval, either through searching classified files prepared on the basis of (b) above, or through the provision of "classificatory maps" to alphabetically ordered manual files, or machine files ordered in a variety of ways.

In the past, attempts have been made to construct general classification systems which are capable of serving all three of the above functions. However, it is now being realized, particularly since the advent of com-

*Permanent address: Dept. of Librarianship, Newcastle upon Tyne Polytechnic, Newcastle upon Tyne, England.

THESAUROFACET
A New Concept in Subject Retrieval Schemes

JEAN AITCHISON

Consultant in Information and Library Systems
17, Ravenbank Road, Luton, Bedfordshire

The English Electric *Thesaurofacet* is a combined faceted classification and thesaurus, for engineering and related subjects. In perspective, it is seen not so much as a departure from existing practice in thesaurus construction; but the culmination of a trend towards the integration of complementary alphabetical and systematic sequences. However, it can claim to be a new concept in subject retrieval, since it is the first indexing language designed for use in both pre-coordination and post-coordinate situations. The structure of *Thesaurofacet* is examined. Each term appears both in the thesaurus and in the schedules. In the schedules the term is displayed in the most appropriate facet and hierarchy: the thesaurus supplements this information by indicating alternate hierarchies and other relationships that cut across the classified arrangement. The thesaurus also controls word forms and synonyms and acts as an alphabetical index to the class numbers. The part played by classification during compilation of *Thesaurofacet* is discussed and some consideration given to the problems of updating, including the use of synthesis for building new concepts. Finally, methods of application of *Thesaurofacet* are analysed for post-coordinate and pre-coordinate information retrieval systems.

Thesaurofacet in perspective

Thesaurofacet (1), the successor to the English Electric *Faceted Classification for Engineering* (2), integrates a faceted classification system with a thesaurus. At the time of compilation, it was thought to be an entirely new species of retrieval language; but it is now realised that Thesaurofacet is not so much a new concept in subject retrieval systems, as a refinement of techniques in thesaurus construction, which have been evolving since the mid-sixties.

To put *Thesaurofacet* into perspective, it is necessary to study the development of classification techniques in thesaurus construction. The thesauri of the late fifties and early sixties were structured purely alphabetically. The limitations of the alphabetical arrangement led to the employment of classification aids, ranging from the broad to the detailed, and from auxiliary to integrated devices. Fig. 1 is a list of the categories of classification aids which may be employed, with examples from specific thesauri.

THE *PRECIS* SYSTEM FOR COMPUTER-GENERATED INDEXES AND ITS USE IN THE *BRITISH NATIONAL BIBLIOGRAPHY*

DEREK AUSTIN

OSTI/PRECIS Project
British National Bibliography

A logical extension of the theory of faceted classification is considered from the viewpoints of (a) shelf order classifications and (b) machine-based retrieval systems. A general citation order formula which holds throughout the subject spectrum is not regarded as feasible for a shelf order scheme, but becomes a practical proposition from the viewpoint of machine-held files. A general decision-making model for regulating citation order, based on the syntax of English, is now being developed at the British National Bibliography. Its application to PRECIS is described, and its use as the basis for a multi-system authority file is considered.

I feel I should start by making a small but important point concerning the status of PRECIS as a computer-generated subject index. In the strict sense of the words, this index is not generated by a computer. Although we use the machine to reduce the clerical drudgery of manipulating index terms and filing entries and references, it will be seen that both the verbal content and the format of an index entry, as well as the complementary hierarchies of "See" and "See also" references, are entirely dependent upon human intellectual decisions. We are not, therefore, engaged in computerised indexing as this is sometimes understood so much as in developing and using a decision-making model which allows us to make a reasonable use of machine assistance.

Before we get down to what might be called the anatomy and physiology of a PRECIS index, we should first consider briefly some of the stages in its evolution, and see how these relate to the classification research which Tom Wilson reported in his paper. Although we are concerned with the manipulation of English words and phrases, not with a system of notation, PRECIS has nevertheless developed directly out of those techniques of faceted classification and relational analysis which were described this morning, and I like to think of the development of this index as part of the continuing search for a new general classification.

THE UNIVERSAL DECIMAL CLASSIFICATION AS AN INTERNATIONAL SWITCHING LANGUAGE

GEOFFREY A. LLOYD

Classification Department FID
Fédération Internationale de Documentation
The Hague, Netherlands

Four questions, with special reference to the needs of the joint UNESCO/ICSU project UNISIST are examined:

- why is an international switching language essential today?
- why is the UDC advocated by the FID for this purpose?
- how can the UDC help to promote systems interconnection and compatability and to minimize interlingual and interdisciplinary barriers?
- what should be done to fit the UDC for this important role?

Little originality is claimed for this paper, which summarizes and expands material presented over the last decade or longer mainly by circles associated with the FID (Fédération Internationale de Documentation), more particularly by members of its Central Classification Committee (FID/CCC) (2, 3, 9, 10, 11, 13, 14). It even draws on some of the ideas expressed during the thirties and forties by F. Donker Duyvis, whose name should always be linked with the two Belgian pioneers Otlet and La Fontaine and the group of European enthusiasts — among them Bradford, Lancaster Jones and Pollard in Britain, and Walther and Frank in Germany — who transformed Melvil Dewey's Decimal Classification (DC, 5th ed.) into what later became known as the Classification Décimale Universelle (CDU), or to us the Universal Decimal Classification (UDC).

Why is an international switching language essential today?

The rapidly increasing production, transfer and consumption of scientific information — call it 'information explosion' if nuclear, population and drug explosions are not enough — present the scientific-technical community, and therefore our profession, with serious problems of inter-

THE UDC IN MECHANIZED SUBJECT INFORMATION RETRIEVAL

MALCOLM RIGBY

National Oceanic and Atmospheric Agency,
Scientific Information and Documentation Division,
Rockville, Maryland

Introduction

We have for some time been acutely aware of the wide variety of subject retrieval systems or modes available to an information systems designer. Now we are certain that a special system is available or may be adapted to suit any given collection, situation or purpose.

In this discussion, the criteria for choice or development of a system or systems for subject indexing, retrieval or browsing will first be examined from a theoretical and a practical point of view. Next the relative merits and limitations of the UDC for certain types and sizes of collection will be argued. Finally the use of the UDC in mechanized information or data retrieval systems and the use of automatic data processing equipment for maintaining and improving the UDC by itself and in concordance with other subject indexing systems will be touched upon.

The fact should be kept in mind that, whereas the UDC is actually universal in the sense that it covers all branches of knowledge, in practice it has from the start been a controlled collection of special hierarchical systems with a unifying notation structure and coordination mechanism. Although it is universal in the sense of being independent of language or orthography, yet it is hospitable to various languages and alphabets. Whereas it is itself a programming language, it requires special instructions as to filing, sorting and display in either a manual or a machine mode. Finally, whereas it has greater versatility than almost any other subject indexing or classification system, it is most often used, or misused, for purposes other than those for which it was originally intended (such as linear shelving or vocabulary control). It has therefore aroused considerable dissatisfaction among the users who want a perfect system for their peculiar uses, and controversy among those who are charged with developing and maintaining the system (for instance whether to subdivide hierarchically as originally intended or to subdivide by co-

LIBRARY OF CONGRESS SUBJECT HEADINGS — REVIEW AND FORECAST

RICHARD S. ANGELL

Technical Processes Research Office
Library of Congress

A description of the Library of Congress list of subject headings is followed by an indication of the bibliographical records and services in which it is employed. Recommendations for review and improvement of the list are offered within the framework of certain general assumptions and enumerated under six commonly identified problems of the alphabetical subject catalog: Terminology, Specificity, Form and structure of headings, Reference provisions, Complexity and size, and Maintenance. A technique for adopting revised headings within the constraints of the present card catalogs is illustrated and suggestions offered for fuller publication of the total LC subject heading system in future editions.

Note

In the preparation of this paper the author has had the benefit of the advice and assistance of Library of Congress colleagues. The views expressed, however, are his own. Some have the status of recommendations for the review, analysis, and future development of the Library's Subject Heading List. *The paper has been cleared in the Library for presentation in this symposium, but no decision has been made on the extent, if any, to which the recommendations will be put into effect.*

Introduction

The principal means of subject access to the collections of libraries in the United States is the subject-entry component of the dictionary catalog. For the most part, the subject headings used in these catalogs derive from statements of "objects" and "means" formulated by Charles Ammi Cutter in his *Rules for a Dictionary Catalog.* (1)

The final formulation of Cutter's objectives and rules was taking place at the same time that the Library of Congress was expanding and reorganizing the collections at the turn of the century. His work had a considerable influence on the founders of the Library of Congress catalog. While the early officers were in accord with Cutter and the majority of United States libraries in rejecting the classified or alphabetico-classed catalog in favor of the dictionary catalog, they were unwilling to contemplate the dispersion of headings that could follow from full adherence

PANEL DISCUSSION

PANELISTS

Dr. Harold Wooster (Moderator)	National Library of Medicine
Mr. Robert R. Freeman	National Oceanic and Atmospheric Administration
Dr. Laurence B. Heilprin	School of Library and Information Services, University of Maryland
Mr. J. I. Smith	ERIC Clearinghouse on Library and Information Sciences
Miss Sarah M. Thomas	Environmental Protection Agency
Dr. Isaac D. Welt	American University

This concluding session of the Symposium was organized so as to give each panelist about ten minutes in which to make a contribution. The following is an edited version of the taped transcript.

Dr. *Heilprin* said that he had received some input from the Symposium on two topics: one of them being the economics of classification, the other, the stability of classification schemes. On the former, one of the principal factors was the competition for scarce resources and it seemed obvious that the two principal competitors for the role of international system, namely UDC and LC, differed considerably in respect to two aspects which had significance for this competition, i.e. in the specific and logical, or switching, efficiency in the service rendered for search and retrieval, and in the administrative services involved in keeping the system up to date.

On the stability of classification schemes, he noted that in the conceptual lattices and in the file structures which attempted to reproduce them, it was clear that the most general classes have the greatest stability, whereas the classes lower down the hierarchy change more and more rapidly the deeper one goes. This leads to the conclusion that there is some merit in trying to achieve a world classification system using the first two or three levels which are comparatively stable: it is a matter of determining the threshold in terms of rates of obsolescence in order to decide how specific such a system should attempt to be.

Miss *Thomas* said that in all of the sessions she had attended the speakers were talking about creating tools which information people were going to use. She was convinced, however, that the users (at least of special

LIST OF PARTICIPANTS

Adelman, Jean S.	University Museum, University of Pennsylvania
Anderson, Hattie T.	Applied Physics Laboratory Johns Hopkins University
Anglemyer, Mary	Woodrow Wilson International Center for Scholars, Smithsonian Institute
Anthony, Betty	Institute for Defense Analysis
Askey, Donald E.	National Agricultural Library
Barbalas, Louis X.	National Oceanic and Atmospheric Administration, Lake Survey Center
Bauman, Jr. Frederick W.	Center for Applied Linguistics
Bread, Charles C.	Library of Congress
Bernal, Emilia	Graduate School of Librarianship, Univ. of Puerto Rico
Blume, Edward J.	Library of Congress
Brodney, Kay	Library of Congress
Bruch, Virginia	Army Library, Pentagon
Burris, Ray E.	Health Services and Mental Health Administration
Canick, Maureen L.	ERIC Processing and Reference Facility
Cantrell, Carl W.	National Agricultural Library
Cardin, Clarisse	National Library of Canada
Chandler, Harold R.	D.C. Public Library
Chapman, Elwynda K.	National Oceanic and Atmospheric Administration
Cheek, Madge C.	U.S. Army Environmental Hygiene Agency
Christian, Portia	Academy of Food Marketing
Clarke, Robert F.	National Institutes of Health
Cresswell, Edward P.	Dept. of the Navy
Custer, Benjamin A.	Library of Congress
Dillon, Martin	School of Library Science Univ. of North Carolina
Dunn, Harold E.	James Branch Cabell Library
Fass, Evelyn E.	Institute for Defense Analyses
Feeney, Patricia	Defense Intelligence Agency
Fodor, Beth	Dept. of Interior
Frosio, Eugene T.	Library of Congress
Fuellhart, Patricia	U.S. Bureau of Census
Garman, Leroy	U.S. Army Environmental Hygiene Agency
Gilbert, Marjorie M.	Arlington County Public Library

Goodstein, Sylvia	Montgomery College - Rockville Campus
Harvey, Dixie	Model Cities Community Information Center
Hopkins, Isabella	NC News Service, Documentation Center
Jackson, Sidney L.	Kent State University
James, Mary G.	NASA Scientific and Technical Information Facility
Jones, Margaret M.	University of Maryland Health Sciences Library
Karklins, Vija L.	Smithsonian Institution
King, Charles H.	Smithsonian Institution
Knable II, John P.	Library of Congress
Lendvay, Olga	National Agricultural Library
Lindley, Jane A.	Library of Congress
Listfeldt, Mary	University of Maryland Health Sciences Library
Maddox, Bennie F.	Coastal Engineering Research Center
Malley, Patricia	U.S. Army Computer Systems Support and Evaluation Command
Meserve, Janet R.	Library of Congress
Miller, Mary Lou	Library of Congress
Olson, Nancy	Mankato State College
Ostrove, Geraldine	Peabody Institute Library
Painter, Ann F.	Graduate School of Library Science, Drexel Univ.
Peters, Martha Ann	Enoch Pratt Free Library
Phillips, Delores	School of Library Science, University of Toronto
Powell, Myrl D.	Library of Congress
Price, Douglas S.	ERIC Processing and Reference Facility
Pritchett, Morgan	Milton S. Eisenhower Library Johns Hopkins University
Rafter, Sharlene G.	Geophysical Sciences Library, National Oceanic and Atmospheric Administration
Rather, John C.	Library of Congress
Reed, Emily W.	Enoch Pratt Free Library
Reed, Mary Jane	New York State Library
Rupp, Susan K.	Westvaco Corporation
Sanderson, Sue E.	U.S. Army. War College Library
Sawaryn, Radomira M.	Western Electric Co.
Samuel, Parkash	Library of Congress
Schneider, John	National Institutes of Health
Schofer, H. Stanley	Highway Research Board

Scott, Edith	Library of Congress
Sherwood, Gertrude B.	National Bureau of Standards
Shumway, Norman P.	National Library of Medicine
Sims, Barry R.	Coastal Engineering Research Center
Slezak, Eva A.	Enoch Pratt Free Library
Smith, Janet	Institute for Defense Analyses
Smith, Jean Chandler	Smithsonian Institution
Sohn, Berta S.	Smithsonian Institution
Spalding, C. Sumner	Library of Congress
Sundermyer, Ruth	Enoch Pratt Free Library
Tabor, Leonard	National Agricultural Library
Taylor, Louise A.	Milner Library, Illinois State University
Terwilliger, Gloria	Northern Virginia Community College
Tubio, Manuel	Glassboro State College
Wilcox, Margaret A.	World Bank
Wilson, Florence N.	Denver Public Library
Witty, Francis J.	Catholic University
Zenich, Margaret	U.S. Corps of Engineers
Zlatich, Marko	World Bank

RETRIEVAL SYSTEMS USED BY THE PARTICIPANTS

(from data submitted on application forms)

CLASSIFICATION SYSTEMS

Dewey Decimal	17
Library of Congress	48
UDC	2
National Library of Medicine	1
Own system	2
No classification system	5

ALPHABETICAL LISTS OF TERMS

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LINCS*	1
NLM MeSH	1
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*Language Information Network Clearinghouse System

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