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Search for a Theoretical Basis for UDC: A Post-Script to the Herceg-Noví Symposium.
(Classification problems. 51).

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[The main points of the papers presented and the consensus of the discussion at the International Symposium on UDC in Relation to Other Indexing Languages (Herceg Novi) (1971) are mentioned. The questions posed to UDC are enumerated. The emergence of these questions is viewed in the historical perspective of providing access to information on a global scale and of the development of UDC. The need for basing the design and development of UDC on a sound dynamic general theory of library classification is emphasised. It is shown that the almost impossible task of enumerating and arranging a very large number of subjects — almost tending to infinity — in a helpful sequence is reduced by the general theory of library classification developed in India to the enumeration and arrangement of a small

number of (1) Main Subjects; (2) Basic Subjects going with one or the other of the Main Subjects; and (3) Isolates in each array in the schedule of isolates, the arrangement in a helpful sequence in these cases being determinable by a few objective principles instead of by flair.]

1 Definition

11 INDEXING LANGUAGE

The term 'Indexing language' denotes a device — such as, a scheme for classification together with an associated system of subject headings, or a system of subject headings alone, or a thesaurus — used in a document finding system.

12 RETRIEVAL LANGUAGE

An indexing language which aids the search and selection of entries in a catalogue or a documentation list for documents of interest to a reader.

13 SWITCHING LANGUAGE

A "bridge-language" between two indexing languages — that is, interconversion and/or concordance between two indexing languages can be established *via* the bridge language.

14 OTHER TERMS

Definition of other specialised terms used in this paper may be found in the *Prolegomena* (14).

2 Variety of Studies

The papers contributed to the International Symposium on UDC in Relation to Other Indexing Languages, held in Herceg-Novi, Yugoslavia, from 28 June to 1 July 1971, were grouped under the following headings:

- 1 Evaluation and improvement of classification;
- 2 UDC *vs* other indexing languages;
- 3 Link and switch role;
- 4 Descriptor and indexing languages; and
- 5 Concordance and thesaurus.

Some of the main points in the papers presented at the Symposium are mentioned in the succeeding sections. (See Sec 92 Appendix for a list of the papers).

21 IMPROVEMENT IN THE DESIGN OF A SCHEME FOR CLASSIFICATION

211 Perreault discusses the helpfulness of the concept of Main Class in a scheme for classification in bringing together related subjects. Analyses, with illustrative examples, the collocation of subjects in LC, UDC and CC, and points out the

scatter of related subjects in LC in particular and in UDC to some extent. The arrangement of the subjects in CC is shown to be more helpful. Suggestions are also given for the revision of UDC schedules, arrangement of class numbers and about the ordinal value of the digits used.

212 Neelameghan stresses the ubiquitous role of classification in a document finding system, and mentions the attributes of an efficient scheme for classification in relation to the attributes of the universe of subjects and the psychology of readers. The need for infinite hospitality in array and in chain, resilience, adaptability and self-perpetuation in a scheme for classification are emphasised. A sound theory of classification constituted out of an explicitly stated hierarchy of guiding principles and postulates, can endow a scheme for classification with the attributes mentioned above. Consistent helpful sequence of component ideas in subjects going with different Basic Subjects is necessary and it can be achieved by making the facet-syntax parallel the absolute syntax of ideas. Such a theory can form the basis for the design and development of a universal classification scheme.

213 Dahlberg examines the structure of UDC and evaluates the scheme on the basis of the results of using the rules formulated for the design of UDC. For a new universal classification, she suggests that main classes should follow the current views, the state of knowledge and priorities, each of these being subdivided by subject fields; the specific facet of each field is to be represented by a uniform array of special isolates. The special isolates are to represent consistently such ideas as the theory, object, process, attributes, organisation, relation, determination and evaluation.

22 UDC vs OTHER INDEXING LANGUAGES

221 Cooke and others point out that machine readable records of indexing languages and catalogue of documents using them are helpful in comparing indexing languages, their inter-convertibility and concordance. Marc Tapes, and UDC schedules, UDC classified catalogue, a water resources thesaurus and a mixed format, all in the form of computer readable record, were used to determine the difference in the approach to specification of subject, indication of relations between the ideas and between subjects in each of the systems examined.

222 Hindson's paper was based on a study in which a record on tape of the British Patent specifications selected by the different information services of the British Steel Corporation was used.

The objective was to examine the feasibility of such a cooperative information service, its cost as a whole and to its users, and to gain experience of the advantage and disadvantage of using UDC and an English language thesaurus. The symposium paper describes the last part of the study. The UDC (special edition) based system was found to be more efficient.

23 LINK AND SWITCH ROLE

231 Samuelson describes the characteristics of computer systems, communication systems, information retrieval systems etc all of which may be involved in a global information dissemination. The different attributes of such a global network and the factors to be taken into account in its design, including the kinds of switching languages and referral directories that would be required, are considered.

232 Rigby compares a thesaurus prepared from the index to the special edition of UDC for the Environmental Sciences, with a conventional thesaurus in relation to their construction, maintenance, efficiency of search etc. The hierarchically constructed thesaurus based on UDC is found to be more helpful in displaying relations between ideas and between subjects, although it is more difficult to prepare. On the other hand, the conventional thesaurus is found to be "clean" but soon reaches a critical size when the intellectual and mechanical efforts involved in its development and maintenance become formidable. The concordance among thesauri and UDC "integrated vocabularies in two or more languages, and problems of special classificatic schemes vs special subject editions of standard classificatic schemes, are considered.

233 Dulovic and Gavrilov point out that at present UD is extensively used in Yugoslavia as in many other developin multi-lingual countries. Therefore, in spite of its deficiency a change over to a new universal classification will involve great cost to such a country. Further, the new classification is likel to have deficiencies similar to those now found in UDC.

234 Wahlin presents a framework for a basic classification system and suggests that special classification for particular subjects could be based on this framework and adapted for particular needs.

24 DESCRIPTOR AND INDEXING LANGUAGES

241 DeWijn and Chernyj in their respective papers discuss the general aspects and the basic requirements for consistent development of UDC.

242 Cruzeiro emphasises the need for a good scheme for classification for Economics, and describes the joint efforts of ILO, DFS, FAO, and OECD to prepare a list of descriptors for economics and social development.

25 CONCORDANCE AND THESAURUS

251 Wellisch and de Vries investigate the problems of using UDC as a switching language between a thesaurus and other indexing systems. The Thesaurus of Engineering and Scientific Terms (TEST) was used and equivalent UDC numbers were worked out for a sample of subject terms from each of the 177 subject groups of TEST. Another 75 isolates from TEST were classified in depth. The class numbers were analysed to examine the relationship between the pre- and post-coordinated terms and the equivalent simple, compound, and complex UDC class numbers.

252 Öhman and Olivecrona describe a FID/CCC sponsored pilot project similar to the work of Wellisch and de Vries. The isolate ideas and subjects represented in TEST and MESH were converted into UDC numbers. Sixty subheadings in MESH were compared with the appropriate special auxiliaries in UDC.

253 The combined use of the EURATOM thesaurus and UDC to develop a more efficient document finding system in the Soreq Nuclear Research Center, Israel, is described by Kara.

26 CONCENSUS

From the panel discussion and general discussion that followed the presentation of the papers, and also the discussions outside the conference, there appeared to be some consensus among the participants on the following points:

1 UDC in its present form may not adequately serve as an efficient universal classification system.

2 UDC in its present form may not serve adequately as an efficient switching language.

3 The structural changes in UDC suggested in some of the papers contributed to the Symposium as well as discussed elsewhere may not solve the problem of finding a better scheme for classification.

4 The present methodology, periodicity and organisation for revising UDC are not adequate.

5 The design and development of UDC should be based on a sound general theory of library classification. For this purpose, the available general theory of library classification should be carefully studied.

6 FID/CCC should preferably restrict itself to working out, publication, and updating of schedules of UDC adequate for the classification of whole book.

7 The preparation of a manual, giving in summary the basic theory of library classification, the overall methodology for design and development of the most evolved form among schemes for classification, and detailed guiding principles and steps for designing a depth version of the scheme for subjects going with a particular Basic Subject so as to meet the needs of documentation, would be helpful.

8 FID/CCC may sponsor and commission depth versions of UDC for specific subjects, by appropriate individuals and corporate bodies.

3 Finding the Trend

The studies reported in these papers are typical of the variety of studies on indexing languages being carried out during the last few years. Any one of the papers taken by itself does not give an adequate picture of the trend in the subject. It may even be difficult to assess the need for and value of a particular type of study, or to establish an interconnection between the different varieties of studies.

31 QUESTIONS POSED TO UDC AND OTHER INDEXING LANGUAGES

One approach to finding the trend is to examine the questions emerging from the studies. The main questions are of the following types:

1 Is there a need for a universal indexing language; if so

11 What are the essential attributes of such an indexing language;

2 Is there a need for a universal classification system; if so,

21 What are the essential attributes of such a classification system;

22 Should it serve both as a "retrieval language" as well as a "switching language";

3 Is the UDC suitable for use as a universal classification system; if not

31 Can UDC be developed into a universal classification system;

32 If it is either not practicable or is uneconomical to develop and use a scheme for classification both as a "retrieval language" as well as a "switching language", then what kind of a switching language is desirable for a world-wide documentation service.

32 TWO FACTORS

If we examine the reasons why the questions mentioned in Sec 31 have emerged and are reiterated more frequently in

recent years, we may be able to recognise some of the general objectives of the variety of studies mentioned in Sec 21. It would give some idea of the trend of research on indexing languages in general and UDC in particular. To get an integrated view of the state-of-art, it would be helpful and necessary to view in historical perspective two factors: (1) The idea of a world information service; and (2) The UDC. These are briefly discussed below in Sec 4 and 5 respectively.

4 Access to Information on a Global Scale

41 INFLUENCING FACTORS

The idea of providing access to information on a global scale is an ancient one. But the difficulties in achieving the objective multiplied several fold mainly due to the following factors:

1 The invention of printing from movable metallic types in the mid-fifteenth century;

2 Rise of periodicals particularly after 1660;

3 Increase in the number of consumers of information, due to factors 1 and 2 in some measure;

4 The variety of languages in which documents are written; and

5 The cyclical acceleration of production of documents, dissemination of ideas, increase in the number of users of ideas, increase in the number of new ideas, and so on. The story of this chain of events and its results are now well documented.

42 UNIVERSAL BIBLIOGRAPHY

The next step was the development of techniques and tools to provide information about the sources of information — here, the documents. The idea of compiling a universal bibliography became particularly prominent with Konrad Gesner's attempt at it in mid-sixteenth century. Several individual bibliographers followed Gesner in the next two centuries. Some confined the coverage of documents to one particular subject or a group of subjects. Many useful lessons were learnt from these experiences.

43 ORGANISING BIBLIOGRAPHICAL WORK INTERNATIONALLY

431 *Two Features*

Two features of the attempts at providing information on a global scale after the mid-nineteenth century are noteworthy. Firstly, cooperative effort replaced individual attempts; and secondly, the concept of a single universal bibliography was largely given up as impracticable, and preparation of bibliographies and provision of documentation service in particular subjects became the new line of thinking (2).

432 *Seven Major Attempts*

From about 1850, with the initial move taken by Joseph Henry, there have been serious attempts at organising bibliographical work and service internationally, particularly in the natural sciences. The seven well-known developments are:

- 1 The *Catalogue of scientific papers* (1851-1925).
- 2 The *International catalogue of scientific literature* (1894-1935).
- 3 The International Institute of Bibliography (1885-1931), continued by the International Institute of Documentation (1931-37), continued, in turn, by the International Federation for Documentation (FID) (1937-).
- 4 Concilium Bibliographicum (1892-1926).
- 5 The International Committee for Intellectual Cooperation (1921-46) continued by the Institute of Intellectual cooperation (1924-46).
- 6 The International Federation of Library Associations (IFLA) (1926-).
- 7 United Nations and its specialised agencies (1946-).

The history of these developments has been told in a very fascinating way especially by Murra (7). Among other things the success or failure of the projects has focussed attention on the enormity of the cost and the management problems of organising documentation work and service on a global scale. A more viable proposition emerged, namely the establishment of national and regional documentation centres, the provision of bibliographical services in particular subject-fields on an international scale, and the coordination of the activities of these centres and services so as to approximate a world-wide information service.

433 *UNISIST of UNESCO-ICSU*

The idea of a world science information service has been revived in the form of UNISIST. The pre-disposing cause or this venture is more or less the same as it had been for the earlier projects and proposals: The accelerated proliferation of documents in science and technology on the one hand and the growing problems of providing pinpointed and exhaustive access to information, irrespective of the location of the specialist in any part of the world, on the other. The context has, however, changed and with it the problems of establishing a world science information service have multiplied. For example, the existence of a wide variety of documentation and information services in a variety of subject fields at various levels following different policies and utilising a variety of documentation techniques, has to be taken into account in planning such a service. The Chemical Abstracts Service, the MEDLARS system, the BIOS, the INIS etc on an

international scale and the many national documentation services have to be reconciled with.

The need for fresh thinking for the organisation of an international science information service was brought to the attention of documentalists and users of scientific information in two papers by Chamberlain (3) and Boquet (1) contributed to the International Conference on Scientific Information (1958) (Washington DC). The Boquet proposal was that international organisations such as Unesco and ICSU should examine the advisability of creating an international scientific information centre. In 1960, Asmonas submitted for Unesco's consideration a similar proposal. It was also proposed that FID and ICSU should examine the question of using an international language, standard terminology, classification system etc. At its fourteenth session held in 1965, Unesco had for consideration a proposal to convene an international conference on the transfer of scientific and technological information with a view to fostering improvements in documentation systems. In January 1966, at the eleventh ICSU conference held in Bombay, a proposal similar to the above was accepted. Because of the similarity between the two proposals the two international bodies — Unesco and ICSU — joined hands to study the feasibility of establishing a world science information service (UNISIST). Working groups are examining matters relating to:

- 1 Improving the quality of scientific information;
- 2 Standardising transfer of bibliographical data, including abstracting;
- 3 Indexing and classification, including the evaluation of the major universal classification systems;
- 4 Isolating problems for research;
- 5 Language problems; and
- 6 Special problems of developing countries.

UNISIST is to be realised in the form of a loosely connected network of information services based on voluntary cooperation so as to act as a catalyst for developing scientific information service (13, 20).

44 BASIS OF HOPE OF SUCCESS

Despite the magnitude of the problems involved, the hope of developing a world science information service is largely based on.

1 The developments in documentation techniques — such as, the possibility of developing a universal classification system and a switching language;

2 The use of computer and other electronic machinery and the experience already gained with them in particular systems; and

3 The concept of a global network of library and documentation services, the design, development and management of such networks being amenable to network theory, systems analysis techniques, operations research, etc.

An important question is what kind of a universal classification system (UCS) will be helpful for the purpose.

5 Universal Decimal Classification

51 GENESIS AND EARLY HISTORY

Nearly a century ago the genius of Melvil Dewey pioneered the idea of arranging books in library according to the subjects embodied in them. And for this purpose he designed the Decimal Classification—a classificatory language of ordinal numbers, a time-honoured tool for any arrangement and maintenance of it.

About the turn of the present century, Paul Otlet and Henri La Fontaine pioneered the idea of arranging the main entries in a vast catalogue of documents—something close to a universal bibliography in the social sciences—according to a scheme for classification. They sensed that a micro subject—such as that embodied in a section of a book or an article in a periodical included in the bibliography, consisted of several units of different kinds of minute ideas in a way different from the subject of a whole book. To facilitate a close classification of such a subject, Dewey's Decimal Classification was fitted with facet feature—space facet and time facet each with its own indicator digit, and the colon being used for all other kinds of facets and phases of subjects. Such a classified arrangement of entries has become a helpful tool in the search and selection of micro documents, while the micro documents themselves may be physically scattered in different host documents. The Decimal Classification of Dewey fitted in this way for use in a universal bibliography was named Universal Decimal Classification. The early history of UDC, which has its echo even today, is worth mentioning in the words of Katherine Murra (8).

“... The deeper La Fontaine and Otlet probed the riddle of making fully accessible the rising tide of literature, the broader the subject of their investigations appeared.

“International cooperation functioning through a central agency which would combine the work of a clearing house of bibliographic information, a library complete with a world bibliographic catalog, and a liaison function seemed the obvious solution. When the first international conference on bibliography was convened in Brussels in 1895, La Fontaine and Otlet had a plan covering the above deside-

rata well in hand—even to a classification scheme. The story of the classification marathon which the intrepid lawyers won is well known. Having secured a copy of Dewey's Decimal Classification six weeks before the conference, they made some adaptation in it and, by way of illustrating its value, applied it to the four hundred thousand cards in their catalog before the conference opened.

“Although La Fontaine, Otlet and their followers were pulling away from European library and archival tradition and practice, they were unable to dissociate themselves from the ancient dream of scholars that a comprehensive yet flexible scheme for the classification of all knowledge could be devised which at best would serve as a kind of universal language through which the scholarly world might communicate as far as access to material was concerned and at least would serve as a device which would enable great masses of references so classified to be sorted and arranged by clerical workers. They believed that the Universal Decimal Classification was that device. The winning of adherents for it soon became a crusade.

“Practically up to this hour people have been either for or against the Institute, for or against La Fontaine and Otlet, for or against the concept of documentation which it developed, for or against UDC. There is scarcely any middle ground.

“Yet, in the face of all this, it will be found that the statement of the Institute's most devoted disciples is true. Donker Duyvis said in 1940 that La Fontaine and Otlet created a lasting, spiritual background for the present international organisation of documentation.”

52 LATER HISTORY

Till about 1947, the development of UDC was in the hands of a few specialists. During and after World War II the need for stepping up documentation activity was acutely felt in specialist libraries and documentation centres. In turn, the need for improving UDC in various aspects to fit it for coextensive classification of the multicomponent micro subjects embodied in articles in periodicals, abstracts, technical reports, patents, specification etc, became evident.

About 1948, large scale revision of UDC was taken up, with some users of the scheme participating in the revision process. Some twenty-five revision committees were set up. The result of the work of the committee and other suggestions for revision made by individuals have been published as ‘P Notes’ and ‘Extensions and corrections to UDC’. In 1953 and 1957 K Fill suggested the systematic revision of UDC. In 1960, G A Lloyd in a comparative study of the classes represented by the first three digits in DC and UDC showed a high degree of conformity between the two schemes (6). In the same issue of the *Rev doc* dedicated to Donker Duyvis, there were several articles evaluating UDC and making suggestions for its improvement in one manner or other. In the editorial to that issue Herbert Coblans wrote: “It

is always a sign of health when informed criticism can be voiced (and, we hope, acted upon) from the inside. If these contributions are right, it would seem that, in spite of the dead weight of the past, the UDC can maintain itself as the universal classification. However, to do this it must clean up its philosophy, tighten up its procedures of revision and extension, and speed up its communication by using the most suitable modern methods of publication". Donker Duyvis himself had made several important suggestions for improving UDC, including the utilisation of the theory of library classification developed in India.

In 1961, Barbara Kyle and B C Vickery, in separate articles (5, 19) suggested *inter alia* the use of the findings of research on faceted classification for developing UDC. K Fill reviewed most of the suggestions. It was noted that there were few fundamental changes in the structure and methodology of design of UDC. However, changes regarding the classes 2, 3, 4 + 8, 346/547, 62, 73/76 and 93/99 were considered drastic. In 1962, FID took an important decision. On the basis of a recommendation of FID/CCC it resolved to sever connections with DC in respect of the design and development of UDC. In September 1962, the UDC Class 4 Philology was set free, and combined with 8 Literature. Precipitation of changes was also warned against. For instance, there now appears to be second thoughts about the shifting of Philology: Has it more affinity to the social sciences or to belles lettres?

UDC has continued to be used widely in Europe both for book classification as well as for documentation purpose. The need for a variety of changes has been felt, and many were also incorporated, specially in schemes for classification of particular subjects. In 1967, G Lophevre has pointed out the many deviations of UDC as used in Europe, from DC (4).

53 CURRENT SCENE

Over the past decade there has been an increasing and intimate involvement of library scientists in documentation work and service. In spite of the provision for the production of revised fascicules of UDC schedules for particular subjects, it has been felt that the basic methodology for the design and development of UDC is becoming increasingly less and less helpful to meet the dynamic developments in the universe of subjects, the psychology of readers, and the needs of documentation.

In the meanwhile, document finding systems based on uniterms, thesaurus etc have been experimented with and also used. Further, with the coming in of the computer on the scene, it was thought that most of the problems of documentation, including the helpful arrangement of subjects, will get resolved auto-

matically. There were naturally protagonists for each kind of system. J Toman in a paper contributed to the Anglo-Czech Conference of Information Specialists (1967), has aptly pictured the prevailing situation in this way:

"Mr. Foskett said last May in a lecture in the Czechoslovak Academy of Sciences in Prague 'Thesaurus is a device of the Stone Age'. Three weeks later during the Berlin Symposium on descriptor systems several of the participants declared 'The classification systems are no good, we need to construct thesauruses'. The old dispute between the supporters of the classification systems and the supporters of the alphabetic, indexing systems obviously goes on as it has been going on for decades.

"On the one hand there is the great work of Dr Ranganathan and of the Classification Research Group and their contribution to the modern theory of classification, and on the other hand the sober reality—the majority of mechanised retrieval systems adopts alphabetical systems — descriptors, uniterms. If we do not want to be blind to the actual situation, we must admit that the classifications are losing ground even in the areas where they reigned for decades in the form of UDC... The introduction of punch card machines and computers brings the wave of uniterms and descriptors (thesauruses).

"Years ago when I became acquainted with the works of Ranganathan, Vickery, Foskett, Cleverdon, Mills and others I started a series of popular articles and publications about the development of modern classification and indexing systems...

"Being persuaded that modern classification systems are better than the thesauruses I must admit that I am horrified hearing now — fortunately very rare views — that the system of UDC should be abolished and for each field of science and technology a thesaurus should be constructed. The whole framework of UDC connecting hundreds of information centres would collapse and an atomisation of the present coordinated net of information centres would be brought about.

"We remember the criticism of the UDC which has been going on for some years. The critics were persuaded that a modern classification system should be substituted for UDC, in their opinion obsolete. But this criticism together with the propagation of information retrieval has resulted in thesauruses being substituted for the UDC. This certainly was not the intention of the critics, who are advocates of systems of classification and not of alphabetic indexing." (18).

6/8 THE DEEP QUESTION AND AN APPROACH TO ITS SOLUTION

6 Efficiency of Document Finding System

61 CONFORMITY TO THE FIVE LAWS

An indexing language, particularly a scheme for classification with the associated system of subject headings, is an important tool used in a document finding system. The ubiquitous role of classification in document finding has already been discussed. An efficient document finding system should enable the pinpointed (that is, with minimum noise and irrelevancy),

exhaustive (that is, maximum recall and minimum leakage), and expeditious selection of documents on the specific subject of interest to a reader at the moment. Providing a service satisfying the Five Laws of Library Science would also imply that document selection should be according to a predetermined degree of pinpointedness, exhaustiveness, and expeditiousness, we shall examine in brief the main problems involved in achieving this and what kind of a classification can help to solve some of the problems.

62 INFLUENCING FACTORS

The factors that affect and bear upon the design of an efficient document finding system are associated with the attributes of

- 1 The universe of subjects; and
- 2 The psychology of readers.

Some of these attributes are briefly mentioned in the succeeding sections.

63 UNIVERSE OF SUBJECTS

1 The universe of subjects is ever-growing. The rate of growth is accelerating.

2 New ideas and systematised combination of ideas—that is subjects—are being thrown forth incessantly and at an increasingly faster rate.

3 Each new idea or a new subject may fit in a particular position in the universe of subjects according to its filiation to the existing ideas and subjects.

4 The universe of subjects is multidimensional—that is, several characteristics may have to be used to individualise any one idea from all others in it.

5 The interrelation among the existing subjects may be disturbed due to the emergence of new subjects.

6 There may be new modes of formation of subjects—that is, modes of combination of ideas (11).

64 PSYCHOLOGY OF READER

1 The facility to communicate his exact requirement at the moment varies from one reader to another and even with the same reader in different contexts.

2 An idea emerging in the wavefront of research may not even have a specific name and the reader may have to use devious ways and the inadequate existing terminology to express his subject interest at the moment.

3 Specialisation concentrates attention on a very narrow subject—that is, a subject of great intension and small extension. The number of components necessary to coextensively specify

such a subject may be large. The reader may not recall all the components at the same time. Further, at the moment he may be most intensively concerned with one or only a few of the component ideas. And he may recall only the names of these at the time of using the document finding system (10, 12).

65 DYNAMIC CONTEXT

Thus, it is a multidimensional, ever-growing, turbulently dynamic universe of subjects that the document finding system has to deal with. Further, the dynamic feature of the psychology of reader in the search for information mentioned above has also to be taken into account.

7 Method of Approach

One approach to achieving the objective mentioned in Sec 61 is to develop a document finding system having the features mentioned in the succeeding subsections.

71 COEXTENSIVE CLASSIFICATION

The scheme for classification used should enable the co-extensive classification of each of the subjects of the documents selected as input to the document finding system. Coextensiveness consists in

- 1 Recognising each of the component ideas in a subject and the appropriate degree of interrelation between them; and

- 2 Arranging and representing the component ideas in a linear sequence preferred by a majority of the specialists in the subject so as to explicitly display the degree of interrelation among the components.

Coextensiveness is to be achieved irrespective of the degree of intension and extension of the subject; and not only in classifying the subjects of the past and of the present but, at least, those of the near future also. This will help in minimising noise and leakage in document search and selection in response to the requirement of the reader.

72 SIMILARITY OF PATTERN

It is helpful if in arranging the components of subjects there is a similarity of pattern everywhere — that is, similarity in pattern of arrangement of

- 1 Components in one and the same compound subject recurring again and again;

- 2 Compound subjects going with the same Basic Subject; and

- 3 Compound subjects going with different Basic Subjects.

73 RESILIENCE

Coextensive classification of subjects of the future requires that the scheme should have built-in capacity for helpfully accommodating new ideas, new subjects, and new interrelation among component ideas and among subjects, thrown forth by the universe of subjects from time to time, without the basic pattern of arrangement of ideas in a subject and the sequence among subjects being appreciably disturbed. Further, the document finding system should be capable of accommodating and meeting the variety of approaches of a variety of readers in searching for information about subjects.

74 PROBLEM OF TRANSFORMATION**741 *Linear Sequence***

Library classification requires the arrangement of the components of subjects going with each Basic Subject in a linear sequence. The number of components of compound subjects going with even one and the same Basic Subject is far too large to be arranged helpfully and consistently without the aid of explicitly stated guiding principles. For, classifying is equivalent to transforming the n -dimensional configuration of the universe of compound subjects into a linear configuration. The difficult problem of "invariant" arises in such a transformation.

742 *APUPA Pattern*

An arrangement of the compound subjects in a sequence helpful to a majority of the specialists and thus satisfying the Laws of Library Science gives an APUPA pattern of subjects — that is, Alien-, Penumbra-, Umbra-, Penumbra-, Alien subjects. But it is impossible to secure an APUPA pattern everywhere in the entire range of compound subjects. For, it requires keeping invariant every immediate-neighbourhood-relation among all the subjects while transforming the n -dimensional universe of compound subjects in a line. Add to this the problems arising from the universe of subjects being turbulently dynamic and tendency for infinite growth.

743 *Consistency of Pattern of Sequence*

The classificationist can keep invariant one and only one of the many immediate-neighbourhood-relations found in the n -dimensional configuration of compound subjects. The question is the immediate-neighbourhood-relation of which point should be kept invariant, and which should be kept as successive removes 1, 2, 3 etc. Conjecture by classificationists as to what is helpful to the majority of readers may not yield consistent results — that is, one and the same pattern in the sequence of compound subjects.

But consistency in the pattern of sequence of compound subjects going with each of the different Basic Subjects would indeed be more helpful to all concerned — reader, classifier, and classificationist.

75 POSTULATIONAL APPROACH

751 *Near-Seminal Level*

It is felt that the desirable invariant-complex cannot be seized by searching for it in the phenomenal level of the universe of compound subjects. A dive to a near-seminal level has yielded something more stable and practical, thereby bypassing the confusing picture presented by the phenomenal level. The design of a scheme for classification and classifying could be based on a set of postulates for the identification and separation of component facets of a subject and a set of guiding principles for determining the helpful sequence of all such facets. These have reinforced the principles already formulated to arrive systematically at a helpful sequence of isolates in an array and of subjects in general. The postulates are acceptable so long as they lead to a helpful sequence of subjects in the universe of subjects and a sequence of component ideas in a subject. This helpfulness implies that the right invariant-complex is preserved. This process of arriving at a helpful sequence of the component ideas in a compound subject is known as 'Facet Analysis'.

752 *Hierarchy of Guiding Principles*

Consistent and helpful development of classification cannot take place in isolation. An integrated approach is necessary. The General Theory of Library Classification developed in India provides this approach. It is based on a hierarchy of about a hundred explicitly stated guiding principles (15). There are:

- 1 General Normative Principles applicable to many disciplines;
- 2 The Five Laws of Library Science applicable to the library science and library service as a whole;
- 3 Canons for classification; and
- 4 Principles — such as the Principles for Sequence of Isolates in an Array — applicable to a particular piece of work in designing schemes for classification.

753 *General Theory of Library Classification*

The General Theory of Library Classification developed in India and its application have been detailed elsewhere (9, 14). The main features of this theory are mentioned below:

- 1 The pursuit of library classification in three distinctive planes — idea plane, verbal plane, and notational plane. In this

functional division of the work, the idea plane is assigned paramountcy.

2 Working at the near-seminar level, bypassing the confusing picture presented by the phenomenal level of isolate ideas and the variety of interrelation among them so as to grasp something more stable and practical.

3 Provision of set of explicitly stated postulates and guiding principles to secure efficiency and consistency in each of the three planes of work in designing a scheme for classification and in classifying.

4 Securing a built-in dynamism in this general theory of library classification by basing it on the findings of continuous research and study of the attributes of the universe of subjects, the psychology of readers, and the practice of classification in libraries and in other contexts involving the arrangement of ideas in a helpful sequence.

5 Formulation of a rigorous terminology for the subject in order to minimise the possible aberration in thinking and in communication of ideas.

754 *Reduction of Work*

Thus, the almost impossible task of enumerating and arranging a very large number of subjects — almost tending to infinity — in a helpful sequence is reduced by the General Theory of Library Classification to the enumeration and arrangement of a small number of

1 Main Subjects;

2 Basic Subjects going with one or the other of the Main Subjects; and

3 Isolates in each array in the schedule of isolates.

In these cases, arrangement in a helpful sequence can be determined by a few objective principles instead of by flair.

8 **Conclusion**

In Paper Q in this issue, the deep reasons for the helpfulness of the Facet Syntax derived on the basis of the postulates and principles of the General Theory of Library Classification are pointed out. Paper D in this volume discussed the attributes of a universal scheme for classification and how UDC may be developed into such a scheme basing it on a sound general theory of library classification (17). The need for establishing a Basis of Reference for the study of compatibility and concordance between schemes for classification in particular and indexing languages in general, whether they are used in a manual document finding system or a computer-based one, has been considered (16). In conclusion it may be reiterated that in order to increase

the efficiency and life of UDC, its design and development could be conveniently based on the available General Theory of Library Classification. The theory itself is being continuously refined on the basis of the findings of research on the attributes of the universe of subjects and psychology of readers. Therefore, the scheme is enabled to keep itself continuously fit to meet the pressures of the universe of subjects and the requirements of readers.

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- 18 Sec 53 TOMAN (J). Influence of information retrieval on the structure

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92 Appendix. List of Papers presented at the International Symposium on UDC in relation to other Indexing Languages.

1 IMPROVEMENT OF CLASSIFICATION

- 11 PERREAULT (J). Concept of Main Class and its implication for the structural improvement of UDC.
- 12 NEELAMBEGHAN (A). A theoretical foundation for UDC: Its need and formulation.
- 13 DAHLBERG (I). UDC and an ideal-indexing language.
- 14 KOFOVEC (L) and SIMANDI (D). Optimising the structure of classification and indexing systems. (Not presented).

2 UDC VS OTHER INDEXING LANGUAGES

- 21 COOKE (G A), HEAPS (D M) and MERCIER (M). Study of UDC and other indexing languages through computer manipulation of machine readable data bases.
- 22 HINDSON (R). Indexing and retrieval of records of British patent specifications using the UDC and the BISRA experimental thesaurus.
- 23 SCIBOR (E). Some remarks on the comparative efficiency of UDC and descriptor languages. (Not presented).

3 LINK AND SWITCH ROLE

- 31 SAMUELSON (K). Relay-switches and referral-directories for international data bases and information networks.
- 32 RJOBY (M). An inverted UDC index as a step toward simplified and effective thesaurus development and maintenance.
- 33 DULOVIC (L) and GAVRILOV (M). Problems of indexing and classification in small, developing, and multilingual countries.
- 34 WAHLIN (E). The AR complex.

4 DESCRIPTOR AND INDEXING LANGUAGES

- 41 DE WIJN (H H). UDC as a language of information itself.
- 42 UNGURIAN (O). Possibility to use the UDC as a coordinate indexing language. (Not presented).
- 43 GILJAREVSKIJ (R S). UDC and its role in the development of the information retrieval languages. (Not presented).
- 44 CHERNYJ (A I). Logical principles of the development of UDC and the information retrieval languages of descriptor type.
- 45 CRUZERO (M M). Indexing languages on economics: UDC, UNESCO and OECD.

5 CONCORDANCE AND THESAURI

- 51 WELLSCH (H) and DE VRIES (I). Concordance between UDC and TEST (Thesaurus of Engineering and Scientific Terms): Results of a pilot project.
- 52 ÖHMANN (E), and OLIVECRONA (Ch). Some notational, hierarchic and syntactic problems in connection with concordance between UDC and thesauri.
- 53 KARA [Marosi] (A). Relation of the UDC to the EURATOM thesaurus from the point of view of the small information centre.