SUBJECT INDEXING
AN ANNOTATED SELECT BIBLIOGRAPHY

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF LIBRARY SCIENCE 1978–79

By
YOUSUF JAMAL

Compiled Under the Supervision of Mr. SHABAHAT HUSAIN (Lecturer)

DEPARTMENT OF LIBRARY SCIENCE ALIGARH MUSLIM UNIVERSITY ALIGARH

Roll No. 16
DEDICATED
To
My beloved father who took every
Trouble
in making me educated
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Level of indexing

- Code terminology
- Thesaurus
- Another technical thesaurus prepared
- Synonyms

Introduction

List of periodicals

Part 2

Annotated Bibliography

Author Index

Title Index

Subject Index
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(YOUSUF JAMAL)
INTRODUCTION
The 'subject' is an assumed term used in the verbal plane, which is also denoted by the term — 'class' in the idea plane.

The subject of a book is the theme or thought presented by an author.

James Duff Browne defines a library catalogue as "an explanatory, logically arranged inventory and key to books and their contents" and which is "confined to the books in a particular library."

Through a library catalogue three types of approach may be established.

Author catalogue (where entries under author) Title catalogue (where entries under title) Subject catalogue (where entries under subject.)

Subject cataloguing has no less importance than author and title entries out it has not been fully developed.

Hitchler says, "subject catalogue is most important and at the same time most difficult among the various types of catalogues."

"It is difficult", because the correct and systematic preparation of subject card of books and periodical articles needs deep knowledge of the subject or topics dealt with in those publications and such knowledge is not easy to acquire.
A subject catalogue enables an enquirer to know information about the documents possessed in a library, on a particular required subject.

Subject catalogue is an integral part of dictionary catalogue (where entries are arranged in alphabetical order.)

In classified catalogue, there are two parts, where subject catalogue is a separate part. In classified catalogue, we know, one part for entries in classified order and another part for entries in alphabetical order.

However, some people want total withdrawal of subject cataloguing from cataloguing operation. According to them, it is a waste of time in presence of bibliography.

The question is — are all libraries able to have different types of bibliography?

Again, through bibliography, a reader may find the references & then go through the catalogue of author entries, but he may not find all the references there (as a library collection has a limit). So in this way, a reader's time may be wasted, which is a violation to the one of the five laws of library science.

Some people say that subject catalogue is not needed in university library. According to them, staff of the University select their reading using reference materials, review...
bibliographies, etc., and students of the University select their reading through prescribed list of books given by their teachers, syllabus, etc.

It can be told was that a good reader, he may be a student or staff of the university, does not like any restriction to his study on a given subject.

We can mention also, in this context, that there is no subject catalogue in the University of Liverpool. But the administrator of that University now feels a great need of subject catalogue.

Subject catalogue is specially useful to the specialist readers.

(2) **DEFINITION:**

Definition given by cutter for subject catalogue is *a catalogue of subjects, whether arranged in classes or alphabetized by names of subjects*.

Cutter says, subject heading is *the name of a subject used as a heading under which books relating to that subject are entered*.

(3) **PRINCIPLES:**

The principles of subject cataloguing are concerned with the following question raised by Carlyle T. Frarey:

1) What is the purpose of subject cataloguing?
ii) What is the subject catalogue to take?

iii) To what depth shall subject analysis ordinarily be attempted?

iv) What shall be the form of entry for the subject catalogue?

v) What ought the language and terminology of the subject catalogue to be?

(4) PURPOSE AND OBJECTIVES:

Hayking says, "the primary purpose of the subject catalogue is to show which books on a specific subject the library possesses."

According to C.A. Cutter, the two objectives of subject catalogue are.

1) To enable a person to find a book of which the subject is known.

11) To show what a library has on a given subject.

E.I. Coat's remarks: "All forms of subject catalogue have a two fold objective; first to enable an enquirer to identify documents on a given subject, and second, to make known the present of material on allied subject."

(5) TYPES OF SUBJECT CATALOGUE:

At the first step, subject catalogue is of two types:

1) Alphabetical subject catalogue.

11) Classified catalogue.
1) **ALPHABETICAL SUBJECT CATALOGUE:**

In alphabetical subject catalogue, subject of a book is presented by words with subject heading, while in classified catalogue subject of a book is presented by notation with class numbers. Then are the two ways, in which a subject catalogue may be prepared.

In the form of alphabetical subject catalogue, words are chosen to present different subjects and information is sought by means of those words. Here, subject matter is expressed in form of words.

H.E. Bliss speaks of this form of catalogue that "subject headings are more complete, more inclusive, more expressive for many general concepts, more capable of minute and meaningful subdivision in many cases and more plastic in showing interrelationships than are any of the classification systems presently known."

B.C. Vickery holds the view that "for direct reference to specific subject, there is no better tool than alphabetical index. Access to each subject is directly by means of the words of a natural language, no transformation into a class or code symbol is necessary. There is freedom to introduce new terms whenever and wherever they are needed."

According to S.R. Rangamathan, the subject headings used in the alphabetical subject catalogue or in the dictionary
catalogue as well, have proved so completely ineffective and illogical that there is no justification in continuing the operation of the subject heading in cataloguing when an analytico-synthetic scheme of classification can provide as many class numbers as the number of subjects required, in addition to the specific class number.

On the other hand, we may remember the discussion what is made by Julia Pettee: "The superiority of the alphabetical subject catalog over the classed catalog parts not only upon its direct access to specific subject matter without the intermediary of an index to a classification scheme, but also upon its ability to collect material from different fields under a topical name, and thus is its suprence claim to distinction.

"Its disadvantage is, of course, that the alphabetical dispiration of topics makes it impossible to assemble logically related material brought together in a linear classification scheme. However, not all material can be assembled in the one dimensional map of the classed catalog. The inter relationships brought together under names in the dictionary catalogue are impossible in the logical sequence of strict classification lines. So the argument of getting all material together under closely related headings is not entirely water light for the classed catalog."
1/a) CATCH WORD ENTRY:

The catch word entries have great impact over the origin of alphabetical subject catalogue. In fact, it has been originated from 'Catch word entries'.

The concept of catch word entries appeared in a code, which was published in France in 1791.

In Germany, particularly, the catch word entry has been highly developed and makes standard entry for the alphabetical subject catalogue. In this regard, we can name the bibliography published in Germany, "Schlagwort - katalog Verzeichnis der Bücher Und Landkarten in sachlicher Anordnung, 1889-1915", which is the excellent example of catch word entry.

The two British libraries - Birmingham public library and Liverpool public library prepared catchword entries in 1869 and 1872 respectively and latter they changed them into two forms of entries.

1/b) Alphabetical subject catalogue is of 3 types:

ALPHABETICO - DIRECT CATALOGUE:

<table>
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<th>- indirect catalogue</th>
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<tr>
<td>Alphabetico</td>
<td>- classed catalogue</td>
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e.g.,

RURAL SOCIOLOGY

or, EDUCATIONAL SOCIOLOGY

or, CHRISTIAN SOCIOLOGY
There are direct forms of heading in the alphabetical-direct catalogue.

About catch word entry, julia pettee writes in her book "subject heading; the history and theory of the alphabetical subject approach to books". When entry under author became the established practice there was still a very troublesome problem, a lot of anonymous literature, government, publications, works of collective authorship and all the various types of literature to which no personal author can be attributed. This gave rise to the catch word and form entry for such items, that is an entry under the prominent noun or phrase in the title, of entry under a form heading such as, for example, periodicals. the catch word was usually a subject word.

The catch word entry is the potent word, which expresses the subject.

Example:

Guide to insects catch word

INSCTs, guide to

e.g., Students handbook of catch word entomology

ENTOMOLOGY, students handbook of

The defect can be mentioned was that, entomology—a branch of zoology, but 'Insects' and 'Entomology' are scattered throughout the catalogue.
1/c) **ALPHABETICO — INDIRECT CATALOGUE:**

**Example:**

**SOCIOLOGY RURAL**

**SOCIOLOGY EDUCATIONAL**

This is indirect form of heading. Here we can say that, alphabetico—indirect catalogue is better than alphabetico—direct catalogue.

1/d) **ALPHABETICO — CLASSIFIED CATALOGUE:**

**Example:**

**EDUCATION**

-ADULT

-POST GRADUATE

-UNIVERSITY

-EXAMINATION

-MANAGEMENT

Under each broad subject heading, a further alphabetical sequence of subheading is accepted here. Here heading given are or indirect form also.

1/e) **CLASSIFIED CATALOGUE:**

E.J. Coates writes: *classified catalogue in which the entries are arranged in systematic order, exhibiting hierarchical
relationship between subjects, and some kind of helpful order (order of complexity, chronological order, pedagogical order, or occasionally alphabetical order.) between co-ordinate subject on the same hierarchical level. The two parts of the classified catalogue are the classified file of entries in systematic order, and the complementary alphabetical subject index. We will discuss about subject index in subsequent time.

6. COMPLEMENT OF CLASSIFICATION:

Subject catalogue is called the complement of classification. For example, a book on Electricity and magnetism, dealing with two branches of physics, is to be placed under electricity with two subject cards for Electricity and magnetism. The book could not be torn into two parts (Electricity and magnetism). For placing them separately under the two different classification numbers. Through with the help of colon classification scheme both the branches of the book are reflected in the class numbers, that numbers are of no use to the general readers, because they do not know the meaning of class number. For their prompt understanding, the users of a library need the appropriate subject heading.

7. HISTORICAL BACKGROUND: a glance

1679 The early European subject catalogue is the classed catalogue with author index as the end. One example of it was catalogue Bibliothecal Thuanæ, 1679.
The classed subject catalogue can be accepted as one of the progenitors of the alphabetical subject catalogue.

1843

American's first classified subject catalogue, was published by Yale college, as a helpful tool for students in reading, listing its approximate 2600 volumes under broad topics arranged in logical order.

1890

An important subject catalogue was printed by Harvard college.

1851

C.C. Jewett made a report on the status of the libraries in U.S.A. in which a few subject catalogues were stated.

1852

In this year, Jewett, librarian of the Smithsonian Institution published the significant report — "on the construction of catalogues of libraries and of a general catalogue, and their publication by means of separate stereotype titles—(with rules and examples)", in which he suggests an alphabetical list of subjects as supplementary to the 'general' catalogue.

1861

Ezra Aleck, the assistant librarian of Harvard University started the work for card catalogue of subjects.
1896

C.A. Cutter's "Hulls for a dictionary catalogue" was published, in which standard subject heading for English and American usage had been compiled. It is considered one of very important guiding tools for subject cataloguing even in this present time.

In this melvil Dewey's "A decimal classification and subject indexes" was also appeared.

1898

An article of R.R. Bowker under the title of "on a cooperative scheme of subject entry, with a key to catalogue headings" appeared in Library journal, in which suggestion made for guidance to subject: (i) "Synthetic" or classed analysis of generic terms and related heading together with (ii) an alphabetical list of headings and cross references.

1899

At Boston, in fourth library convention the need of choice of subject word entry was recognized and a "committee of five on an index to subject heading" was appointed, thought nothing was done by this committee.

1901 AMERICAN

American library association's committee on an index to subject headings published "Report on subject headings" C.A. cutter was the chairman of this committee.
1889

2nd ed. of "Rules for a dictionary catalogue" appeared.

1890

George H.Baeder, Successor of Dewey, became librarian of Columbia University and started to substitute the form of dictionary catalogue for the Dewey classed subject arrangement as that university.

1890

3rd ed. of "Rules for a dictionary catalogue" was published.

1892-1895

During this period committee on an index to subject heading of American Library Association prepared several reports and in 1895 American Library Association published also "List of subject headings for use in dictionary catalogue".

1898

2nd ed. "List of subject heading for use in dictionary catalogues" was published by American Library Association.

1904

"Rules for a dictionary catalogue" 4th ed. appeared.
There is a Hitchler's "cataloguing for small libraries" (Revised) was published by American library association, in entries which subject/taken a place.

Margaret Mann's "Subject heading for use in dictionary catalogs of juvenile books" was published by A.L.A.


"Subject headings used in the dictionary catalogues of the library of congress", 2nd ed. was published.

M.E.Sears' "List of subject heading for small libraries (2nd ed.) appeared.

S.G.Akers' "Small library cataloguing" published by A.L.A. presented a discussion about "Choice of subject headings".

G.O.Kelley's writing on "subject approach to books, an
adventure in curriculum" and margaret Mann's book "Introduction to cataloguing and the classification of books" of great importance.

1938

S.R. Ranganathan's "theory of library catalogue" presented an extensive treatment of subject headings.

1959

M.E. Sears' "List of subject headings for small libraries" 4th ed. appeared.

1945

"Subject headings used in the dictionary catalog of the library of congress" - 4th ed. was published.

1944

M.E. Sears' "List of subject heading for small libraries" heading decimal classification numbers by Isabel Sterenson Mann was published from New York by H. W. Wilson.

It should be noted here that only some of the most important publications related to the subject cataloguing are mentioned here. The more detailed information regarding it, can be achieved from the bibliography presented by Julia Pettie
in her book - "subject headings; the history and theory of the alphabetical subject approach to books".

(6) CERTAIN DIFFICULTIES IN SUBJECT CATALOGUING:

Author catalogue has reached a perfection. But in subject catalogue, there is a need of a lot of work to be done.

There are no of internationally accepted codes (such as AACR) and the rules which prescribe the choice and rendering of heading (authors) in author catalogue. But there in no internationally accepted rules for subject cataloguing. It is no easy to find out the subject of a book. To determine the subject of a book generally we are to force the following problems.

1) Scattering: a subject may be scattered in different document.
2) See page: a subject may be found not only in related periodicals scattered, even in unrelated periodical.
3) Multifocal feature: The subject of a book sometimes is not simple and of only one discipline.

We know, in case of multifocal feature, document deals with more than one focile; WHILE IN CASE OF unifocal feature, a document deals with one focile only.

No subject is, today, distinct. The inter disciplinary research makes a subject more complicated and so a book now
deals with more than one subject which makes the problem in determining the subject heading for the subject catalogue.

(9) **THE CHOICE OF SUBJECT HEADING:**

Margaret S. Taylor, written in the book "Fundamentals of practical cataloguing," published in 1954, stated that when words are used for subject heading, these need not be limited to the one expressed in the book's title. This peculiar convention was followed in the early days of the dictionary catalogue and is still practised in German libraries. As far as British and American catalogues are concerned, its death blow was dealt by Cutter in Rule 172.

Cutter first stated that one should not be guided by title alone while choosing of subject heading. Word should be one to express the document in best way.

Rule 172 says: "Enter books under the word which best expresses their subject, whether it occurs in the title or not."

Again, Rule for specificity (Rule 161; cutters code) suggest that which is most specific—should be provided. Rule 161 says: "Enter a work under the subject heading and not under the heading of a class which includes that subject."

For example, a document deals with cataloguing should not be provided under 'Library Science'.

But this rule was challenged by some librarians. Lilley,
one of them, challenged that is could not be determined. In 1955, Lilley said that the degree of specificity would depend upon a number of.

**FACTORS:**

i) **SUBJECT AREA**

ii) **TYPE OF LIBRARIES**

iii) **TYPES OF BOOK**

**FOR EXAMPLE:**

**LAW** — This specific subject heading can be accepted in general library, but in special library, such as in law library, this degree of specificity is of one use to the specialist.

This argument was upheld by Julia Pettes and Haykin.

According to Norris, when deciding upon the heading for a subject entry, the following points should be borne in mind:

i) The subject of a book is the topic written about.

ii) The subject heading is the term chosen to represent that topic in the catalogue.

iii) The subject entry is the entry containing the necessary bibliographical details made under the subject heading.

**CONTRIBUTION OF C.A. CUTTER:**

Many of the problems of the present dictionary subject
catalogue, can be found, related to the rules made by cutter.

Cutter's "Rules for a dictionary catalogue"—3rd ed. 1891 was the first code to formulate standard rules for subject heading for English and American usage and its principles are still in practice in the English speaking world.

1) Cutter was the first person to make it clear that one should guide by the title alone, when determining the subject heading. Rule 172 prescribes to "enter books under the word which last expressis their subject, whether it appears in the title or not".

1) RULE FOR SPECIFICITY:

(Rule 161) This is important cutter has prescribed in this rule to "enter a work under the subject heading and not under the heading of a class which includes that subject".

According to this rule, a book on SOUND should be entered under SOUND and not under PHYSICS.

1/a) CRITICISM OF SPECIFICITY RULE:

Other writer such as Lilley (1955) , Haykin (1951) Julia Pettée (1940) have criticised cutter's rule of specificity they have argued that there are different degrees of specificity and it will depend upon such factors as the subject area, the library, the book and the searcher's need. eg. , LAW maybe a specific heading in a general library, but not in a law library.
E.J. Coates in this view writes, "the expression distinct subject had more meaning to Cattar and his contemporaries (1891). It can have to us. At that time knowledge is still consisted of a number of accepted spheres of thought, each comfortably separate from the others. Subject were island of knowledge separated from one another by Oceanic voids. In our day the various island have become so thoroughly inter connected that it is often very difficult to see any ocean at all. Any subject may impinge upon almost any other and the chances are that such a union will produce a brand new offspring."

The specificity rule is ideal for locating books when the subject is known, but it is for less satisfactory for showing what books the library has on a particular subject because all books dealing with a subject can not be listed under one subject heading alone.

iii) SINGULAR VERSUS PLURAL:

It is generally accepted that the plural form of nouns should be preferred to the singular form. In this context Margaret Manns points out that the plural in inclusive, eg., The heading CANAL could mean one CANAL only, whereas the heading CANALS must mean CANALS in general.

iv) SUBJECT VS. PLACE:

There has been a great deal of discussion about the problem of whether to enter under subject of place - a work dealing with a subject in relation to a particular locality. Different catalogue have suggested different solutions. Cutter
(Rule 164) suggests that there is no real solution and the only satisfactory method is double entry, e.g.

ARCHITECTURE - India

INDIA - Architecture

But in the Rule 165, Cutter advocates entering under place, works dealing with a general subject with special reference to a place from the subject, as he says, "A work treating of a general subject with special reference to a place into be entered under the place, with merely a reference from the subject", e.g. Birds and seasons of New England under NEW ENGLAND, under ORNITHOLOGY say see also NEW ENGLAND.

In this connection, it can be told that Haykin makes a number of other important points about geographical headings. The form of name should be as recommended in the code of Rules for author - title cataloguing used by the library.

The geographical names are subject to much change and the headings must change accordingly or, they may be the linked by see also reference. In this connection, it is important to remember that geographical names may also be used as subdivisions.

V) PERSONAL NAMES AS SUBJECT HEADING;

Cutter (Rule 165) states that biography is of a ruler and works perposing to be histories of his reign should be entered under his name, but he goes on to suggest in a note that histories of a reign really ought to have double entry under person and place.
Haykin also makes a number of useful additional points. As with geographical names the form of heading should be that advocated in the code for author and title cataloging. Entry should be made under mythological legendary, biblical and imaginary characters if necessary. A number of writers may need extensive subdivisions.

eg.

**SHAKESPEARES WILLIAM** - Authorship controversy
- Bibliography
- Concordance

A number of libraries do not make a subject entry for an to biographies which seems an unhelpful economy since it could lead to such works being overlooked, it a subject search is being made.

vi) **EVENT VS. COUNTRY:**

Cutter (Rule 163) points out that events and periods of history having proper names eg., Battle of Britain ) should be entered under their names and those common to a no. of countries (eg., Revolution) - under the country.

Rule 165 says: "Event or periods in the history of a country which have a proper name may be entered under that name with a reference from the country; those whose name is common to many countries should be entered under the country." eg., for events—"St. Bartholomeuos day", for period—"war of roses", and for countries—"Civil war".
vii) **COMPound HEADINGS:**

Although a subject heading should consist of one word only whenever possible, compound headings will often be necessary. Cutter (Rule 174) suggests five possibilities:

1) A noun preceded by an adjective

*eg.* ELECTRICAL ENGINEERING

2) A noun preceded by another noun used as adjective.

*Example:* AUTOMOBILE ENGINEERING

3) Two nouns connected by a preposition

*Example:* MANAGEMENT BY OBJECTIVES

4) Two nouns connected by 'and'

*Example:* CITIES AND TOWNS

5) Noun with an explanatory term in parentheses

*Example:* COMPOSITION (ARTS)

**INVERSION:**

One of the problems of compound headings is whether are not to use inversion should such subject as constitutional law, criminal law and international law be entered directly as they should or as 'Law, constitutional', etc. There can surely be one answer if the specificity rule is to be observed and this is the one given by cutter in the first I words of his rule 175.
Enter a compound subject-name by its first word." Unfortunately, Cutter went on to say, "inverting the phrase only when some other word is decidedly more significant or is often used alone with the same meaning as the whole name," while creates an element of doubt in the cataloguer's mind.

Mann treats inversion for a number of strange reason. It bring aspects of a subject together & prevents the reader from having a book in several places for related topics. Mann says that the resulting grouping may be different from that on the shelves.

viii) NO. OF SUBJECT ENTRIES:

In the rules 176 - 180, Cutter points out that there may be more than one entry for a book. A guide to Devon & Cornwall must be entered under both countries & a book on Bananas & oranges would be lost under the general heading - FRUIT. An exception may be made when a large no. of books might be entered under the same two or more headings, such as, BUTTERFLIES AND MOTHS, or, HEATING AND VENTILATING., in such cases entry under one heading will suffice with a reference from the other.

When a book deals with a no. of specific subject which together make one whole, the general heading should be preferred. a book on various art form (eg. Painting, Drawing, Sculpture & engraving.) can only be entered under ARTS.

ix) FORM HEADING:

Occasionally entry will be made under form (eg. Poetry, encyclopaedias) instead of subject, Cutter suggests to make a
form entry.

ix/a) For collection of work in any form of literatures (Rule 189)

ix/b) For single work in the rarer literatures (Rule 190)

ix/c) For encyclopaedias, indexes & works of similar forms (Rule 191)

ix/d) For periodicals (Rule 191)

He admits that it would be desirable to make a form entry for single literary works as well as collections, but points out that this would be uneconomical of both time & space.

It is important to remember that a form heading can also be a subject heading. There will be works on English drama as well as works of English drama, books about encyclopaedias as well as encyclopaedias. There are following devices for distinguishing between subject and form headings:

i) Using singular (e.g., ENCYCLOPAEDIA) for the subject and plural (e.g., ENCYCLOPAEDIAS) for the form.

ii) Adding the form subheading—collection for works of literary form. (ENGLISH DRAMA means works about English Drama, ENGLISH DRAMA—COLLECTION being used for actual place).

iii) Distinguishing form by the adding of a place subheading.

Example: PERIODICAL AND NEWSPAPERS—UNITED STATES.
Encyclopedias, periodicals and similar works concerned with a particular subject are entered as form subheadings under the subject.

Example: CHEMISTRY - PERIODICALS

REFERENCES:

In "Rules for a dictionary catalog", 4th ed., cutter given the definition of Reference: "partial registry of a book (omitting the imprint) under author, title, subject, or kind, referring to a more full entry under some other heading; occasionally used to denote merely entries, in which the reference is implied."

Cutter further adds, "distinction of entry and reference is almost without meaning for short, as a title - a - liner saves nothing by referring unless there are several references". He prescribes, "in references use the work see when there is no entry under the heading from which the reference is made; see also when there is one."

References are an alphabetical part of an alphabetical subject catalogue if it is to fulfill cutter's objectives and ii) reveal everything which the library has on a subject.

See references are made from unused headings such as, synonyms, near synonyms & opposites to used heading

Example: HUMOUR

See WIT AND HUMOUR
Example:

INTOLERANCE
See TOLERANCE AND INTOLERANCE

See also references are the usual method introduced in an alphabetical subject catalogue of linking related subjects and aspects of a subject. References are made from general to specific.

Example:

SCIENCE
See also CHEMISTRY

Cutter says (Rule 138) says: "make references occasionally from specific to general," but goes on to point out that ascending references can only in the interest of economy, be made selective. A no. of writers have emphasized the importance of such references, and it is certainly true that without them the reader may miss valuable material.

Descending references should be made as follows:

MANAGEMENT
See also MARKETING
MARKETING
See also SALESMANSHIP

Though obviously, if there were no books on Marketing in general, the first step would be missed.
According to Coates, we can mention here two functions of references.

i) To help the reader seeking all available materials in a broad subject area;

ii) To help the reader who consults a more general subject heading the really he needs.

11. GUIDE TO SUBJECT HEADING:

From the point of view of consistency and convenience in bringing together the books of the same subject in the catalogue it is very important to choose the right subject heading & the same wording for all the subject heading for books of or parts of books of the same subject. To do this it is essential that there should be some specific code or a carefully worked out list of subject heading for guidance so that standard and appropriate heading may be used.

But in this context, it can be told also that subject heading with their complex relationships and the uncertain demand of readers for topical material make cataloguers to struggle for fixing the rules and we can not demand the success achieved fully now, in this field. More than three quarters of a century ago, 'Rules' prepared by Cutter is still one of the authoritative rules for subject headings.

The following are considered to the standard ones for subject headings.
i) Standard list of subject heading, compiled by A.L.A. in 1895, of which 3rd ed. was published in 1911.


"The library of congress subject heading is more elaborate than sears'.

iii) Sears' list of subject heading with practical suggestion for beginners in subject headings. It was first published in 1925 in 185 pages, revised by B.M. Frick, 7th ed., 1959.

The sears list, originally designed for the use of small libraries.

12. Library of congress - List of Subject Heading:-

The first ed. of subject heading used in the dictionary catalogue of the library of congress was published in 1914. The 7th ed. covering heading established upto June 1964 was published in 1966, and is supported by a supplementary volume covering the period July, 1964 to Dec., 1965 and quarterly supplements cumulating annually from Jan., 1966. Automated methods were used to produce this ed. & its supplements. This is the most comprehensive list of subject headings in existence. The fact that it is based on the library of Congress collection limits its value in smaller libraries, but it is widely and in larger libraries throughout Britain & U.S.A.

Approved subject headings are listed in bold type followed by a list of headings to which see also references may be made, a list of headings from which see references should be
made (preceded by 'X'), and a list of reading from which see also references may be made (preceded by XX).

Example:

**EDUCATION AND CRIME**

*See also* Education of prisoners

*X Crime and Education*

*XX Crime and criminals*

Crime prevention

Delinquents

Illiteracy

Omitted from the library of congress list are names of persons with a few exception; family names; names of corporate bodies; place names unless they fail an integral part of a subject heading; systematic names of genera and species in Botany and Zoology; Chemical compounds; Natural features such as, lakes and mountains; structures such as bridges and dam.

Whether to use direct or indirect sub division when using geographical subheadings is indicated as follows:-

Flory culture (indirect)

Opstdtricians ( direct)

The cataloguer would, therefore, construct such heading as:

**FLORY CULTURE - England - London**

**OPSTDTRICINS - London**
The pattern of geographic subdivision is however subject to considerable variations and has been discussed in preliminary pages.

Coates has made a no. of searching criticism of L.C. list, in particular its lack of principles & its frequent neglect of specificity rule such as use of LIBRARIES as heading instead of PUBLIC LIBRARIES. The reader might also be confused by inconsistencies in geographical subdivision since many headings subdivided indirectly are also used as subject subdivisions or under names of cities.

eg.

LIBRARIES - England
- Lancashire

But,

LIVERPOOL - Libraries

There have been a no. of guides to the application of L.C.List one of the earliest and for many years the most important being the work of Margaret Mann.

More significant now is the attempt by Haykin, chief subject cataloguer at L.C., until his death in 1958, to explain the principles on which L.C. subject heading are chosen. Coates has rightly criticised a no. of Haykin's points, but his work still a valuable guide.

Some clues may be achieved to solution by breaking the
subject heading further, which needs much more thorough work than done previously. To break subject heading into words, phrases, subdivision in different ways and different aspects of subject and at the same time to know the readers interest in general and special libraries with a comparative survey may be helpful to have the idea about the specific subject heading, though the questions may be raised, "how specific shall subject headings be? when is proper to invert a heading", and so on.

15. CONTRIBUTION OF S.R. RANGANATHAN IN SUBJECT CATALOGUING:-

1) CHAIN PROCEDURE:-

Dr. S.R. Ranganathan is originator of it which is also known as chain indexing. It was first mentioned in his 'theory of library catalogue', The device of chain procedure was designed in 1938 in the 1st ed. of ccc. This method may be used to provide subject indexes to classified catalogue and classification schemes, and again it can be used to prepare subject heading for a dictionary catalogue. The chain procedure as a technique to achieve perfection in the field of subject cataloguing is a most outstanding contribution Dr. S.R. Ranganathan. It is a mechanical device for deriving subject word entry from the artificial language of classification to the natural language, specially for the purpose of subject heading or class index entries. Since the first ed. much improvement have been brought in subsequent ed. of ccc and the latest ed. of ccc (1964) contains special terminology. During the last 20 years the chain procedure has been made so effective that desp应ts its formulation. For work with analyticosynthetic classification, specially
with the colon classification, it can be used equally well with any other scheme of classification, matter in general a method of subject indexing.

ii) PROCEDURE:-

The difficulties of subject heading which could not be solved either by cutter or by latter attempts of standard subject heading besides many other efforts were easily got over by the chain procedure in different ways. This method mechanizes the system of deriving word entries which are got by analysing the class number of a document as a series of links in a way of step wise division form the main class to the specific subject. In analysing the hierarchy, the terms found in the schedule of classification scheme are used. Beginning with the last step of division, index entries are made for each step, which is significant & may be sought by the readers.

Example:-

0 III, 2 J 64, _ : g

0 = Literature (S.L.)
01 = Indo-European lit. (W.S.L.)
011 = Tutonic lit (W.S.L.)
0 111 = English lit (S.L.)
0 111 = (F.L.)
0111,2 = Eng. drama (S.L.)
0111,2J64 = Shakespeare william (1564) (S.L.)
In deriving the heading for subject index by the chain procedure, it should be borne in mind that there are some steps which are not significant. Such steps are indicated either as 'false link' or 'unsought link'. False link is not a class no., nor has it any meaning, nor present any subject with definite name. A false link may be a connecting symbol and the digits representing relations. Unsought links are the terms representing such subjects on which no material is likely to be produced or sought, nor it is likely to be looked up by any reader seeking anything on specific subject. Sought link is that link in which a reader is likely to approach.

iii) CLASS INDEX ENTRIES DERIVED FROM CHAIN PROCEDURE

In the above example:

CRITICISM, MACBETH, SHAKESPEARE (William).

For documents in this class and its subdivisions see the classified part of the catalogue under the class number 0 111, 2 J 64, 6; G

MACBETH, SHAKESPEARE (William).

For ... Number 0 111, 2 J 64, 6
v) ADVANTAGES OF CHAIN PROCEDURE:

(a) It helps a lot in seeking appropriate OIE headings for the classified cataloguing & subject headings of subject word entries for an alphabetical subject catalogue.

(b) The alphabetical subject headings got by chain procedure serve as verbal key to the classified part of the cataloguer & this lead the users to the exact spot of subject.

(c) It mechanizes to a great extent the choice & rendering of specific subject heading.

(d) The subject approach is made very successfully by the subject headings derived by the chain procedure & thus a helpful symbiosis is established between the scheme of classification and cataloguing.

(e) It brings about economy in the number of subject index entries for specific subject & checks the cataloguing from
budking out due to accumulation of unwanted heading. In this way, the law of parsimony is satisfied.

(f) It avoid the diminution of subject list which become out dated & saves the time of the catalogur.

(g) While discussing the efficiency of chain indexing, Thomas has pointed out that, "the value of chain indexing is that it automatically collects aspects of a subject which are scattered in the schedule, a disadvantage is the diffiently often found in its use."

(h) Malt by also pointed out the utility of chain procedure in following words.

"Chain indexing is intended as an economical method of revealing in the index those approaches to the subject field which the classification has necessarily rejected. It has been argued that the chain procedure allows this to be done without calling upon the index to show all the possible combination of elements. Nevertheless in some subject fields, it may be objected that the classification and the index based on chain procedure do not cater between them for all possible subject searches; in this circumstances the answer seems to be the used or the 'rotated index' where each element is brought to them fore in turn."

vi) SHORTCOMINGS OF CHAIN PROCEDURE:

(a) Entry would got by chain procedure may not be a sought heading.
(b) Sought and unsought links make it less mechanical.

(c) It is workable efficiently only with symthetic scheme of classification.

(d) It does not provide collateral subject links.

(e) Also point out the limitation of chain indexing. According to him, "with the preferred order of the chain index, the concept are arranged according to predetermined order. There are several disadvantages of the preferred order and chain index techniques. Therefore, the scattive of facts in the class sequence and the one directional & other limitations in the arrangement of concepts in the chain index."

(f) It does not provide detailed rules of direct application, only broad guide lines can be given to apply the chain procedure. So the cataloguer will have to use his own knowledge and experience to decide which entries are to be prepared.

Coates states about the chain procedure that, "It importance lies in the fact that it is the first systematic procedure laid down for subject indexing. In is nearly, although not always, mechanical in it method of working. It scores heavily over earlive practices on the ground of economy. It provides entry word approach through combined system of generic and specific entries, but it has the disadvantages that the compou
In its compound subject entries are not given in the order in which most enquirers will think of them."

Chain procedure devised by Ranganathan as an effective means of alphabetical subject index and alphabetical subject headings has been found suffering from some defects, while it was tested by Cranfield research project. The procedure has not been able to indicate the combination of terms which a searcher might look, rather it has produced a more complex combination which hides the terms. Therefore, in order to remove such limitations, applications of cyclic rotated index has been applied. This limitations of chain procedure has been pointed out by Wilson and Steffenson.

14. **CYCLIC INDEXING**:

In cyclic index all component terms with diverse aspects or facts of a subject are taken together within an index entry wherever their positions vary according to a prefixed pattern.

An isolated concept from chain index can be granted for indexing separately, but in cyclic index, no concept can be isolated and no component class number is taken out of the integral class number for indexing separately.

When subject is complex one and with several relationship with others, cyclic index works more effectively, which is accountable to much utilization.

**Example:**

Safety device for package reactor in nuclear power stations.
The helpful order of keywords in such index entries is as:

(i) 1;2;3;4
(ii) 2;1;3;4
(iii) 3;1;2;4
(iv) 4;1;3;2

The other alternative is to permute all these descriptors.

In the words of H.Bose, "So for as chain indexing is concerned, the whole class number in single entry system, representing the integral subject, is indexed. But complex subjects generally get long class numbers, specically when the U D C scheme
is used. Indexing of such subjects bads to scattering of their parts. Multiple entry system is adopted to minimise the scatter by indexing component class numbers (which are separated from one another by colon) separately. This reduces the subject scatter and lessens the load on alphabetical index. But, since the class number get multiple entries under each of its components in the classified file, the economy, brought about by multiple entry system, is substantially multified because the classified file swells up disproportionately in the long run."

Here, we come to know that components in compound subject entries, in cyclic index, in such a order are given which are very helpful to cover various approaches, and in which many specialist readers are likely to ask.

15. CONCLUSION:

Now we can say that subject cataloguing has its own problem. It needs attention of library specialists for doing a lot of work in its field. At the present time, the need of it is not lost. We may remember what Carlyle J. F. Frasre says in this context," It is not likely that subject catalogue will disappear. For we are beginning again to recognize, as W.W. Bishop aid in 1906, that "our aim as librarian is not merely to accumulate book, it is to help to reader to the books he wants - or ought to want. In a large library the only tool which accomplishes this result in the catalog, and of this the subject catalog, is the part most difficult to make, most useful when well made."

16. REFERENCES:

1. Mann, Margaret J. Introduction to cataloguing to and the
CONTROL OF INDEXING TERMINOLOGY SELECTION OF INDEXING WORDS:

How do we select indexing words? Some indexer can read text and understand it their understanding being shown perhaps by their ability to formulate its subject in words that differ from those used by the author. These little knowledge about the mental process involved in such human understanding. Other indexer cannot understand it will set but these are adopt at picking out its words, phrases and sentences that their author has emphasized as important the title and section headings introduction, conclusion summary and so on. Some indexing system deliberately restricted the selected phrase to the title alone to minimize the skills and effort needed at this stage of subject analysis is guided by the system designer in choice of indexing words. e.g. An indexer of scientific and technical article may be estimated to select the following:

(1) The heading subject of the text taken from the title.
(2) The type of study (experiment survey product, development etc).
(3) The problem investigated.
(4) Direct conclusion, supporting result that answer the problem.
(5) Method of Investigation.
The chemical abstract journals regard as suitable for index entries every measurement, observation method apparatus, suggestions and theory that is represented as new. In some systems indexing words are taken from the title alone and number of words depends on the system some prefer two words and some up to 60 words. This all depends upon the systems, their analysis and the users needs.

**AUTOMATIC INDEXING**

The phrase automatic indexing is used to over performance by mechanical mean of any or all of the stages of subject analysis any the selection of indexing entries from the text considered here. Machine indexing in this secure requires. (a) That the text of documents be in a form that can be read by a machine. (b) That machine can be recognised individual words. (c) We can provide the machine with rules for selecting certain words phrases as index entries. Machine readable text can be produced in the form of codes on punch cards, punch tapes, in magnetic tape, such coded text can be read and manipulated by the digit computer. Two types of rules have been used in experience on machine indexing. In the human analyst compiles a list of key words of potential entries to further user of the index. This list is compared by the computer with each word in text of a document.
If a key word appears the fact is recorded and these selected words make the index entry. Then the second type is reverse or opposite principles. Experiment suggests a new approach to the treatment of Heart Disease. The most frequent noncommon words were harmones, (occuring the times) female (11 times) effect (8) Animal (7) Heart (7) physics (7) Retrienoendot (7) chnal. This method of statistical indexing by FINER and LUSH, who applied it to mechanize the selection of significant words, phrases and sentences. This system was first to count the frequency of occurrence of each journal words in a text to select the most frequent words of indexing representing the subject entries. By this system we count the words used in a text and significance of the words used in a text book which will show the subject matter of the article usefulness of the article. This entry help in selection and in indexing easily and quickly.

USE OF TEXT WORDS IN INDEXING

The word first used to describe the information contents of a documents are words selected from the document itself. These are not necessarily the words finally used in a retrieval system. They may be standardized transformed coded. Many systems do rely solely or mainly on text words in course this can be done by unskilled persons. The use of title words for indexing has long been common out. It has recently being given greater emphasis in so called
keyword. In context indexes e.g. keywords in context index of biological abstracts. In this case the indexer examine the title of each article and add word if necessary to indicate.

1) The nature of investigation (Descriptive experiment theoretical).
2) The nature of the article (Research Report review, bibliography).
3) Organisation and substance used as object of investigation.
4) Technique used e.g. Tissue culture, chromatography.
5) The locality of the investigation.

These added words are also in journal taken from the article and this involve securing more than the title.

**How Do Words Affect Performance:**

In a good selection of words the users of the index can retrieve easily and specific subject but if the words are not selected wisely it will effect on the retrieval system.

**Number of Index Words Per Document:**

Retrieval system very widely in their depth of indexing i.e. if the average number of index words used for each document in system only two or three words are taken from the documentation e.g index medicus 10-12 words.
CONTROL OF INDEXING WORDS:

Each of central concepts may be indexed by one word or sought by its synonymous words or some allied words. To govern such misses on some misses on of this kind instead of choosing indexing words freely from documents we can restrict them to a structured terminology. Any such terminology consist essentially of a list of words likely to be found in documents with two added few times.

(a) some words are not allowed as indexing words; they are treated as synonymous.

(b) The generic specific and other relation of each word to other words and shown by see verferences. By showing relation between words and we help the indexer as searcher or both to more from one word to another. Every time a different form of structure of terminology is produced. It is announced as revolutionary discovery. In fact there are two basic forms and each has been evolving in the same way. The first form is the alphabetical list of the words with sec or see also references. The conventional is the subject heading list each entry in the list is a complete heading. Sometime an phrases on a succession of noun. In the modern version of this form the phrase and noun compounds have largely being broken up and the individual words separately listed.
A second list is the classified list of words with an alphabetical key containing see references. The conventional type is the enumerative classification where each class is a subject heading. In the modern version of this form the compound.

If we express the topic by thinking four nouns: Plant, Disease, Control, Antibiotic, and use every possible permutation. We could make 24 entries. How many useful access points? How many essential indexes provide only access point per topic. If there is to consistency in the choice of access point serve rules are needed to indicate which entry word to choose when ever the topic expressed by more than a single word. In this case when we are using towards an index entry e.g. town planning which will be access point planning for towers. So there are so many example for this type of expression. The librarian J. KAISER proposed that the words in subject phrases we consider as either concrete e.g. Boat point, Town, Aluminum bicycle soon. This rule was to make an added entry under concrete. The rule would not cover the topics, bicycles wheels and suspension bridges where two concrete appear KAISER would enter them under Bicycle and suspension using the natural language sequence of the words in phrase this rule can not help us with control of plant disease by antibiotics. So more complex rules have been developed to index entry. Such as Rotated or permuted index entry in which every entry is notated and tens is used in key word in context index which can be produced by the computer.
The compound classes have largely been broken up the individual components separately listed. This is faceted classification.

NUMBER OF ACCESS POINT PER DOCUMENT

According to RjED in a study of an abstract even if a large number of words has been selected from a document not all of them may be available in the system as access point for the information search. In principle are would like to use all of them. In this way all have been selected as suitably representing the information contents of documentation. The only restriction is an examine are the more search keys provided the more cost is to construct on the other hand the fewer keys will make the index less easy more costly to use and tend is towards increasing access. e.g. In a document the subject theme of the document is the control of plant disease antibiotic. Different users might except this topic to be indexed indifferent ways e.g. control of plant disease by antibiotic, control by antibiotic of plant disease, plant disease control by Antibiotic, antibiotic control of plant disease and so on.

Each of these is a potential access part.

CONTROL OF INDEXING TERMINOLOGY

The basic reason for applying this control is the immense variety of natural language suppose that an index user derive to find document dealing with oscillation motion, movement and for searcher the index for entry
under oscillation. Another may be discuss this concept under many other names such as vibration, undulation, Pulsation, Mutation sawing, beat, Pitch and so on. If each index entry used each author onwards and no books are made between them searcher will miss all these entries can be helped in two ways.

1) At the time endexing all the variant forms from this concept used by author can be represented by a standard entry.

2) At the time of searching from each terms used as an entry the searching can be guided to all other terms used so that the he can be wishes over all possibilities. In most systems in practice rely on both methods and some degrees on terms standardization at in put and some guiding at out put. In other case the terminology of the field covered by the system will be controlled and organised same from system will be controlled and organised some of this control have already been suggested in one form of automated indexing. A standard list of key works for which a text is examine sets a limits to what terms will be used as index entry. Again as Kaiser to define terms as either concrete or process already limits them use a standard. Then, even more elementary form of control is to decide on standard word form e.g many system use:

1) Noun where possible e.g Heat and powering not pour, roughness not rough.

2) To name of specific material such as urea versus bag
of qualities, roughness are used in singular.

(5) Types of material solvents dyes, equipments bicycle are used as plural. The next step is bar introduction of synonymous words having the same weaving.

SYNONYMS

There are perhaps few exact synonyms in most field of knowledge. Each word have its seen shape of meaning and usage. It is better to define synonyms as words that in a particular system as words that in a particular system are represented by the some index term e.g a phrase Junior college. There are at least two other phrases having the same meaning namely community college and two years college. Unless a rule is made to use are of the three terms when even the topic Junior college is to be indexed. The index under Junior College and sometimes under other two phrases. This would result is only partial or incomplete retrieval Documentation one Junior College when searching the heading Junior College. If Junior College became like standard term then the following see references are made in the index.

Community Colleges
See Junior Colleges
Two Year Colleges
See Junior Colleges
The preparation of see references for synonyms in one of all the techniques used in terminology control.

**NEAR SYNONYMS**

There is also the problem of words that have similar but not same meaning that is near synonyms e.g. In an index to documentation in the field of marketing there may be documentation dealing credit purchasing also documentation with both forms of purchase there are related but not have the same except. The difference can be shown by having two indexing terms namely cash purchases and credit purchases respectively. The relationship between the two indexes is indicated by near of the two see also references cash purchases.

See also credit purchase. The following cross references should be provided to make the decision clear, credit, purchases.

See purchases
Cash purchases
See purchases

**HOMONYMS:** — Author problem is that of homonyms there are many words that have different meaning. These meaning have been used by one author in a particular context e.g. when we used the word Bond so the word Bank indicates there as well as their meaning. In writing and conversation meaning is supplied by context this
also needed to be added in index to avoid ambiguity. The context is provided by a parenthetical words or phrase following the index heading for the word Bond various context will as under Bond (chemical) Bond (legal) Bond (financial) and so on. The word Bond can appear in an index several times with different parent theoretical statements.

**Level of Indexing:**

Skill author problem is the problem of generics or levels of indexing. This variable characterizes subjects describe in documentation is concluded in an index the same subject can be indexed and therefore searched at different levels of specificity.

*E.g.* North America, Florida

A practical solution of this problem is to instruct the index to as specially as the subject permits. The entries problem is not yet solved as he my have to search indifferent levels of specificity. If all the documentation on Florida needed one can not search only under Florida needed serve same documentation will be on parts of Florida perhaps lien country and will therefore have to be searched under generic term Florida and specific term for parts of Florida. In the type of index the hierarchically classified index the more Generic (Broader) concepts are included in the specific (Narrower) concepts. For the other indexer the specific
Generic relationship can be spoiled out either by separate listing of specific generic word families or by cross references.

e.g. the splitting of the phrase.

**COED TERMINOLOGY**

Systematic terminology usually translates standard indexed terms into code. The most complex coded terminology yet developed index term is systematic code developed at Western Reserve University by Perry and KNT. Semantic code involves the analysis of words into term that collectively define from and expression there terms rudolated disciplines.

**THESAURUS**: A book of words that shown explicitly the relationship among the words in certain their relationship may be those of synonyms specific to general (often called broader terms) Generic to specific (often called narrower terms) General non specific relationship (related term) The sources in the new introduction in the indexing system and used into central vocabulary in mechanized indexing system.

E.g MSHE (Medical subject heading)

ASHA (Thesaurus).

The first thesaurus was used in engineering term known as THESAURUS of engineering term provides following related terms.

Documentation, Document - Drawing, History Phograph, records, management.
ANOTHER TECHNICAL THESAURUS PREPARED:

In called T.D.S. Givenar Thesaurus system list following related terms. Geographic representation, Atlases charts, dimatological Atlases charts, dimatological Atlases cabnet, Chart, Diagram, Display, Geographical Atlases, map.

Another approach to control of terminology is given is a semantic analysis of terms by contemporary. The term, record is related in this approach to the following term.

Information Comment
Record Communication
Recording Declaration
Archives Diagramme

The idea of new type of thesaurus arose from an existing need in operating information retrieval system in this process of providing AEROSPACE LITERATURE to industry through the National Aeronautics and space administration (NASA) technical utilization projects. The different interpretation of the same terms by industry on one hand and the AEROSPACE field on the other become evident as did the fact that of 17578 available terms for retrieval purposes listed in the machine terms vocabulary approximately 1000 terms of there are used for retrieval information for the clientele.

SYNONYMS:- To indicate terms that may be used interchangeably to present single concept e.g. lead peroxide or red lead.

SPECIFIC TO GENERIC RELATIONSHIP:- To identify term that is part of a broader class e.g. ethanol and isopropanol both are belonging to class Alcohol.
Generic to specific relationship:

To identify a term that may represent a group of more specific words e.g. spraying equipments includes Airless, spraying equipments.

General Non specific:

To indicate term which are related other terms but not in a totally synonyms or generic specific manner e.g. fire retardant coating may have meaning related to Non flammable coating.

Two project were undertaken which were designed to permit the systematic development of thesaurus and its lasting the first was thesaurus of pant and allied technology published in 1968. In this more than are lakh and 5000 term were collected from wide sampling of relevant literature. By which the area of the field were divided were into five major leading.

(1) Material
(2) Equipment
(3) Supplies
(4) Process and methods
(5) Property characteristic and conditions.

For those terms did not fall in these five areas a miscellaneous category was established to deal with

1. Surface or structure to be coated.
2. Terms of measurements
3. Terms of classificable
4. Terms not known
5. Trade names.
After initial placement of these terms into one of the above areas, subsequent decision was made by following the road map to reduce all material or supplies or all equipment into more specific location. After this a rough these areas were prepared and it was also further reviewed by the technologist and the suggestion and criticism incorporated in final draft. E.g. this resulting entry is given below.

**ALCOHOL**

(Broader term) ET - LACUE SOLVENCY

(Narrower term) NT - OXYGENATED

HITANON

CARBINOL

CYCLOHEXNOL

ETHANOL

METHANOL

See also ANTZ FREEZONEYOL

E.g. AERONAUTICS

See also

AVIATION

See AERONAUTICS

(Broader term) - Industries and Science

(Narrower term) - ASR PLANES

( Related term ) - ( R T ) ASTRONAUTICS

In the above text aeronautics is selected as an index term and Aviation is synonyms for aeronautics. This is recorded as index decision by the cross reference Aviation See Aeronautics. The reference from aviation is recorded. The see also
reference indicates related terms. Three kinds of related terms are listed.

1. Narrower term (More Specific term) A econometrics.

2. Broader term (More Generic term) Aeronautics

Specifically non geneically but related in other undefined way this term is followed by designation (R T). The thesaurus provides more access point for the information search.
The present century gave rise to the rapid growth of literature. Researches are being conducted in every field of study and literature is enormously multiplying day by day. Micro thoughts of the past have become the macro thoughts of the past have become the macro thought of the present and may become the full fledged subject in the near future. The present era rather to say research era meditates retrospective and intensified research and study. Hence it has become necessary that all the possible available material on a subject should be colocated so that a researcher might go through all the updated information regarding his topic or subject. Therefore subject indexing is a tool to promote the research and intensified study. For this purpose several systems, techniques, and methods have been evolved. Computers are also being used for subject indexing. Although the number of published literature is so great, particularly in the field of science and technology, that a researcher can not consult every document relevant to his topic, even then the importance of subject indexing can not be underestimated. There are certain problems in subject indexing e.g. terminology, synonyms, homonyms etc. which create trouble in its utilization. But certain guiding principles have been proposed by the library scientists. There all as parts have been carried in the descriptive part of the present work.
The bibliography includes 251 entries which are not comprehensive but are fairly representative of the subject. While starting with this venture, a general survey of the literature available in important libraries via Maulana Azad library, Aligarh, and level lines of Delhi are changed was made. Help was also sought from some indexing and abstracting services of sought from same indexing and abstracting services of respect. Out of the fairly large number of periodicals covering the field, only important ones were selected for the purpose. A list of these periodicals consulted including their respective places of origin, abbreviations used and frequency, has been given in the beginning of this chapter.

Although the bibliography is essentially selective in nature, I have tried my best to cover all aspects of the problem and to make it fully representative of the various techniques and system.

The other problems pertaining to each of these group have been so subordinated to them with the help of subject headings.

STANDARDS FOLLOWED:

As far as possible the Indian standards recommended for bibliographical references (is : 2581 - 1963) have been following. In certain cases, such as indexing of the heritage of library science, where the said standards do not
give any guidance, full words have been preferred.

**ABSTRACTS**;- 

The entries in the bibliography contain abstracts given the essential information about the articles documented. An important feature of this bibliography is that I have given informative abstracts rather than indicative and feel a needy researcher need not consult the original articles in the periodicals.

**ARRANGEMENTS**:- 

Efforts have been made to arrange the entries under extensive subject headings. For this purpose a comprehensive list of subject headings was compiled which is given as chapter of **Postulat** for the development of subject heading no classification scheme was found to given co-extensive class number, scheme was found therefore was for the headings have been derived by following a logical helpful sequence guided by following a logical helpful sequence guided by postulates and principles of helpful sequence given in cc. Although there is always scope for difference of pinion an any issue the list of subject headings is expected to be helpful to the consultants of the bibliography.

The entries are serially numbered and the following items of information are contained in the various entries.

(a) Serial number 

(b) Name of author/authors 

(c) Main stop (*)
(d) Title of contribution including subtitle and alternative title, if any.

(e) A full stop (.)

(f) Title of periodical in abbreviated form so as possible. This has been under lined.

(g) A full stop (.)

(h) Volume number

(i) A comma (,)

(j) Issue number

(m) A comma (,)

(n) Year

(o) A semi colan (;)

(p) Inclusive pages of the articles.

ALPHABETICAL INDEX:

Bibliography contains exhaustive author, title, and subject indexes reportily. See references have been provided to facilitate the various approaches. Consideration of the permission in the names of the authors have been specially kept in mind.

I hope it will augment the utility of the bibliography.
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Journal of American society for information Science
Journal of chemical Documentation
Journal of Documentatation
Journal of Education Librarianship
Law of library journal
Library Association Record
Library and information science
Library Resources and technical services.
Library Trends
Library Quarterly
Medical Journal of Australia
New Scientist
National lending library for science and technology Review.
Petroleum Review
Program
Reprographics Quarterly
Special library
Unesco Bulletin for libraries.
Works management.

J. Am. Soc. Inf. Sch.
J. Docum.
J. Educ. Libr.
Law Libr. J.
Library Ass. Res.
Library Trends
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Lib. Q.
NLL Review.
Spec. Libr.
Unesco Bull. Libr.

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Chicago Q
Bangalore Q
Urbana Q
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London W
Boston Spa M
London M
New York Q
New Delhi Q
New York
CHAPTER

BIBLIOGRAPHY

SUBJECT INDEXING AND INFORMATION EXPLOSION


The information explosion has led to new methods of classifying and retrieving of information no matter how big or small the organisation. Alphabetical classification has proved inadequate, and has been followed by the "inverted file" and post co-ordinate indexing technique. The card index is being superseded by the computer enabling searches to be made on a scale not practical with manual system and leading to rapid development of current relationship between recall and precision, special difficulties arise in information retrieval such as making a match between the relevant documents and the question. The special problems of managers, methodical recording, current awareness and retrospective search are inter-related.


Information retrieval as an identifiable concept arises with the increase in scientific literature and the availability of new physical forms of index after world
War II. Purchased cards, and Luhn’s application of computers with index cards and Luhn’s application of computers with indexing were among the most significant of early developments. Computers have also been successfully applied to citation indexes and other published indexes such as index medicus.

Development of index language is closely related to research on thesauri. Current research system using natural language, and the sociology of information users should soon make a significant contribution to performance of information retrieval system, but further basic research is still needed.

IN RELATION TO CULTURE


Paper presented at a seminar conducted by the department of Librarianship, Royal Melbourne institute of technology, Aug. 72 Glenn college, La Trobe University, Bundoora.

An attempt is made to look at classification and subject indexing in the context of culture as defined by sociologists. The content of culture is divided into ideas involving our thinking, norms governing our doing, materials involving our possessing and doing, but these categories are not mutually exclusive.

INFLUENCED BY NATURAL LANGUAGE


Because current knowledge is expanding so rapidly and in
such complex ways present classifying and indexing systems are becoming inadequate. In the search for the most efficient organisation of data the influence of language as a primary classifying systems should be extensively examined. The English language has a particular pattern system, but in other languages, different ways of viewing events or relationships appear, these alien concepts may lead to new and better systems for classing and retrieving data.

SUBJECT INDEXING

5. BATTY (David). Whence? or, the man with the only rag. Cat Index. 1970: 14-15.

Abridgement of the opening paper, spring seminar, subject to information 1970. The history of the subject approach is a developing recognition of ignorance and question arising from it. Librarians have moved from a single, optimised knowledge structure to a healthy state of doubt. A subject catalogue should guide to the subject of interest and indicate other relevant subjects. Considers alphabetical subject Cataloguing, classifications, post coordinate indexing and indexes without an index language. There are two main problems: (1) A simultaneous need for rapid, extensive growth and the maintenance of a stable, coherent system, (2) A concern to characterise information as the best possible answer to a hypothetical best possible question. There has also been an undue pre-Occupation with technique.
6. CHATTERjee (Mrinal). Library science from a new angle. 
Her. Libr. Sci. 15, 1, 1974; 138-142.

Presents library science as an information retrieval system for the communication of knowledge. Includes the following sections: Information retrieval; subject index in and index terms; Indexing and Boolean algebra; pre-coordinate and post coordinate indexing; Exhaustively and specificity of Index language.


Reviews writings under the following (1) The subject catalogues place in soviet libraries. The classified catalogue enjoys recognition that the alphabetical subject catalogue has been unable to gain proponents of the alphabetical catalogue seek to introduce it along side the classified one. (2) The nature of the subject catalogues controversy on the respective merits of the catalogue is based on the alleged in ability of one to provide what the other provides. (3) The structure of the subject catalogue considers writings concerning what a subject and a subject heading are the arrangement of subject heading and the use of sub headings. Concludes that the practices of the fundamental library of Social Sciences of the academy of sciences would justify detailed examination, discussion recognising social function and Marxist Leninist epistemology achieves sharper focus than some western discussion above all the discussion on elementary points (What is a subject, etc.) provide food for thought. 


The approach to teaching classification and subject cataloguing has been to regard the activities as having little in common. Coordinate indexing and methods such as key indexing have been taught in quite separate courses. Arguments for change, treating these methods as variations on a basic information retrieval theme, are the Granfield project which shows there is little intellectual differences between the various system and the students position as users of retrieval tools. There are causes of this kind at several UK Library schools and Maryland School.


The elements of a basic for a theory of information storage and retrieval are presented. It is believed that this theory can best be formulated in terms of a general theory of indexing. After stating basic premises and defining essential concepts the relationship between a theory of information storage and retrieval is considered. The relationship between query formalation retrieval, benefit is discussed, and these notions are then related to the human performance variable. It is believed that the ideas presented in this paper provides a useful framework detailed investigation into the indexing process.
10. NISTOR (S) and JAMALAN (T). The subject catalogue.

Brief history of the introduction and development of the subject catalogue through the ages. The catalogue is defined and its alternative names mentioned. Subject catalogue in libraries in various countries are listed. The importance of a subject catalogue in the cataloguing system of a documentation unit is emphasized. The structure and principles of compilation for a catalogue are set out.

11. OLDING (R E). John Metcalfe and Subject Catalogue.

There is some doubt, internationally, on whether Metcalfe should be listed in the annals of fame or infamy. He views subject work as indication not education and rejects the theories of Richardson, Bliss and Ranganathan with Kaiser, Metcalfe development of cutter's treatment of complex subjects is a major advance, it clashes seriously with procedure as exemplified in the British technology index Metcalfe should be lauded and thanked for long researches, identification with problems pungent criticisms, interest in teaching the subject and concisience that cataloguing is art, not a science.


In considering the future of information retrieval, past developments are useful for understanding the relations
between classification and location of a required subject. They indicate that comparatively crude arrangements for documents and post coordinate systems for complex subjects must suffice. The most noticeable development have been in machine of retrieval systems, but the problem of representing subjects to allow retrieval from various points of view remains. The specialists needs of individuals indicate that retrieval systems designed for limited fields may be more useful than all purpose systems, but progress will ultimately depend on development of a sound basic theory.


There are two main aspects order in a library: the arrangement of documents on the shelves; and the arrangement of the document surrogates; i.e. entries in catalogues, indexes or bibliographies. The second aspect is concentrated upon, although some of the factors examined also have a bearing on the systematic arrangement of documents in store. There are two sections: Naming subjects, in which the importance is shown of the correct selection of terms e.g. in the handling of synonyms and, even more importantly, in the manipulation of the terms selected to form the actual headings used; and Display of relationships which demonstrates the relationship between subjects.

Asserts that current library subject catalogues are costly weak tools, almost impossible to keep in reasonable working order and of marginal usefulness. The essential functional elements of a system such as this would be a "free" vocabulary segmentation of the subject files, logical operators, and a synonym dictionary.

15. SUBJECT INDEXING-EVALUATION


A discriminant function index is proposed for use in the evaluation of information storage and retrieval systems which takes into account the interdependencies between the measured variables and the relative value placed on those variables by the system evaluator. Application of the proposed index is illustrated through performance data obtained as part of the MEDLARS study.


Contribution to a special issue of J. Docum. containing essays presented to RA Fairthorne on his 70th birthday. The development of reliable methods of evaluating information retrieval systems is essential as a basis for monitoring developments in systems and predicting means for improvements.

UTILITY STUDY

17. CLEVERDON (Cyril W). User evaluation of information
retrieval systems. *J. Docum.* 30,2, 1974; 170-80.

The general suitability and applicability of the measures of recall and precision are discussed in relation to the performance of operational systems. In devising an evaluation test it is necessary to decide exactly which questions have to be answered to enable the design of any test to provide the required data.

**TECHNIQUES-MANUAL compared with AUTOMATED**


The results of 2 questionnaire surveys conducted in 1968/69 and 1973 among a sample of 98 special libraries are discussed in terms of conventional (Pre-Coordinate) indexing system and non conventional (Post coordinate and mechanised) systems. Post coordinate and mechanised systems users make more use of multi system indexing, of these 67% are applied research libraries.


An effective man machine interactive retrieval system is not achieved simply by placing a terminal on each end of an existing machine retrieval system. It should also provide different levels of service to experienced and inexperienced searchers, recognize the difference between in narrow and
broad query, furnish clues as to the next direction to be searched, recognizing the database dynamically as the searched changed his viewpoint, provide a ranking of responses in the most likely sequence and offer the searcher the option of over riding the ranking when a particular term is of extreme significance.

A SURVEY

A brief account intended for the layman of information retrieval of by conventional indexes and catalogues, Punched & Cards and computers. Inhile the ideas belived KWIC, KWOC and uniterm can be made intelligible in a short propular acc­count, the pros and cans of computers in the information retrieval role are much more difficult to convey to the uninitiated in a short space.

A consideration of the bibliographical analysis of documents particularly subject analysis, the use of centralised index­ing terminologies and the construction and search of sub­ject files.

TECHNIQUE

Discusses the use, advantages and disadvantages of classification schemes, card indexes, edged punched cards,
in indexing non book materials in school resource centres.


The information that provide access to news articles and features from the New York Times material will be processed with 4 working days after publication. The indexing operation will eventually process about 100, 1000, NY times articles and 150,000 other articles a year. Each indexer specialises in particular subject working at cathode ray terminals which are also used when interrogating the Bank.


Contains the following sections: Meaning of information retrieval, Aim of, and need for retrieval, theory of sets, of types/system, including data base, reference retrieval, document retrieval and text processing, classification, facet analysis function and types of indexing, method of reducing indexing variances. Calls for closer collaboration between librarians and specialist to improve methods.

INDEXING CONSISTENCY

A measure of indexing consistency is developed based on the concept of "Fuzzy sets". It assigns a higher consistency value if indexers agree on the more important terms than if they agree on less important terms. Measures of the quality of an indexer's work and exhaustivity of indexing are also proposed.


To explore the assumption that the amount of inter indexer consistency experienced under a given method of indexing is indicative of the indexing quality, two hypotheses are stated. A specific example is then exhibited to show both hypotheses to be invalid. A mathematical analysis of the counter example shows a definite relationship between inter indexer consistency and retrieval success.

27. INFORMATION RETRIEVAL

27. HEAPS, R. S. Criteria for optimum effectiveness of information retrieval systems. Information and control. 18, 1971; 156-67.

Three measures of effectiveness of an information retrieval system are formulated in terms of a user's estimate of the relevance of items output. The search effectiveness is then optimum for the permitted form of question, the measure of output relevance and for data bases of similar statistics.

28. LORING, R. J. Guidelines for a personal information retrieval system. Chemical Engineering, 73, 1971; 91-95.
Even with access to an automated retrieval system, a simple personal system may still be necessary for daily requirements. The methods of gathering, processing and storing information must be flexible and geared to the user's retrieval needs. Library reference sources used to supplement personal files include published indexing and abstracting services and a guide to the literature.


The SOL project, 1965-8, examined the testing of IR systems. A model system, a set of measures and a methodology for performance testing were developed. The results of the main experiment show that output components (handling of questions, method of question analysis, construction of search strategies) seem as important in their effect on system performance as in input components, number of index terms per document affects performance considerably more than indexing languages, the human factor appears to be the main variable in all components of an IR system, IR system seen to be able perform at present only on a general level failing to be specific and comprehensive, testing of total IR systems controlling and maintaining all factors (environmental and systems related) is not possible at present.

MANNAL, CLASSIFICATION

SOCSCI, U.D.C. Social Sc.

UDC: combination of true and false hierarchies limits its usefulness in social science fields. Where false hierarchies normally represent an old-fashioned view of subject. Forest analysis proceeds such a multiplicative lattice-work of terms rather than a single linear sequence, and has much to offer the controlled indexing languages used in post coordinate systems.

THESAURUS, UDC


The UDC water thesaurus concordance and a special subset of UDC water schedules will be used for indexing, classifying and retrieving documents within the Water Resources Date systems Document Reference Centre (dARDC) of Environment Canada through an online interactive system.

SOLICITED WITH MACHINES


The machine searches furnished a higher percentage of unrelated materials, but little staff time is required to obtain them. Leaching qualified persons to do literature searches, either in the library or in the research groups, greater use should be made of library or in the readily available computerized searches.
The British Air craft corporation (BAC) carried out an experiment to determine the effectiveness of the Retrospec I on line information retrieval system which has a database selected from computer and control Abstracts over the past three years. Manual searching using standard methods on the same enquiries were carried out by library staff as a means of comparison for time, cost and amount of information retrieval.

SEARCH STRATEGY


Searches theory is applied to scanning shelves for books of possible interest, or a catalogue (card or computerised) for items of immediate utility. The result is a formula quantifying the fact that browsing follows the law of diminishing returns. It also allows method for optimising chances of success for a given amount of effort. Discusses how a library or catalogue might be arranged to aid the average browser.

Influenced by RELEVANCE

It was desired to check whether the unexpected test results obtained in Granfield II has been influenced by the relevance decisions. 3 new relevance decisions were therefore obtained and the Granfield II results were recalculated for 19 index languages on the basis of the new relevance judgements. A rank order of the index languages was found, in no case did the correlation co-efficient of any of the 3 new rank orders fall 0.921 when compared with the original Granfield II results.

RELEVANCE


It is possible to define relevance in terms of logical implications viz. a stored sentence (in either the systems or the user's memory) is logically relevant to the user's information need only if: (1) It is in a minimal premiss-set for some component statement of the tree representing that need; and (2) These exist stored premiss sets for all component statements in the tree (except the origin) which are the ancestors of this component statement. For any yes-or-no question answering system operating with one of the standard formalised languages this definition provides a mathematically precise criterion of relevance.

Studies were carried out on librarians, students & research workers to determine whether relevance judgements were influenced by differences of subject speciality. Relevance judgements of the student group correlated more closely to there of the research worker's than to the judgements of the librarian group. This seemed to indicate the effects of subject knowledge and a questionaire revealed that chemical study was thought to be an easier subject area than basic study.

SEARCHING


Persons with information needs are faced with determining which potential sources of need satisfaction should be accessed and the order of accession. A reward-cost theory of behavior provides the structure necessary for postulating various user evaluation functions. Applications of techniques of sequential optimization in search theory yield criteria for determining optimal sequences relative to both the many sources one need and many sources many needs problems these criteria are then analyzed relative to the operation of an information storage and retrieval system. It is show that the information storage and retrieval system has control over the factors which interact to determine the optimal sequences, and the specific role played by each of these factors is investigated. The decision criteria can also be used to optimally order items services, or search zones. (Original abstract: Aslib).
A measure of the effectiveness of information retrieval strategies is shown by a discussion of the relationship between semantic information content and coding theory as an experiment. Information and coding theory constitute a probabilistic theory which measures variability on a stochastic basis. The measure of variability is entropy. Information clearing up certainty. If a message is known with certainty, no information is gained.

Users studies carried out at INSEEC are discussed under the headings (1) Information gathering activities of scientists and engineers, (2) Users preference in printed indexes including the subjective approach, quick reference versus exhaustive searches, subject index headings, cross references; (3) Science Abstracts covering use of cross references, index entries. Result indicate information officers and scientists employ differing search techniques; many users scan all references under subject heading in preference to using the alphabetical arrangement; users have greater confidence in an index with obligatry cross references; there is no correlation between the use of cross references and case of use of indexes.

If a normal distribution for the pertinence value of a document is assumed then, in some cases, the sets model of an information retrieval system does not satisfy the condition that recall and precision are inversely related. It is suggested that the anomalous case is not an intrinsic fault in the model but develops from the associated retrieval rule. A modification of the rule yields an improved level of performance by the model and the inverse recall/precision ratio is engorged.

HIERARCHIC-MODELS


The most frequent technique of information retrieval is the inverted file method which consists of producing lists of accession no. of documents concoted with every descriptor, and is particularly fast when a query is composed of a single descriptor. A model of an information retrieval system is presented in which lists are produced for the elements being a conjunction of all descriptors. The response to a query is the union of corresponding lists. This method of information retrieval has been applied to the case when a hierarchical relation of descriptors is defined on the descriptor set.
CHOICE OF TERMS


An evaluation of procedure for indexing requires subjective judgement and two methods of indexing are chosen to be tested. Method I consists of indexing documents from a restricted set of alphabetically ordered descriptors and method II allows the indexer to consult a set of suggestion lists in addition. Each document was indexed by the 2 method and a sample of 316 documents was used, divided among 45 indexers. Analysis shows no significant differences in the quality of the results and that the evaluations did not vary systematically with the judges.

NOISE ELEMENT

44. FLUTIN (M) and LISTERN (S&D). Noise its effect on depth of file search. *Inf. Stor. Retr.* 7, 2, 1971; 79-57.

By means of a set of Monte Carlo computations, the general behaviour of the efficiency of probabilistic information retrieval system as a function of human variability noise may be shown. The effect of noise is measured by the fraction of the file that must be retrieved in order to obtain the document that, without noise, would be retrieved 1st. Also, for a fixed number of terms in the cluster, the fraction of file searched decreases with the number of terms in the query.
Enquiring how the effectiveness of a library system may be measured in quantitative terms at least in theory the author draws the analogy of a reader looking for a book with a detective called to the scene of a crime and introduces the interesting concepts of entropy and noise for the insight they provide.

The author is a fellow of Nuffield college Oxford and his main research interests lie in the field of criminology.

**TESTS-USE OF FACET ANALYSIS**

46. **NEELAMEGHAN (A)**. Analysis of readers question: a case study.


Analysis of the subject matter of questions put by specialist reader to retrieval systems is often necessary. In this case one question used in the As Lib.Granfield research project and covering the field of high speed aerodynamics and aeronautical engineering were facet analysed. Steps 0-4 of Ranganathan's postulational method were used. The questions were mainly confined to the core subject. The subjects of the questions fell into two groups: compound subject 76.5% and complex subject 23.5% where compound ideas were only implied they had to be implicitly named, and where a multifocal subject was involved each focus was treated as a separate subject and analysed accordingly.
NOTATION-CHEMISTRY

47. LONIVER (DA) and FELDMAN (RJ). Interactive searching of chemical files and structural diagram generation from WIESWESSER line notation. J.Chem. Docum. 11,3, 1971; 139-59.

An interactive search and retrieval system for Wieswesser for line notation (WIN) has been implemented. The system employs but screens, which are useful for filtering a file. 4 fortran iv programs were developed to prepare bit screens for WIN files, input the search request to generate the WIN iteratively search the WIN bit screen file, and generate a 2 dimensional representation of the chemical structure directly from the WIN.

PRECIS


The precis system produces a printed alphabetical index with a high degree of pre-coordination of index terms. Multiple entries are generated and computer sorted but the input requires details subject analysis by indexers. Concepts are formed into index term strings, the citation order and subsequent manipulation being based on a scheme of relators. The paper describes the origin and development of the system.

CASE STUDY

49. AUSTIN (D). The development of PRECIS. A theoretical and technical history. J. Docum. 30, 1, 1974; 47-102.

The development of PRECIS is discussed in 7 main sections:
(1) Introduction—the PRECIS system in its present form, the
syntax and the semantic aspects; (2) The classificatory background of PREGIS reference is made to the NATO/classification Research group research project and to summary of ORG research; (3) present development and future plans for PREGIS.

CHAIN PROCEDURE in related to CLASSIFICATION.

50. RAMAKANDA (BS). Subject headings by chain procedure and classification in; Documentation Research and training centre. 1967; 545-55.

Three case studies in which subject headings are derived by chain procedure from the class numbers of a faceted depth classification and from those of a full edition of the UDC. It is shown that the subject headings derived are helpful in pointing out the deficiencies in a classification scheme.


Explains the concept of chain procedure and considers the possibility of homonyms when time is olate in a class number is treated as a false link according to Rule KB2 of the classified catalogue code. Rule KB1 is needed for individualisation purposes in same cases. Suggests possible alternate rules for the treatment of period in History with suitable examples.

MICROFILM

The improve access to the recent issues of CA accumulative quarterly index, based on keyword phrases, has been produced in microfilm form by lol ltd. CA condensates records certain all the information needed to create the entries for each CA issue, and the index is provided by converting the weekly tapes into the index format. The index has proved to be effective in use, and the time saved in searches justifies the cost, searching for references to a keyword over 16 months requires the scanning of 6 reels of film in comparison with 76 hard copy issues.

56. MNYRE (Vance A). A case study of improper conclusion drawn from an sufficient analysis of information costs and benefits in: proceeding of 36th annual meeting of the American Society for information science, Los Angeles, 1975, 21-25
Improper conclusions were drawn from a cost-benefit analysis because an sufficient number of factors were analysed. From the automation survey it was expected that there would be a reduction in personnel of one clerical worker and one scientist but this did not happen. A consultant undertook a simulation study to determine the performance potential of the automated system.

CLASSIFICATION SCHEMES

The elements of the major classification schemes now in use for shelf arrangement of scores and sound recordings are identified. These schemes, i.e. library of congress Dewey, Dickinson and Maccluom, are evaluated as they apply
to the two main groups of library collections: Those argained for the researcher, and those argained for the browser. For sound records the music library association has suggested a method of shelf arrangement which still account for 80% of the schemes used. There are numerical; classified, trade symbol; and alphabetical arrangements.

**FACET ANALYSIS—MATTER ISOLATE**

55. NAIK LAMAN (A) and GOPINATH (MA). Grouping of matter (Property Isolates. Documentation Research and training Centre. 25, 5, 196 64-85.

A short treatment of the development of the idea of matter (Property) is followed by an attempt to group isolates demand to be a manifestation of matter (Property) by the correlation of such isolates with the concepts of the five fundamental categories.

**GOLON: BOND THEORY**


The 7 bonds previously suggested are enumerated in sequence of increasing strength. The bonds are phase bond, there corresponding to the fundamental categories Time, Space, Energy, Matter and personality and fission bond, with the strangest bond strength. This new concept is demonstrated by the examination of the succeeding statuses given to the subject of Bio-Chemistry during the last half century.

Based on lecture 3 of the first Dr S.R. Ranganathan memorial lecture's, Bangalore Feb73. The following technical terms are defined: (1) Idea (2) Subject (3) Isolate and (4) Subject field. Discusses postulates about Basic subject of the General theory of library classification; (1) The ubiquitous nature of Basic subject (2) First components implications of the following are outlined (1) Delimitation of subject field (2) helpful grouping of subjects (3) Analogy in organisation of memory. The helpfulness of conforming to the postulates about BS in practice is stressed, and a revision of the concept and the terminology of BS proposed.

**BASIC SUBJECT ARRANGEMENTS**


The universe of subjects consists of (1) Simple subjects; (2) Compound subjects; and (3) Complex subjects. Each subject is deemed to go with a basic subject. A simple subject consists of a BS only. BS can be categorised into primary BS and non primary BS. PBS may be formed by (1) fission (2) Distillation of kind 1, (3) Distillation of kind 2 (4) Fusion and (5) clustering.


A selected list of 77 references to documents dealing with the concept of Basic subjects, their recognition and made of
formation, and their arrangement in a helpful sequence in
the schedules of a classification.

**DICTIONARY Compared with CLASSIFIED CATALOGUE**

60. *IFIDON (SM)*. The public card catalogue: Dictionary or divided?
Nigerian Libr 9,2,1973; 35-41

An exhaustive search of the professional literature reveals that
nothing conclusive exists on the best form of public card
catalogue. Based on information gathered by means of questionnaires
a new approach is advocated: (1) Division of the public card
catalogue in all new libraries, (2) Discontinuing existing
dictionary catalogues in the older libraries and starting
divided catalogues from a cut-off date.

**CORPORATE AUTHOR- GOVERNMENT**

61. *MANGL (PB) and SARAVAI (JL)*. Corporate author: Govt; A compa-
rative study of rules in ccc and **AAR**. *LACLIC Buls* 13,2,1968;
149-65.

The inadequacies of entries under corporate authorship in the
**ALA cataloguing Rules (1949)** contributed to the appearance of
the Anglo American Rules (**AAR**) in 1967. Both **AAR** and Ranganatha
classified catalogue code (**UGC**) define author as the body
responsible for the contents of a work. The types of corporate
author recognised by both are Government, institution and
conference. The conclusion is made that **AAR** is an improvement
over the **ALA rules** and much influenced by Ranganatha.
ANGLO AMERICAN RULES

62. SALVI (GN) and GIHA (B). The Anglo-American Cataloguing Rules with emphasis and rule 14 (reviser or original author).


The principles which under lie rules governing from of entry revised works are; the extent of revision, usage and the wording of the title page. The influence of these three principles on various codes is traced. In the Anglo american cataloguing rules, rule 14 for the treatment of revision depends by implication, as the wording of the title page.

This principle which is explicitly stated in Ranganathan's classified catalogue code under the name of the canon of ascertainability, is not only simplest but also the most reasonable, as the title page will be influenced by the other a principle of usage and extent of revision.

CATALOGUE CODE - DEVELOPMENT

63. OLDING (RJ). Information indication-the rule of conventional

/N.Z.Libr. theory. 17,3,1969; 95-102

a brief outline of the ideas and methods of Panizzi, Andrea crestradora, Kaiser, E.J. Richardson, Bliss, E.W. Hulme, Gutter; Ranganathan etc.

STUDY OF RULES

64. DOWNING (JC). A national cataloguing policy. Libr. Ass. Rec


93
paper given at the London seminar of the cataloguing and indexing group of the library association on the implementation of the Anglo American cataloguing Roles 26 and 27 October 1968. Describe the prepublication review of British Text of the Anglo American cataloguing rules (1967) under taken by working party of the cataloguing staffs of the copy right deposit libraries and BNB.

CHOICE OF READING


states the change in authorship where a work get revised or rewritten. Discusses the provision in the of CCC regarding the ascertainability of authorship of such a work. Suggests additional rules with a view to link the revised work and its authorship with that of original.

PERSONAL AUTHOR


illustrates the need for knowledge on the cataloguer's part of the practices regarding personal names in different cultural groups, and asks for new approach for future titles. Suggests that a solution would be to adopt the Indian standard supplement to author statement to be printed on the back of the title page; this is already done by some publishers in India.
67. RAIGANATHAN (SR) and BHATTACHARYYA (G). Conflict of authorship: person vs person. J. Docum 6, 4, 1969: 59-51

Refers to the importance of defining the term "personal author" and compares the 1967 Anglo-American code with the 5th edition of the classified catalogue code in deciding which of the various individuals named on the title page is truly the author. The problem is considered with special reference to: (1) reported verbal contribution (2) correspondence; (3) maps and atlases; (4) dependent works.

CLASSIFIED


JNUL has started indexing its classified catalogue for more effective use. The catalogue combines material from 5 different alphabetical catalogues, none of which includes subject heading. There are two indexes in the social sciences: an area index with listings of all class numbers which contain publications relevant to the area and a subject index including the subject of books in the collection and subject listed in the schedules. Both indexes were begun on the basis of a review of existing class cards and under go continual revision expansion.


Abridgement of a paper at the spring seminar, subject to information, Aberystwyth 1970. The alphabetical subject index, as
part of the classified catalogue, needs re-examination. Ranganathan's chain procedure has led great influence, question arising from this techniques use are: (1) is the unassisted reader aware of the alphabetical subject index classified file interaction; (2) are economic arguments powerful enough to warrant its use. Considers (1) from the viewpoint of a user's search for fertilisers for wheat and title known about user's subjects forumulations. Including contains thing material action theory for (2) The most satisfactory procedure would be full permutation.

CLASS INDEX ENTRIES

70. NEELAMGHEAN (A) and BHATTACHARYYA (G). Class index entries for microdocuments: a case study. Documentation Research and training centre. 1967, 369-382

It is suggested that where desirable, parts of documents should be indexed separately and that each part should have a main entry in a classified catalogue together with an abstract of that part. Each microdocument would have class index entries derived from its class number to facilitate browsing in the catalogue.

SUBJECT HEADING SCHEME-UNION CATALOGUE

71. RYDINGS (ADDED HT). Subject headings for a local catalogue Libr. Resour. Techn. Serv., 19,1, 1975, 24-50

The university of Hong Kong is compiling a union catalogue of material relating to Hong Kong available in local libraries.
The main sequence is an alphabetical subject catalogue, using modified Library of Congress subject headings, with author and title indexes in western languages and Chinese. The main reasons for basing the Hong Kong catalogue on the same pattern as the university’s Fung Ping Shan Library are:

1. The majority of the entries were expected to come from the university library and would need minimal adaptation;
2. The users would be accustomed to the style.

Double entries under generic and specific headings have been used frequently; the value of this approach must still be ascertained by use.

THE SAURUS PROBLEM

72. STEINER (WA). Thesaurus problems; Thesaurus problems as exemplified by the index to foreign legal periodicals. International Journal of Law Libraries, 2, 1974; 5-13

Report delivered to the 39th General Council meeting, IFLA, Grenoble, Aug 27th Sept-1, 1973. Explains the choice of alphabetical rather than classified subject order for IFLA. Suggests that an alphabetical index should be complemented by a classified list of subject headings and vice versa to eliminate certainties and anxiemties. Discusses the causes of gaps in the subject headings; difficulties of translating legal terms; the use of scope notes and geographical subdivisions, and limitations imposed by the recent computerisation of printing.
73. KOREVAR (Jacobe D). Thesaurus problems: UDC legal literature. *International journal of law libraries*, 2, 1974; 20-21

Report delivered to the 39th General council meeting, IFLA, Grenoble, 27 Aug-I sept 73. Discusses the nature of UDC as stuctured list of terms similar to a thesaurus; recent and imminent revisions in the legal part of UDC making it reflect continental European law, and the possibilities and impossibilities of UDC for law.

**ASLIB LIBRARY**

74. WALKELY (Janet) and BARBARA (Hay). An annotated list of thesauri held in the Aslib library. *Aslib. proc*. 23, 6, 1971; 292-300.

This list of 66 lexical authority files (which may be thesauri term list or subject headings lists) is arranged in broad subject order following UDC, each entry gives bibliographic details, subject coverage, type of publication numbers of preferred terms and lead in terms notes on contents and layout, supplementary information. These publications are held in the reference stock of the Aslib Library, and are normally not for loan.

**CUTTER'S PROCEDURE**


An explanation of cutter's terminology relating to subject
indexing, the special attributes of the dictionary catalogue envisaged by him and development in subject headings prior to cutter referring to the general theory of subject headings introduce cutter's procedure of dividing subject headings for synoptic subject specific subject indexing in a dictionary catalogue. The application of Cutter's basic rules is demonstrated, using the postulates the implied systematic scheme of subject headings and the rules.

LIBRARY OF CONGRESS


An economical classification process of order n long n (for n elements), which does not employ n square procedures. It requires the following parameters as input. (1) Maximum number of clusters desired; (2) approximate percentage of loose documents desired; (3) decision on whether or not loose documents should be 'blended' into nearest cluster at the end of the classification; (4) amount of overlap desired. The algorithm is not guaranteed to terminate but convergence has always been obtained in practice.


A comparison of the 1935 5th ed. and the 7th ed. of the LC subject headings list indicates that there was an increase in headings with in direct subdivision, mainly in the
science and technology field. Appendices list headings sub-divided indirectly in the 7th ed., changes in the 7th ed., involving alteration of the subject heading, changes from indirect to direct, and from direct to indirect sub-division.

CITATION ORDER-PRECISE CATEGORIES


Describes Ranganathan's subject analysis methodology by pointing out the difference in notational classification and subject headings in relation to citation order. Explains by means of examples Ranganathan's derived structure and the application of his analytical techniques based on fundamental categories, and Rounds and Levels. States the citation order analysis questioning the postulate that (x) focus alone is capable of producing new Rounds.

MUSIC


Subject heading theory exemplified in the practice of two leading music libraries, the New York public library and the LC, is discussed from the view point of Cutter's basic principles, identifying significant differences in terminology and the structure of heading for music monographs. Variation from LC practice particularly in regard to sub-division and inversion, result in more specific and direct subject
entry. The desirability of adopting LC subject headings for use with automated cataloguing is contrasted with value of specialised subject access for the music library.

AUSTRALIAN MATERIAL

80. MCKINLAY (Johan). Subject heading for Australia. *J. Libr. J* 1974; 131-36

The need for a list of specifically Australian subject headings is argued, to deal with Australian terminology. A proposed list of subject headings given include: (1) existing acceptable headings from the library of Congress subject headings relating to Australia. (2) A complete listing of sub-division applicable to the heading Australia; Categories of heading to be excluded include names of persons and families, names of corporate bodies, names of tribes, tribal group etc.

MEDICAL SUBJECT HEADING


A computerized English - Spanish correlation index to 5 biomedical library classification schemes (National Library of Medicine library congress, Dewey etc) and computerized English - Spanish listing of MESH were accomplished by supplying appropriate numbers from the schemes to MESH and a Spanish translation of the scheme. Other classification schemes UDC, and translation of MESH into other languages can be added.
The four types of libraries surveyed were: law schools; governmental; and other 80% returned the questionnaire. Results showed: (1) 33% use more than one subject heading list in combination; (2) the LC list is relied upon by 85.5% but only 16.5% accept it as it stands (3) popular modifications concern the use of the word LAW, and establishing new headings. (4) 39.5% are a marked copy of a published list as an authority list with 25% a card file.

The final part of the survey was concerned with LC subject headings; their improvement; the degree of user satisfaction and recommendations for their standardization, involving collaboration between the law libraries and the LC.

Modification to LC subject headings involved: (1) Those beginning with the word LAW; (2) legal vs. nonlegal aspects; (3) nonlegal subjects; (4) nonlegal subdivisions. The library's subject authority file is described, with reference to the LC subject list. The full project involved the following: removing cards for 16 subjects from the drawers at one time; checking each card; searching the LC subject
list, 7th ed, and its supplements; examining see references etc. The new file was completed in 16 month, and consists of 20,000 cards in 29 drawers. The standardisation of subject heading used by LC and the law libraries is recommended.

CHAIN PROCEDURE compared with CYCLIC PERMUTATION

84. SURAMANYAN (TV). Chain procedure and cyclic permutation of terms in class index entry. Documentation Research and training centre. 1967; 356-67

Although the use of chain procedure is economic in the derivation of class index entries, it is suggested that combination of chain procedure and modified cyclic permutation would increase the efficiency of the former.

MANUAL CHAIN INDEXING

85. JOB (MM). Dictionary catalogue and chain procedure.


Discusses the modified rules of chain procedure meant for a dictionary catalogue as given in Ranganathan's Classifie catalogue code, chapter K20. The effects of these rules on the syntactic function of a dictionary catalogue by way of examples with full chain, specific subject headings. See also subject headings, and see subject headings are provided.

CHAIN PROCEDURE


Comments on M.M. Jobs article on chain procedure which
suggested that time isolates could be used sparingly as subject links as they are not always false links. Demonstrates the uneconomical results of treating time isolates with in a classified index as sought links by giving examples.


Explain the concept of chain procedure and considers the possibility of homonyms when time isolate in a class number is treated as false link according to rule *KB* of the classified catalogue code. Rule *KB* puts a bar on using isolates from the outside the class number which is needed for individualisation purposes in same cases.


Defines chain indexing, originally called chain procedure, stating its genesis and use. Describes the need for chain indexing and its advantages. Explain the methodology of chain indexing and the concept of sought heading and the links in a chain. Points out the hierarchical sequence followed in deriving the chain and the need for a suitable classification scheme. States the contribution of chain indexing in learning about a symbiosis between classification and cataloguing. Describes its limitations and modifications made to over come there limitations.
ALPHABETICS CLASSED INDEX compared with ALPHABETICAL INDEX.


Predicasts Inc. produce 2 types of indexes: (1) The F and S index of corporations and industries (industry action), using hierarchical classification; (2) The F and S index of current events, listing entries alphabetically. Both cover business literature, but the emphasis is different. F and S (industries) deals with the highly structural product information; F and S (current events), covering social, legal and political problem, is aimed at a less sophisticated market. The main advantage of an alphabetical index is easy entry.

RELEVANCE - SEARCHING


Given a particular retrieval system, it is reasonable to attempt to utilize user generated feedback regarding its past performance in order to modify and improve it. By performance is meant simply how well the system has served the user no considerations of times, cost etc., are included. A general mathematical model may be developed for this purpose.
INDEX LANGUAGE-SURVEY

91. VICKERY (BC). Structure and function in retrieval languages.
    Inf. Stor. Retr. 27,2, 1971; 69-82

Retrieval languages can have varied structural characteristic.
(1) The distinction between indexing and search languages,
(2) The possible type of (a) dictionories and (b) Thesauri.
The functions of retrieval languages can be identified
(1) String selection (necessary)element of retrieval language,
    natural language words and synonyms
(2) Specific reference
     (either natural language terms and summation or word form
     and synonym control; control; interlocking, structural relations)
(3) Genesic survey (either specific terms and summation
     or generic relations); etc. No retrieval system provides all
     these facilities, user needs determine what functions are
     required and different functions require different structures

LANGUAGE PROBLEM - NATURAL LANGUAGE

92. TOWNLEY (Helen Mq). A look at natural language retrieval system

Natural language systems are defined as those in which people
do not sit down and select, from a limited vocabulary, words
to describe the formation in documents and enquiries; a model
system is put forward to elucidate the definition. Such
system fall into 2 classes; (2) Those which operate on the in
put information, by semantic or syntactic analysis, to provide
a controlled language; (2) those which are controls on the
enquiry which using an the obtruded language in stored
texts.
Linguistic analysis - influence dictionary


To mistake of distinguishing linguistic and non-linguistic knowledge made by many traditional philosophers and repeated by the logical empiricists, has been perpetuated in linguistic theory by such and standing proponents of transformational grammar as Noam Chomsky and Jerrold Katz. Programs retrieval would have to model our entire cognitive apparatus, since a dictionary is not as many believed, all that is needed.

Compound word


The problem of compound words has become evident in post coordinate indexing systems. Rules for handling compound words, including there for pre-coordinate or rotated indexes are discussed in
detail, including rules made up by aitier, Farradane, Taube and Jespersen etc. In use for 2 years, they been of great assistance in decision making and rectifying earlier decisions, thus making the vocabulary more consistent.

**LANGUAGE CONTROL - TERM WEIGHTING**

95. SALTON (G) etc. A theory of term importance in automatic text analysis. *J. Am. Soc. Inf. Sci.* 26,1, 1975; 33-44

A new technique known as discrimination value analysis is described as a basis for automatic indexing and content analysis. Text words are ranked in accordance with how well they are able to discriminate the documents of a collection from each others, i.e. the value of a term depends on how much the average separation between individual documents changes when the given term is assigned for content identification. Experimental results are given showing the effectiveness of the technique.

96. SGALL (Peter) and HAJICHOVA (Eva). A linguistic approach to information retrieval. *Inf. Stor. Retr.* 10, 1974; 411-17

An approach to translation of natural language into artificial language is presented. The technique is based on the functional generative description of language elaborated by the Prague
group of algebraic linguistics. Hierarchy of predications of a topic and focus and of delimiting features of noun phrases. Assumptions employed to account for the hierarchies are discussed.

STANDARDISATION


Extensive linguistic research has failed to solve the mystery of natural language which cannot and should not be standardized. Classification remains a vital bibliographical function, but current trends include automatic indexing, the association controlled terms and faceted classification and development at the centre national de la Recherche Scientifique of an information science intermediate lexicon of converting indexing terms from one system to another.


A modern indexing language suitable for the needs of the present and future will provide for both subject indexing and classification, it will be as applicable to non-book materials as to printed matter. Some problems of making an indexing language for the arts are common to all subjects; others, for the most part problems of definition, are unique to the arts.
LANGUAGE CONSTRUCTION


Describes a method for constructing indexing languages, based on faceted classification and using educational technology as an example. The processes described are: literature survey; subject analysis into categories and facets and order within facets; citation order, those relation etc; notating the scheme and retroactive notation indexing the scheme; chain procedure for constructing verbal subject statements, editorial presentation of the finished work.


Relational analysis as an alternative to the "categorical" view of syntactic structures in indexing is discussed. Relational characterisation of syntactic structures by references to the meaning of the spaces between constituent terms may point the way to classification structures which are stable to new knowledge and discipline independent.

The relationships between authors, indexers and enquirers concepts and the free or controlled language, used to express them are of 4 sorts: synonymous, hierarchical, coordinate and related. Definition of these relationships is facilitated by the use of semantic field charts on which a terms, subject coverage may be represented by a 2 dimensional area. The system improves vocabulary updating, indexing consistency and retrieval, and is also applicable to on line searching.

THESAURUS FREQUENCY DISTRIBUTION

102. TOMA (Eugeniu). The structure of the EURATOM - Thesaurus.
J.Docum 27,1971; 267-72.

The analysis of the rank frequency distribution of the EURATOM thesaurus was carried out. Zipf's law (a hyperbolic function) was found to be suitable for this distribution, and an exponential law was used instead. The exponential function may provide a criterion for revising some zones of thesauri.

INSPEC

83. FIELD (BJ). A thesaurus based indexing and classification system developed for inspec products and services.
J.Docum 30,1,1974; 1-17

Development of the INSPEC vocabulary system comprising
unified indexing and classification scheme has entailed complete revision of previously separate and independent schemes. The vocabulary system uses 2 controlled languages and free indexing. Thethesaurus can be used as a controlled language system for indexing and searching or as a natural language and in searching.

PERMUTATION - MULTI TERMS INDEXING


A new indexing system the multi term system, is described. It was conceived and developed to achieve through assigned terms and combination of terms a communication of relatively high informational content and discriminatory power. In its simplest form, a multiterm is a combination of correlatable term, such as C/R/P/A/ in which C may be a chemical prepared from reactant R by process P using catalyst A. The oblique stroke or risquele following each of the 4 terms is the program code for the computer to permute the multi term. The importance of employing a defined dissectional order for the terms in each term, the importance of employing a defined dissectional order for the terms in each multiterm, and the stressed.
ALPHABETICAL SUBJECT INDEXING

105. BAKEWELL (KGB). ANBAR indexing. Cata index 1971, 14-15

ANBAR: The Documentation service for management consists of monthly issues of indicative abstracts a quarterly index which cumulates throughout. The year and a 4 monthly bibliography which cumulates throughout the year.

Arrangement of the monthly issues is alphabetically by title with in the 4 groups. Top management reading: Accounting and finance computer views, management service practice. The quarterly index aids retrospective searching by grouping abstracts in classified order with an alphabetical subject index. Under each class number, articles are listed by phrasescriptive of their content.

ASSOCIATIVE INDEXING

106. MINKER (J) and GARY AUGUSTON (J). Deriving term relations for a corpus by graph theoretical clusters. 1970; 101-11

The alternative methods of how automatic term clustering may provide insight into how terms are related within a corpus are discussed. The work reported uses a corpus of 2267 documents containing 5950 index terms. A similarity matrix is developed using the document term matrix. A threshold level T is applied so the similarity matrix. Entries in the matrix that are equal to or greater than the threshold level are set equal to one and the remaining entries are set to zero 3 definitions are applied to the corresponding graph of each threshold matrix to
develop clusters these are (i) the connected components of
the graph (2) the maximal complete sub graphs of the
graph as described by Gopulib and Kumar. 2 examples
are described that show insight may be gained into the
term relations by varying the threshold levels and the
cluster definitions.

COORDINATE INDEXING - ASLIB

107 NIGHINALE (RA). Same quantitative of feature cards
systems: results of a questionnaire. ASLIB proc
23, 9, 1971; 481-95.

The ASLIB coordinate indexing group has recently com­
pleted an investigation of 62 optical coincidence ca­
rd systems on the basis of answer to a questionaire.
Aspects examined were: input material (abstracts, jou­
ral articles); keywords per item, indexing time per
item; means of punching (single or multiple). Special
problem encountered. Save of these correlated indexing
time with type of input; number of keyword, with index­
ing and punching time.

CLASSIFICATION SCHEMES

108. BHATTACHARYA (G). Vital role of depth classification in
a system for document finding: a trend report. Libr. Sci
Slant Docum. 12, 2, 1969; 123-27.

Surveys some of the significant works of the period
1945-68 on the use of a scheme for classification
in designing a mechanised system for document finding
(SDF) concludes that a harmonious combination of the potential of the new methodology of designing scheme for depth classification developed in DRTC with the ability of a computer for fast search in the design of USDf would be able to meet more efficiently the document needs of specialists.

**COLON CLASSIFICATION**

109. NEELAMEGHAN (A) and VENKATARAMAN (S). Formulation of kernel terms for a subject and isolate terms for a classification schedule for use in the synthesis of class number by computer. _Libr Sci. Slant. Docum._ 11,6,1969; 71-93

Compares the procedure for the analysis for the synthesis of a class number by conventional methods and using a several purpose computer. Suggests a modified postulational method for the formulation of kernel terms. Discusses problem in the verbal plane in naming the isolates in a classification schedule and the kernel ideas in a subject and gives guide lines for the structuring of kernel terms and isolate terms to ensure correct matching between such terms denoting a single idea.

**USE OF STANDARD LISTS - LIBRARY OF CONGRESS.**

Criticises LC subject headings as linguistically conservative in their treatment of women, children, the handicapped and racial and sexual minorities; such groups are linguistically abnormal they fall out side the assumed norm, there by perpetuating socially discriminative stereotypes.

USE OF NOTATION - CHEMISTRY


A method for searching wisdom line notations has been found to be highly efficient the reducing computer search time for substructure searches, so that substructure searching on files containing hundreds of thousands of compounds is now economically feasible. The same technique, using binary but screen has been used to study the structural characteristics of new compounds reported in the literature.

112. SEDINIK (Herman). A notation symbol index for chemical compounds. J. Chem. Docum 11,2, 1971; 120-24

A new linear notation system was introduced recently by the author and bored upon this is a method which yields an index of the radicals associated with each atom in a molecular structure. In contrast to a formula index, the notation symbol index is unique and discriminatory for each compound and are economical for computer processing than a linear notation permuted index.
CHEMISTRY - CASE STUDY


Successful searching for publication on the basis of subject obeys rules whose relation to thermodynamics are unmistakable. As a collection of literature grows, the degree of order required increases, since the patience, time and memory used by men to compensate for each of order cannot keep pace. The high degrees of order that are necessary now a days in scientific literature cannot be attained by traditional documentation methods. If modern techniques are used to improve communication, the conceptual basis of such a documentation method must be revised and adopted to suit the new possibilities. The conditions in chemistry are relatively favorable for the effective use of modern technical and conceptual methods since the terminology has been developed further than in most other sciences.

THESAURUS - LAW WEST GERMANY.


Report delivered to the 39th General council meeting.
IFLA, Grenoble, 27th Aug - 1 Sep 73. Examines the need for a thesaurus, which could contribute to a unification of legal terminology in the area in which German is spoken. Large scale preliminary work for the application of electronic data processing in the field of legal information is lacking.

DEPTH OF INDEXING - FREQUENCY DISTRIBUTIONS.

115. BIRD (PR). The distribution of indexing depth in documentation systems. J. Docum. 7/1974; 381-390.

Actual documentation systems of varying types, both human and machine, were examined to investigate whether the distribution of indexing depths fits a negative binomial or mixed poisson distribution. The documentation systems investigated were; (1) permute: subject index; (2) Euratom/ CID Nuclear Documentation system; (3) SCIDOC a medical literature coordinate indexing system (4) Toxicity Bibliography (5) Chemical Biological activities. The rules of indexing may be considered as determining the average depth of indexing and the laws of chance as determining the distribution of indexing around that average depth. The results contradict previous reports that a log-normal distribution of indexing depth is to be expected.

ROTATED INDEXING - PRECIS

From Jan 71, British National Bibliography (BNB) will be produced from MARC magnetic tape. The problem of retaining traditional specific subject indexing necessitated research into alternative means of constructing an alphabetical subject index which remains means of specific and pre-coordinate. A model was provided by the classification Research Groups work on the theoretical basis for a new general classification. The group decided to build the generic relationships between concepts into thesauri according to a consistent basic relationship, and to define further relationships which the classifier could then use for any compound subject. Merging of the two research projects resulted in production of the computer generated subject index system, preserved context index system (PRIS) in which indexing is carried out in 2 stages; concept analysis and coding for the computer. The PRIS system permits depth of indexing system control and consistent indexing.

SEARCH STRATEGY— MODEL


The information retrieval process, treated strictly as a matching procedure, has the defects that the whole file must be probed for each query, and that it overlooks the fact that the relevance of the information from a document depends upon what is already known about the subject and in turn affects the relevance of other documents subsequently examined. A mathematical model of a search
technique in which the defects of the direct method are taken into account is demonstrated by an experiment in which a given paper is treated as an enquiry and the references cited in the paper are treated as relevant answers. The results in two tests show much better results than those achieved by the direct method. No spurious material was retrieved by either method.

COMMUNICATION THEORY, SHANNON FORMULA.


Currently there is some increase at the state of IR system evaluation. Shannon's mathematical formula for information transmitted over a noisy channel can be applied to the evaluation of information contained in a retrieval message. It provides an optimum coordination level, an optimum index exhaustivity and an optimum citation coupling strength. This leads to a new criterion by which a single figure represents the value of given system in a given environment. Labour needed to apply this formula does not seem to be excessive. The method should help librarians by cutting the coordination level expected to give maximum information on any request.
ARRANGEMENT


Paper given at the aesco seminar on electronic Data processing in libraries, Regensburg university, Apr 70. The following procedures are described (1) correction of machine readable records (2) production of index including Kwo, Knoc and rotation methods, (3) sorting and cumulation of entries (4) output and setting. Problems arising from unsatis factory date recording, limited fonts and choice of index term are discursed.

STATISTICAL TECHNIQUES


The indexing and retrieval of documents are discussed in the basis of formal decision theory. The basic theoretical approach taken is illustrated by means of a model of word occurences the documents in the context of a model information system; both models are discussed. Recall and precision curves are interpreted as seen from the point of view of decision theory.

EVALUATION

The print-outs of program SADF provide lucid information on the structure of the documentation file or on its manageable sample, which is used as input data. Three printouts are obtained: Table of simple indexing terms, survey of simple indexing term functioning, and retrieval description frequency test. Data which may be calculated from these lists include relation between rank and from quancy or accumulation frequency, relation of the length of document descriptions to their frequency combination power of indexing terms, simple indexing term analysis.

COST EFFECTIVENESS


To date, many decisions made in efforts to improve indexing have been guided by criteria related to effectiveness as measured by an objective method or judged subjectively. When developing indexing techniques for operating services, it is highly desirable to take cost as well as effectiveness into consideration. The central problem of operating services can be reduced to either that of producing indexing of a given level of effectiveness at least cost. This attempt to develop rules for human, machine and man machine indexing employs a cost effectiveness type of criterion in making critical development decisions. The several approach is described and illustrated with examples of how measures of cost and of cost
and of effectiveness were considered, such as how to divide indexing into discrete steps, the effect of long term vs short term activity in humans and small batch vs large batch considerations for machines.

**BIBLIOGRAPHY CITATION - STRUCTURAL CITATION.**


A variety of complex information sources can be generalised, with respect to their internal structure, into some basic structural models represented by groups. These models can be interpreted for complex information services of documents, authors, journals and institutions from the original reference or citedness relationship of the source documents and additional information can be derived from statistical parameters and empirical distribution laws.

**NON-SUBJECT CITATION.**


Completely automatic procedures are presented for the self-generation of meaningful groups among the members of a document collection for the classification according to these groups of subsequent documents. The self-generated groups correspond to a very specific subject heading
retrospective bibliographies generated in the procedures allow are to classify the subsequent literature with remarkably high recall and relevance ratios, close to 100%.

PUNCHED CARDS - OPTICAL COINCIDENCE.


Reviews the characteristics of standard so column data processing cards as optically coincident feature cards and the factors favouring their use. Project FAIR has produced multiple sets of these cards, and they are recomended for inexpensive mechanized mass production.

CITATION ORDER

126. CROGHAN (Antony). Citation order; subject indexing. J. Docum. 1970; 4-5.

Abridgement of paper at the spring seminar, subject to information Aberystwyth, 1970. considers the work of cutter, Kaiser Hajhan, Ranganathan (and his influence on the British National Bibliography), and creates (including the subject arrangement in British Technology index). Discusses the classification Research Groups, new General classification and its influence on BNB,S PRECIS Project, investigation into the verbal forms used by BTI and PRECIS in comparison with natural language is needed. There may be no citation order based solely language structure that would work but so far it has not been tried.
TERMINOLOGY.


A glossary defining several of the basic terms germane to information retrieval. Data processing terms are also explained emphasizing their relationship to problems in information retrieval.

GEOGRAPHIC HEADINGS


In the world study centre of sojourner truth library as Geographical approach to area studies necessitates a list of valid entries for Asian, African and Near Eastern countries. Neither Library of Congress classification nor subject heading is adequate. The Asian section of list of Geographic subject headings for the world study countries is given in full, African and Near Eastern sections are still in preparation. Geographic heading entries follow LC practice as much as possible and the U.S. Board on Geographic Names (BGN) Gazettes have also been consulted.

PHYSICAL FORM- PUBLIC LIBRARY

The Ramapo Catskill Library System, middle town, New-

york, developed a subject catalogue in card form of
materials in the central library and the system head-
quarters. In an effort to improve service to the indi-
vidual in member libraries desiring this material, sub-
ject heading simplification was instituted, the subject
catalogue was filmed and placed on standard microfiche,
and set of these microfiches accommodated in each of the
member libraries.

THESOURI - COMPILATION

130. BATTY (David G). The instant Thesaurus; synthesising
users concept systems to reduce cost and time in index
language development. IN: Proceedings of the 36th Annual
meeting of American society for information science
1973; 21-25.

Index languages conceived and designed on the quasine
Aristotelian basis of concepts and terminology contained
in document may be in appropriate for application to mu-
lti and interdisciplinarity fields. NO index language has
been based on the user concept systems that in multi
and inter disciplinary areas, determine the interpreta-
tion of the concepts, languages, and utility of litera-
ture originally written for a differently oriented
discipline.
KEYWORD INDEXING – CLASSIFICATION


An information retrieval system for experimental use is considered and a notation is introduced to help in its description. The system is experimental in that it is designed to facilitate the examination of the effect of different keyword classification on retrieval performance. The notation derives from the basic of criteria encountered in information retrieval and examples are given of its use in a system which has already been implemented on a computer. These operations and their relevance to retrieval system are described in detail. Consideration is given to storage allocation in the implementation of such a system and a simple method of automatic allocation is presented.

CONTENTS LISTS - CURRENT CONTENTS


The weekly subject index to current contents provides rapid access through title keywords and allows retrospective searching of very recent literature.
The operation of the WSI indexing system is briefly described including the content and purpose of the dictionaries, i.e., 2 stop-list, 2 word phrase and 2 variant preferred dictionaries, which create and unify subject entries; thesequence of operations in the indexing cycle is traced. The system can be updated and benefits both the producer and the user.

KEYWORD CONVERSION - THESAURI


The feasibility is examined of devising a scheme for operating a joint keyword system in a given subject area using several independently compiled thesauri. It is suggested that if the individual keywords of each participating thesaurus represent identifiable concepts, and these concepts are given unique code numbers, then the code numbers enable the keywords of any participating thesauri to be converted into the appropriate keywords of any other participants in compatibilities between keyword system aware from differences in the selection and form of keywords.

MATHEMATICAL MODEL

T. Turski (M. T.), On a model of information retrieval system based on thesaurus. Inf. Stor. Retr. 1971; 89-94.
A mathematical model of a thesaurus-based information retrieval system is developed and definition given of: Thesaurus, classification document description, information query and response. It is proved that: (1) The system is inclusive; (2) The response to query \( r_1 \land r_2 \) is a subset of set intersection of responses to queries \( r_1 \) and \( r_2 \) and (3) the response the query \( r_1 \land r_2 \) is the set intersection of responses to queries \( r_1 \) and \( r_2 \).


Many Thesauri each adequate semantic structure. Thesaurus was found to require: (1) a basic syntax capable of differentiating between various word functions (macro-structure), (2) a set of semantic relationships, capable of into decreasing structure by elimination of synonyms, by generic linking of words and by differentiation between compound forms (micro-structure). This inherent structure should be as compatible as possible with the macro structure.


The greater London council's planing and transportation library is designing a Thesaurus for indexing the
Daily intelligence Bulletin, planning and transportation Abstracts, the New publication list, etc. The basic principle guiding construction of the thesaurus will be user-orientation, a flexible attitude to the introduction of new relationships etc. Terms will be ensuite from the Document processing system (DPS) and a proposed Article index.

**document finding system - designing**


In place of the conventional classified catalogue, a Doc-Finder (Computer) can be substituted for storing and retrieving required items. Doc-Finder should provide for at least 100 different print and characters MEDLARS uses 170 characters on a specially designed off line computer printer GAC. When in the future there may be one world centre a specialist reader should receive a push button documentation service (using long distance dialogue television and tele typing).


Paper describes a method of selecting entries from the catalogue on tape in response to a subject enquiry. First the subject of the enquiry is found out and then translated into a class number based on depth version of CC. Computer matches this number with that of class number entries on tape and select the matched ones. Flow charts and examples of queries is given.
This article is based on a series of experiments undertaken by DRTC on the use of a computer in document finding. Author emphasises 3 things: (1) Advantages of using freely faceted analytico-synthetic classification (depth version of CC) (2) Need for reader librarian contact so that later can guide the former in the formulation of a query (3) Provision for browsing by the reader among the retrieved entries should be there. Flow charts show the steps involved in the experiments.

**AUTOMATED CLASSIFICATION compared with SUBJECT HEADING SCHEMES**

Goffman's indirect method partitions a group of documents into classes based on the number of attributes each pair have in common. This method was used to classify a set of 101 medical documents, using *index medicens* terms. Only exact matches between index terms were considered as attributes in common, resulting in a fine partition.
141. BORCHAROT (D H). Annotations on a retrievalists prayer, 

Libraries are concerned with data storage and access to 
their data. Two criteria for judging libraries and data 
banks are size and accessibility. Size is often over-
rated although acceptable minima might exist determined 
by user's needs. Classification is fundamental in es-

blishing access and the system must be suitable for mech-


erisation. Skill in library are combined with scientific 
and scholarly knowledge will make the student better equipped 
to do research.

SEARCHING-STRATEGIES

142. HEER (Dc T). Experiments with syntactic traces in infor-
mation retrieval. Inf. Stor. Retr. 10, 1974; 135-44.

A new concept called syntactic trace is introduced and dis-
cussed. Syntactic traces consist of syntactic similarity 

patterns and database pointers. The similarity patterns 

contain indications about poly gram-substrings that 

searchables parts of the different documents which are 

connected by means of the pointers have in common.

143. COOPER (Williams) On deriving equation for information 

retrieval systems. J.Am. Inf. Sci. 21,6, 1970; 335-95.
Design equations are important in the progress of information retrieval research, the alternative being full scale retrieval experiments. The explore this equation of mathematical design equation and set about deriving an equation, case studies, in the form of 3 hypothetical retrieval systems are examined. First of all, a performance equation was adopted, and then an attempt made to derive design equations for 3 progressively were advanced retrieval systems. It was found that in all 3 cases an equation could be found, ranging from brevity and perspicacity in the simplest case to complexity in the most general case.

PERFORMANCE MEASUREMENT

144. MILLER (William L). The extension of users literature awareness as a measure of retrieval performance, and its application to MILLARS. J. Docum. 27,2, 1971; 125-35.

The recall ratio is a suitable measure of retrieval performance with a fill of only a few hundred references, but with a large file, only an estimated recall is possible. Even when recall can be measured, it ignores the relationship between the file and the users; some index of the extension of the users knowledge is essential.

COMMUNICATION THEORY

145. MENTHAM (A R). Communication theory and the evaluation of information retrieval system. 7, M I T 6, 1969; 129-54
Currently there is some one case at the state of IR system evaluation. Slaman's mathematical formula for information transmitted over a noisy channel can be applied to the evaluation of information contained in retrieval message. It provides an optimum citation coupling strength. This leads to a new criterion by which a single figure represents the value of given system in a given environment. The labour needed to apply this formula does not seem to be excessive. The method should help librarians by indicating the coordination level expected to give maximum information on any request.

CLASSIFICATION-EVALUATION


Two major conclusions can be drawn from this study: (1) The simulated machine indexing technique cannot be used as a standard for comparing two indexes but it can be used to determine the breadth of indexing; (2) It is important to distinguish between two kinds of indexing. Only 3 characteristics of indexing are responsible to quantitative comparison. These are depth of indexing, use of cross references, breadth of vocabulary.

This paper is the first of the 5 papers. The aim of these is to find a rational basis for indexing and some means to evaluate it. Indexing must be examined separately from the entire retrieval system, otherwise too many variables enter into the evaluation.

148. BLOOMFIELD (Masse). Evaluation of indexing, 2; the simulated machine indexing experiments. Spec. Librarian. 61, 9; Nov, 1970; 501-7.

The simulated machine indexing (SMT) has shown that it is possible to use a thesaurus as a simulated computer memory to match title words and produce index terms and cross references. SMT can reliably measure the breadth of vocabulary used in a subject index by calculating the ratio of the number of SMT to KWIC index terms generated for identical citations.

149. BLOOMFIELD (Masse). Evaluation of index, 3; a review of comparative study of index sets to identical citations. Spec. Librarian. 61, 10; Dec, 1970; 554-61.

Five studies which have generated comparisons of indexing for identical articles are reviewed (1) KWIC V.s. human indexing (2) Machine vs. manual (3) A indexing publications. It is impossible to discern in pattern in the comparisons.
The first Cranfield project attempted to test and compare the retrieval ability of 4 indexing systems in terms of recall and relevance ratios. There has been criticism of methodology. The second Cranfield project successfully indicated the use of index language devices to increase recall and precisions.

OUTPUT STUDY - STATISTICAL METHOD


A statistical description of the output structure of a text retrieval system. The system allows for the deviation of a unique and measurable performance criterion that in turn, may be used in discussing various parameters of systems performance. The standard quantities recall" and "precision" appear to be incomplete. The method is illustrated by application to a small test data base and query sample. Performance may be conveniently evaluated by the are of an ordering parameter.
Current on-line information systems are mainly program adaptations of batch processing techniques, whereas an ideal system would interact more and increase the effectiveness and efficiency of searching and display procedures. Such a system would offer statistical inference and would include on-line programs for automatically computing, generating and executing optical query formulations and retrieval on request.

Tests.

The past 20 years have witnessed many studies evaluating various aspects of information retrieval systems of which documentation inc. Comparing the uniterm system of coordinate indexing with conventional subject heading was the earliest. The most important effect of Granfield I test, on four indexing languages was to publicise the concept of evaluating testing. Tests have evolved for different purposes: research, for a given environment and operational systems. Relevance of recall is best
assessed by the user. No single best system has been
decided on a logical decision is best achieved on a
cost effective basis.

SEARCHING - RELEVANCE

154. CANNOR (John O). Some independent agreements and resolu-
tion disagreements about answer providing documents.
Amer. Docum. 20,4, 1969; 301-19.

Eighty-two documents and thirty questions in documenta-
tion and related areas were compared to find answer
providing documents. Two judges made comparisons inde-
dependently. In each case positive judge was first asked
indicated what answer he inferred and from what docu-
ment passage. In general, the resolution procedure will
resolve a disagreement about whether a document is an-
swer providing or not.

COMPUTERS

155. HARLEY (A J). Dialogue with a computer. NLL. Review
1,4, 1971; 123-36.

Reprints, with annotations, a complete MEDLARS dia-
logue. A search a the relationship between driving
and alcohol is formulated, tested against the sample
file, modified, veterted and finally sent away for
batch processing against the full MEDLARS file.
AUTOMATED-SEARCHING


The paper, presented at an IBM computation seminar, Endicott, NY, May 54 is believed to be the first report on library related computerisation. The difficulties associated with searching through several hundreds of documents filed under broad subject headings for a required report, prompted the adoption of descriptors and a coordinate index. This was converted to a truncated machine readable form to allow the application of an IBM 701 calculator. The steps of the search operation and the programs used are described. Objections of the experiment include reduction of the amount of time spent entering new serial numbers, establishment of a schedule for document searching and the reduction of the time required for each search so that the system will be economical and practical.

SCIENCE AND TECHNOLOGY


4 of the 6 editions of CC now carry a title word index called the weekly subject index. WSI provides an adjunct which permits the editions to grow with the literature growth and still allows for rapid scanning and identifi-
fication of relevant articles by the reader WSE is computer produced and alphabetically lists every significant title word announced in a given CC issue. The result is a new access tool for CC which makes weakly searches for relevant information faster, easier and more production.

ASSOCIATIVE-INDEXING.

158. ADAMSON (George W) and BOREHAM (Jillian). The use of an association measure based on character structure to identify semantically related pairs of words and document titles Inf. Stor. Retr. 10, 7, 1974; 253-60.

An automatic classification technique has been developed, based on the character structure of words. A sample of 50 words from a chemical data base was chosen to contain stems derived from the names of four chemical elements. They were successfully clustered into groups of semantically related words. Each cluster is characterized by the root word from which all its members are derived. A second sample of titles from Mathematical Reviews was clustered into well defined classes which compare favourably with the subject groupings of MR.

COMPUTERISED.

159. CAMPEY (Lucille H). Generating and printing indexes by computer a supplement. Program 8, 3, 1974; 149-65.
An up date report of the 1971/72 survey, published by Aslib which was conclude to locate generally available index generation packages designed for producing a printed subject index. The survey covers information that was either readily available in the literature or obtainable from contacts in the U.K.

**AUTOMATED.**

160. HALL (Jim) and NEGUS (Alan). Towards instant information. *New Scientist*. 5,1,1971; 210-212.

The recent growth of interactive on-line computing means that computerised information systems can be constructed which respond in seconds rather than hours. The problem of user interaction is central to the culham investigations which are concerned with decisions and participate in the search. Though much research has to be done on cost effectiveness, perhaps the most powerful reason for improving the information finding process is the saving of the users time.


A part of the refashioning of the information service in the Monsanto company's Agricultural Research and Development Department, the computerized chemical substructure data file was recoded using the inivswesser
time notation (WIN). The procedures used to interrogate files are described.


Describes the following methods in computer form; KWIC; WNOS; SLIC; CILT; Permuterni; articulated indexes; auto indexing. The time is approaching when technical papers now appearing in periodicals will be wholly held, indexed and searched by computer. The human indexer of books will not, how user be replaced.


Interactive retrieval systems require fast access to large stores of data and should be useful and accessible to large numbers of people who can share the cost of the service they provide. Three magnetic tape data bases were finally selected for study. (1) CA co-deviates; (2) stadtler corporation infrared Data files; (3) NMR (nuclear magnetic resonance) bibliographic files of preston laboratories.

outlines works at sheffield university postgraduate school
of librarian ship and information science on the arti-
culated subject index. For articles giving similar
information.

ARTICULATED - INDEXING

165. ARMITAGE (JE), and LYNCH (MF). Experimental use of a
program for computer-aided subject index production
Amer. Docum . 11,2, 1970; 79-87.

dpaper presented at the 2nd international conference
on mechanised information storage and retrieval systems,
cranfield, September 2,5,1969. Stages in the development
of a program for the production of articulated subject
indexes are described. The preparation of an index to
the 3rd edition of the SIBRE Bibliography has enabled the
the technique to be assessed in practical situation.
Title from 1700 documents included in the bibliography
were edited to provide input to the program, and out
put recorded on a microfilm/hard copy recorder in upper
case alone. A production sealed program based on exper-
ience, gained with this and other indexes is now in pre-
paration.

ROTATION - Precis

166. KEMP (DA). Precis indexing; a short note the method.
Cat. Index . 21,7, 1971; 10-12.

The British National Bibliography is developing pre-
cis for computer production of pre-coordinated printed page subject indexes. A full subject statement is given under every significant terms in a compound subject. page layout is such that a glance establishes the wider context in which lead term has been considered and those subject aspects which are narrower than the lead. Strings of terms are rotated through 3 basis position, distinguished typo graphically and by indentation.

LEAD ---------- Qualifier

Display

two lines may, therefore be required. The stages of making a PRECIS index are described; (1) concept analysis (2) writing a manipulation string for computer input (3) establishing references from higher and co-ordinate terms.

ROTATED - INDEXING.


The function of the BNB are described in the light of an exchange arrangement between its personnel and that of the library of congress decimal classification
Division. The processes involved in producing the entries for the BNB lists and cards are described. The reference sources chiefly used by the Dewey classifiers are the PRECIS authority file, containing the concept cards arranged in Dewey number order, the LC printed card file, Books in English and the national union catalog.

PROGRAMS - LANGUAGES


A general description of computer program languages point out that they are far removed from natural languages and are highly machine dependent. To all evi ate there and other drawbacks involved, languages closer to natural but with precise syntax have been developed called higher level programming language designed specifically for IR problems, but a case study is presented comparing the early computer language, FORTRAN with higher level SNOBOL to show greater suitability of the of the latter for IR. The study revealed that SNOBOL is simpler and less foreign to IR workers thought processes but requires a high run time.
Since the late 1950s, serious attempts have been made
to remove much of the human element from indexing.
Generally, the work divides into two streams: The
examination of the text to match inquiries with docu-
ment descriptions, and the analysis of text to generate
index languages and the assigning of terms from those
languages to the documents. The aim of most work on au-
tomatic classification is for the index language to develop
with document collection rather than retrospectively by
revaluation. Discussed briefly are the work in statistical
Tanaalysis carried out by Luhn, Masan and Kuhn, associa-
tive indexing by stiles; Taninoto's mathematical models;
Herman's factor analysis; Doyle's semantic maps; William's
discriminent analysis; the latent class analsis employed
by Baker and Clump theory of parker-Rhoeles, Needham
and Sparhes Jones. Works is now continuing generally
in the direction of techniques handling larger collec-
tions of data; Barko's factor analysis Doyle's associa-
tion maps and CLBU's Clump theory.

170. BENNETT (John L). On line access to information; NSF
as an aid to the indexer cataloguer. AM.Docum 22,3
1969; 213-220.
An interactive system designed for experimental study of indexer behavior as influenced by data selected from a library management data base. The negotiated search facility provides on-line computer display for an IBM 3/360 model 65, using an IBM 2260 Display Station, and an associated IBM 1053 printer. The indexer can see a selected portion of the alphabetical list of descriptors showing the number of entries already made under each, and can inspect, in as much detail as he requires, the bibliographical entries made under any descriptor, to ensure that similar items are indexed by the same terms, and to secure a sufficiently precise set of terms to differentiate the document being entered from those already recorded in the system. Although designed to investigate indexer behavior, and to provide assistance to words consistency and specifically in indexing, the system could also be used by searchers.

**STATISTICAL - TECHNIQUES**

The construction of a term classification matrix is outlined. It is proved that an optimal construction is difficult to compute. The computer time required by the method is still too great to be applicable to any real document collection. The experiment is performed using the same set of requests as that used for the construction of the Matrix, using the remaining request to show the improvement of the method over simple term retrieval.

LINGUISTIC ANALYSIS-SUBLANGUAGE GRAMMERS


Originally presented as a talk at the fall joint computer conference, Anaheim, Dec 72. The results of an investigation into information structures in natural language science text are presented. The method of sublanguage grammars for obtaining information formats is described, using the subfield of pharmacology as an illustration. Parts of the procedure are computerized or are being implemented.

COLON CLASSIFICATION-INDEX LANGUAGE

A general purpose computer ICL 1085 is used for the transfer an to magnetic tape of a schedule of basic subject, schedule of special isolates for subjects related to the different basic subjects and of schedules of various kinds of common isolates. In this process specific schedules can be identified, as can the symbols which indicate the use of particular colon classification devices informing the isolate number.

**INDEX LANGUAGES-CODING-SEMANTIC RELATION**


Informatic geology involves computer treatment of geological data which necessitates a codification of geological concepts. A method of semantic coding, replying on an analysis of the "Significant" is described. Codes for each term are built as a chain of built considered as the answer yes or no to a set of questions. This set of questions allows a rigorous definition of stored terms and the use of "Pertinent bit" makes for flexibility. Other levels of semantic analysis can be derived and allow the distinctions between interpretation and observation to be formatted.

The conceptual basis of fragmentation codes parallels chemists thought and so retrieval by fragment, i.e., functional group or moiety is highly desirable. This system is suitable for a computer main pulutable index, and the resulting system has been found to be versatile, economical and relatively easy for chemists to learn.

STANDARDIZATION


International standard disposition of retrieval gives rise to the problem of evolving artificials from natural languages with a 1-to-1 correspondence between the words of different languages, MARC and the French GIMIS (Groupe informatique de bibliothèques universitaires et spécialisées) System (Sec 71/1460) are not suitable for automatic retrieval based on a work’s content. Systems specially devised for such retrieval include: (1) Those based on full-tent recording (2) system containing tent summaries; (3) descriptor systems. The technical committee on Documentation of the international organization for standardization (150) has produced a draft standard for magnetic tape bibliographic records and codes for the numbering of books and serials. 6 areas for further work are outlined. ISO’S information committee has started a study of an international system to link a central
information bureau in Geneva with ISO members. This work in the specific subject field of standardisation will serve as a schematic model for more complex systems.

PERFORMANCE MEASUREMENT - SEARCHING


The application of conventional rank correlation tests to the comparison of relevance judgements and their disadvantages are noted. The fundamental disadvantages is that they ignore the difference in importance attached to different parts of the scale. A weighted rank correlation coefficient $r_{W}$ is proposed, which assigns variable weights to exchanges of rank in different parts of the scale. Examples of its application are given, for both tied and untied ranks, and the values of $W$ for $n=3$ and $n=4$ are tabulated. The chief mathematical properties of the coefficient are investigated and it was found that $W$ acts as a type of synthesis of the other measures, besides providing varying degrees of relevance and sensitivity at different points on the table.

TERM - WEIGHTING

Various approaches to weighting document terms have been investigated. The logic of different types of weighting are examined and the varying effects of different forms of weighting are retrieval are discussed. Attention is concentrated on statistical weighting. Experiment with automatic statistically based weighting schemes have been carried out under the SMART project, and demonstrate particularly the value of collection frequency weighting.

**WORD FREQUENCY**

179. ROSSLOFFS (Robert) and CARROLL (John). Computer selection of key words using word frequency analysis 7,11, 1969; 227-33.

A statistically based method for automatically indentifying keywords in machine readable text has been developed, which produces keyword lists that agree better with composite lists produced by panel of human indexers than do lists produced by criteria previously suggested, and also better than lists produced by most of the individual panel members. The method makes use of both the in document word occurrence frequency and the in corpus relative occurrence frequency as measures of word importance, each statistical criterion was compared with performance of human indexers by the use of rank correlation statistics. The simple word count was found to be superior to the other 4 previously
suggested criteria all of which made use of the in corpus relative occurrence frequency. The texts were conducted over 19 documents dealing with the subject of information science, a total of over 66,000 word occurrences. 17 indexers representing 8 different information centres participated in experiments.

TERM WEIGHTING


The standard theories for the specification of term values in automatic indexing, namely term total and document frequency are shown as inadequate. The aim is to determine the usefulness and potential effectiveness of the inter activities between term frequency weighting (TF), inverse document frequency weighting (IDF), and discrimination value weighting (Disc) and to ascertain whether a single common procedure can be found to operate equally effectively in different retrieval environments.

COMPUTERISED ENGINEERING


An experimental procedure for indexing physical materials based on simple syntactical rules, MIS was tested by encoding the materials in the journal Applied Physics letters. It is anticipated that the materials index
can be produced by computer based photocomposition directly from a computer file containing a test.

SYSTEM ANALYSIS


Reviews the state of the art in automatic indexing under the following headings: (1) The topic and its context; (2) Syntax (3) Semantics (4) indirect indexing (5) operating systems (6) Experiment in automatic indexing (7) conclusions. The results of the few experiments carried out on automatic indexing are heterogeneous and difficult to compare. Few direct comparisons have been made between automatic and manual indexing; it appears that the former is quite competitive. Quite simple techniques, keywords with statistical weighting, are quite effective. The value of syntax is the same for both automatic and manual indexing.

EVALUATION


Five studies which have generated comparisons of indexing for identical articles are reviewed; (1) KWIC vs. human indexing; (2) Machines manual; (3)
a manually prepared KWIC index and 4 agricultural indexing publications, (4) The three agencies contributing to the office of technical services; (5) a manually prepared KWIC index and 5 scientific indexing publications. It is impossible to discern any pattern in the comparisons; there is no underlying consistency on index term assignment nor is the indexing evaluated quantitatively. This review indicates the need for a better understanding of the indexing function and the difficulty in defining criteria for the numerical evaluation of indexing.

EFFICIENCY STUDY


Two general requirements for over all measures of retrieval effectiveness are proposed namely that the measure should be as far as possible independent of generality (This is interpreted to mean that it can be described in terms of recall and fall out, and that it should be able to measure the effectiveness of a performance curve) it should not be restricted to a simple 2X2 table). Several measures that have proposed are examined with these conditions in mind. It turns out that most of the satisfactrey once are directly or
indirectly related to swets measure A, the area under the recall-fall out curve. In particular, Brookes measures S and Rocchio's normalized recall are various of A.


The relative retrieval performances of the CA integrated subject file (CASF), CA Condensates, and a merged file created from there 2 data bases have been measured. Retrieval performance is reported in terms of recall and precision values as well as costs. The precision and recall retrieval failures, i.e. irrelevant and missed documents, have been analysed for each data base and characterised according to five major types of failures; index language; indexing; searching; clerical; and miscellaneous.

AUTHORTITLE - CATALOGING

186. HJICKING (Frederich H). Bibliographic retrieval from bibliographic input, the hypothesis and construction of tests. J.Libr. Automat. 11,2,1968; 227-238.

A study of problem associated with bibliographic retrieval using unified input data supplied by requesters was made by the fondren library, Rice university, Houston Texas. A code derived from comparison of title and
author information to 4, 4-character abbreviations each, was used for retrieval tests on IBM 1401 computer. Retrieval accuracy was 98.67%.

ALPHABETICAL INDEX


187. System analysis and flow-charts of the computer generation of 3 varieties of alphabetical subject index are given. There are the postulates-based permuted subject index (POPSI), keyword and context (KIC), and the conventional chain index (CI) and they are presented on the basis of feature headings in the main entries of a computer readable catalogue.

INDEX LANGUAGES-ABSTRACTING SERVICES

188. SILICIT (PM) etc. Automated conversion of chemical substance names to atom based connection tables. *J. Chem. Docum.* 14,4,1974; 135-143.

CAS has developed a computer program for converting systematic names of organic compounds into atom based connection tables of the type input to the chemical Registry system. This nomenclature translation program is designed to process names based on the word roots and punctuation conventions used in the CAS index.
nomenclature. Both inverted and uninvested names can be processed if they are specific and unambiguous. The translation program is currently being stalled as part of a comprehensive name editing system.

EVALUATION

189. BLOOMFIELD (Masse). Evaluation of indexing, 2; the stimulated machine indexing experiments. Spec.Libr. 6, 9, 1970; 501-507.

The SMI experiment has shown that it is possible to use a thesaurus as a simulated computer memory to match title words and produce index terms cross references. SMI can reliably measure the breadth of vocabulary used in a subject index by calculating the ratio of the numbers of SMI to KWIC index terms generated for identical citations. Per 100 KWIC index terms, chemical abstracts generated 83 SMI index terms, Nuclear science Abstracts 81 and physics abstracts 58. This ratio seems both valid and reproducible, while the efficiency ratio (a standard evaluator of indexing) which was in consistent.

DATA INPUT METHODS


The costs of four methods of input for wesseler line notations key punch, magnetic card selectio
Typewriter, cathode Ray tube and optical character recognition were compared comparisons were made in four categories. (1) Cost (2) efficiency in use (3) versatility (4) acceptability by the input operator. Basic labour costs were judged to be including, transcription from the original document, so. 29 per metation. This cost does not vary widely with type of input. The comparative total costs were: (1) key punch and 77.00 (2) OCR & 22.00; (3) CRT- & 560.00; (4) MOST- & 305.00. The OCR is easily the method of choice if cost is counted with the other factors.

THESAURUS


A set of modular computer program elements has been designed to reduce the repetitive effort and costs often involved in recording index entries and proceeding for thesaurus production and maintenance. The program set may be used independently but was designed to be compatible with existing programs for producing thesauri, block indexes, and indexes to journals and abstracting services.
USE OF COMPUTERS - Thesauri.


Paper at the 4th international conference on mechanised information storage and retrieval systems, Cranfield, July 73. A computer aided method of building up a controlled indexing language is proposed. The aim is to combine the particular advantages of a thesaurus and a hierarchical classification scheme using a video terminal for the interactive build up of a special area controlled language from day to day indexing. Terms would be linked with the UDC/ISBD of the standard reference code which available.

AUTOMATED OUTPUT STUDY

193. BRYANT (EC) and KING (DW). A diagnostic model for evaluating retrospective search systems. 5,5,1970; 281-72.

Describes a mathematical model for estimating overall search accuracy as a function of the effectiveness of question interpretation indexing, query formulation and search output screening. The model not only permits the determination of the relative effect of each of these system processes, but provides a means of simulating the effect of the system process under a variety of alternative conditions for these processes. The cost effectiveness of the search system.
KWIC & KWOC INDEXING - DESIGN METHOD


The typical situation requiring a text indexing system is briefly discussed. A basic algorithm for generating keyword indexes is described. The various factors to be considered in the design of a generalised KWIC - KWOC system are output lined; specification are proposed.

COST STUDY


A research project at Aslib was initiated in Feb 71 to survey the operational software for providing printed subject indexes and to measure the costs of producing them. The input types, keyword selection method and output format as options specified for each variable, and their effect are the costs of running INDALAS, a KWIC/KWOC are described. Machine costs were found to be the second most important factor when an external bureau was used.
KWOC INDEXING


KWOC indexes based on summaries of the library of Congress and the 16th and 17th editions of Dewey decimal classification schedules were prepared and the keyword vocabularies assembled in a side by side comparison. Only 40% of the words co-occur between LC and either of the DC lists; 25% of the DC keywords changed between the schemes, 2 editions. The experiment serves to indicate the kinds of data which could be supplied by more detailed comparisons.

SEARCHING


197. Anecdotal and empirical evidence shows that on improved retrieval capability may have a significant impact on indexing criteria. The index consisted of title, all keywords document number, classification and accession numbers. The KWOC index was converted to Microficlic and merged with the collection, thereby integrating the index and the collection and supplying a back up to the on line system.
Manual preparation of the annual KWIC index of the Indian Journal of Technology involves repeated keyboarding operations and clerical routine. Experimental work in computerizing the index involved a single keyboard operation committing each title and the entry elements only once to a magnetic disk memory and generating the various entries by suitable programs. Comulations of the index can be brought out by sorting and sorting the data in machine readable form.

The AEVIC system is a compromise between the KWIC (keyword in context) and the NADEX (word author index) systems in which the author's name is included with the title and, similar to KWIC index, on entry occupies only one line per title.

The following central features may be used to increase...
the effectiveness of KWIC index. (1) Struggling to
gather several words for which indexing is necessary
with only 1 entry based on the first word of the string
(2) The 20 letter rule stating that no entry will be
formed for character strings longer than 20 characters
list.

201. PATRICIA (Schic K) and COOKE (Geraldine A). KWIC but
effective indexing the unindexed speedily. In American
society for information science. 11,6,1975; 17-24.

In an attempt to control the information explosion
the advantages of the KWIC index are often overlooked.
KWIC indexes, provided by the libraries of the Alberta
Department of the environment and the Boreal institute
for Northern studies, for general use, are described.
At the department of the environment library an index
covering local periodicals is produced, cumulating
monthly with an average of 600 entries. At the Boreal
institute two monthly indexes are produced: (1) a kwic
index of English language titles and authors from arti-
cles of polar interest in Journal and news papers
(2) A kwic index of news paper clipping files maintained
by the institute.

202. SAGENA (Vinod K) and TANJIA (Ram B). Compilation of
corporated indexes need for broader guidelines and
The increasing use of mechanised indexing will necessitate modification of the standardized rules for making alphabetical indexes. The institution annual handbook of publications highlighted particular problem areas, e.g. absence of lower case types, Greek letters, chemical symbols, format irregularity in that a line may begin with a part word, each of see and see also references; elaborate planning of vocabulary control; limitations on the length of keywords.

USE OF KWIC


The double KWIC coordinate indexing technique, which facilitates coordination of secondary concepts with that of primary interest, was applied to 5 linear chemical notations: Wiss MASS'ER line notation (WL); WPAAC and mechanical chemical code (MCC), for comparative purposes. The possibility of coordinating 2 or more notation symbols permits greater searching specificity when there are may notations containing the symbol or set of symbols used as primary access point.

Since 1972, current contents has published a weekly subject index. This has two uses; it provides a rapid alert to the reader's subject of interest from keywords found in the titles; and it allows retrospective searching. The index relies on a computer assisted ad-hoc routine using a number of different dictionaries which (1) stop frequently occurring words with no indexing value (2) standardize and unify variant spellings etc.

INSPEC

Their rule in on line bibliographic information retrieval systems. Reprographics quarterly, 8,2,1975; 61-64.

A recent experiment by INSPEC on a prototype Marceni automated microfilm terminal shows: (1) It is practicable to select frames under computer control;
(2) Display times are comparable with those obtainable using medium speed digital transmission. A study of the operational system is given showing benefits affecting storage, transmission and display, and there is discussion of the cost performance facts.
MISA


MISA (Mechanised indexing system by Anzai) is a computer system for indexing journals articles. The system produces KWIC and KWCC indexes; an author index and a wader index, and a word frequency table. Each index gives detailed bibliographical descriptions, making it unnecessary to look up a separate bibliography.

SLIC INDEXING CASE STUDY


The index entries generated by the SLIC technique constitute a lattice which is a subset of the power set of the set of descriptors assigned to a document. This fact leads to an improved algorithm for generating SLIC entries. An isomorphic mapping exists between the SLIC lattice and Boolean lattice.

AGGREGATIVE SYSTEMS - SMART-SEARCHING

208. SALTON (G). Evaluation problems in interactive information retrieval. 6,7,1970; 29-44.
Paper presented at the 2nd international conference on Mechanised information storage and Retrieval systems, Gran field, September 2-5 1969 while most of the operational computer based retrieval systems are functioning in a batch-processing mode, there exists a number of experimental systems based on high capacity random-access storage mechanism and conversational input output consoles, which make it possible to process questions individually and permit a rapid interchange of information between users and system. With such a system, it is not feasible to process the whole file against each query and parts must be selected for comparison with the query. Special techniques for file organization, evaluation of partial searches and feedback are required and these are discussed in relation to the results obtained using the SMART system (aslib)

GOWTON DIALYSIS


The retrieval effectiveness of bibliographic citation was evaluated by using the normal content analysis methods of the SMART system and then a modified process based in the bibliographic citations attached to the test collection of 200 document abstracts. The usefulness of bibliographic citation for document content analysis is entirely confirmed.
ASSOCIATIVE INDEXING


Experimental results with associative retrieval procedure as part of the SMART automatic document retrieval system indicate that (1) in small collections associations are not useful for determining word meaning or relations, since the majority of the associated retrieval is not an effective recall device but often a precision device operating by increasing the weight of significant terms rather than by introducing new significant terms. (2) ASM a method of improving both precision and recall, a property made thesaurus is generally preferable to associative procedure.

211. MARC - OUTPUT STUDIES


A computer based file of approximately 8000 MARC pilot project records was searched in four different ways to find all the relevant references for (1) Latin America; (2) Middle East. Access to every
NUMBER OF searches in the title statement and subject headings retrieved 95% of relevant records for Latin America and 97% for Middle East. Although some false drops are unavoidable because of the homonym problem, the search strategy can refined to minimise these with out affecting the number of hits. Greater attention needs to be paid to the truncation of keywords.

SEARCHING - MAGNETIC TAPE

212 LYNCH (J) and SMITH (George). Information by the yard. New Scientist, 5, 6, 1971; 52-54.

In sufficient attention to profile construction can result in the retrieval level of computerised information services being as low as 40-60% (equivalent to manual searching success). To maximise the retrieval performance, user profiles must be drawn up more carefully, tested more rigorously and monitored regularly. Another important line of development is in conversational soft more writing and in the provision of interactive systems, especially video display terminals. The user could then explore the contents the index of a book.

For efficient access to information elements, usage should be taken into account and files organised in the order of upcoming requests for elements. The suggested solution for organisation divides the files or index into at least 2 entities according to the frequency of retrieval. The most frequently called terms would be combined into an immediate file of highest level, those on the next levels of frequency into similar files.

USE OF INFORMATION SERVICES


Paper presented in the chemists club library symposium, New York, Apr. 74. The Research library at Rohm and Haas company has been searching a variety of bibliographic data base on-line for over two years. These include SDC Lockheed, Chemical Data centre, Chemical Abstracts condensates, MEDLINE, CAIN, NTIS, IN-PSC, COMPENDEX, INFORM and chemical market Abstracts. A summary of the company's experiences and the merits of on line searching as compared with batch processing and manual experiences is presented. A conference call technique for driving a remote slave terminal is described.
215. FOREMAN (Getrude) and ALLEN (Margaret) etc. A user study of manual and MEDLINE literature searches in the hospital library. Bull. Med. Libr. Ass. 6,2,1974; 325-337.

To determine possible uses for MEDLINE in the hospital library health practitioners requesting literature searches were provided with both a manual search, in which they received photocopies of articles selected by the librarian, and a medline search. MEDLINE should prove to be a valuable supplement to the manual search, but for the participants it can not completely replace the selection and photo copy service provided by the hospital library staff.

Punched Cards—Technical Reports


A technical information system is described; on receipt, technical reports are scanned and allocated keywords and roles which describe their subject content. This information, together with bibliographic details, is stored on 30 column punched cards which can be stored either manually (if less than 1,000 cards) or by a mechanical sorter. The low cost of a mechanical sorter, by comparison with a computer, and the saving in space and time are advantages of this system.

Jolley's method of coding geographical locations employing a subcode and a related dissect coding missing part of the name do not relate parts of an area to the whole. If physical location rather than place name is used then position can be expressed through simple coordinate as on a map, e.g. degree of latitude and longitude and the national Grid system.

EVALUATION - GRANFIELD PROJECT


The 1st Granfield project attempted to test and compare the retrieval ability of 4 indexing systems in terms of recall and relevance *(or precision) ratios there has been criticism of the methodology: introduction of uncontrolled variables, search questions based too closely on the titles of source documents, inclusiveness of recall measurement (in evaluating in estern Resem university indexing system), and failure to provide comparative measures in MEDLARS tests.
The procedure used to produce the index to volume 20 (1969) of American documentation are described to demonstrate a system for computer-assisted indexing and bibliography production developed at the Columbia university school of library service. Only the subject entries and the input keying require human intervention; all other entries and all page layout and formatting are then produced automatically.

**COLON CLASSIFICATION - INDEX LANGUAGE**

A step by step procedure is given for two methods of forming the isolate number using a general purpose computer: (1) according to the rules of colon classification for the alphabetical, numerical, environmental geographical, and chronological devices; and (2) for an isolate representing the fundamental category either of space or time. The basic class numbers retaining the helpful sequence of the isolate numbers arrived at in the idea plane.
221. NEILAMOTHAI (A) AND VENKATARAMAN (S). USE OF COMPUTER FOR SYNTHESIS OF CLASS NUMBER: A CASE STUDY WITH A FREELY FACETED VERSION OF COLUM CLASSIFICATION. 125, 1968; 359-88.

Though feature headings take much time in an entry on catalogue on tape, their commission greatly increases the number of entries the computer must scan. Therefore kernel data of the subject of a document are fed into the computer. Using the depth version of column classification, the computer synthesises this into a class number and compares it with class numbers in the entries on the catalogue on tape.

PLASMA PHYSICS - U.K.


A system for real-time interrogation of files of references stored on KDFG disc in being developed at Culham Laboratory. This system is currently available on an experimental basis, due to the limitation of space. Searches may be made from any terminal connected to the main computer and references may be printed or shown at a time on a video display terminal (in which case the user can choose which references to have printed).
ENGINEERING - CONFERENCE


Paper presented at the special libraries Association 65th Annual conference, Toronto, June 74. The IBM Technical Information Retrieval centre was estalished at the company's headquarters for company's engineers, scientists, and technical and-based retrieval and dissemination system using retrieval text searching and offering.

NUCLEAR ENERGY

224. PERSCHES (S) and VERNIMB (C). Feasibility study of automatic indexing of INIS abstracts. Information system and their interconnection and compatibility. 50, 1975; 409-16.

The information science Research unit of GCTIS is conducting in cooperation with the Directorate General XIII of Luxembourg a full study of the automatic indexing of INIS abstracts with the INIS Thesaurus. The preparational wash for this study, conversion of the thesaures, definition of the indexing algorithm and parameters, is discussed.
KEY WORD INDEXING


Until the July 73 issue of Nuclear science abstracts (NSA) descriptors (keywords) were not used in the primit ed index. With this issue the subject heading modifier system was dropped and the present subject descriptor qualifying descriptor, title and augment a tion type of indeing adopted.

NASA DATA BASE - RESTRUCTING


Three goals were establis ed to ensure efficient future use of the system: (1) To modify the record and size of the data base; (2) to lessen the amount of computer search time required; (3) To increase the relevance of the material retrieved. An analysis of the NASA data base indicated that a number of fields were not being searched and could be eliminated from the record e.g. title security classification, country of origin and personal author note, and there were removed.
AEROSPACE

227. FANGMEYER (H) Advisory group for Aerospace Research and Development (AGARD). 22, 6, 1974; 22p.

Research that has been done in developing operational retrieval systems is reported; how the computer can be integrated into the indexing process so as to supplement the intellectual effort and render human intervention more reliable.

CHEMISTRY


Computer programs developed at the national institutes of health produce unstructured though otherwise compounds. The WIN generation programs accept connection table input and recognise situations which they cannot handle the output is these either correct WIN or on acknowledgement of program limitation.

229. KRISHNAN (C) and SANKAR (LV), etc. Algorithm wisswasser Notation System for organic compounds. J.Chem. Docum. 14, 3, 1974; 130-41.

Procedures and rules are given for constructing ALWIN for a cyclic and cyclic structures i.e. benzene and its derivatives monocyclic, bicyclic penfurred, spiro,
Cyclic Structure can be presented in two equivalent forms, with in that equivalent forms, parenthetic and non-parenthetic.

(2) Repeated chemical groups may be contracted by factorisation.

(3) The main ring and bridging branches of a bridged ring system are encoded separately then joined by punctuation.

(4) Algorithm for processing chemical graphs have been developed.


The principle of the topological encoding of formulas and name searching are briefly described. These methods have been developed to the point where it is now possible to carry out a computer search for a given structural fragment without the risk of false drops. It is also possible to carry out searches where requirements, while well defined and readily used by chemists, can not be represented exclusively by elemental symbols and chemical bonds.

231. PALMER (G.). Wiswesserline-Formula notation.

Chemistry in Britain, 6,10, 1970; 422-26.
The 

"linear string of symbols. The basic set comprises

upper case letters, numerals, four punctuation marks and

the blank space. Notation for a structure is formed by

stringing together the symbols for its fragments in

the order in which they are connected. The resulting

notation is compact, unique and unambiguous and parti-

cularly suitable for indexing and computer processing.

252. WARRIN (H). Chemical Abstracts will names for chemi-

cal substances in the ninth collective period. J.Chem

Docum. 14, 1, 1974; 5-15.

Index names for chemical substances have been signifi-

cently revised by CAS for volume 76 (Jan-June

1972, the first volume of the Abstracts). Machine

ing of index names and translation of these names into

structural representations in the CAS computer based information system are also aided by the revisions.

Specific identifiable alloys, elementary particles, enzymes, and substance mixtures are now indexed.

ORGANIC CHEMISTRY

253. DUNFIELD (Everett). Information retrieval system for

organic chemistry compounds. APLABILL. 55, 1, 1971;

10-14.
Information from research articles concerning location, form of experiment, molecular formula, ruling systems, functional groups and physical properties is coded and key punched on 80 column IBM cards. The system is designed for computer searching. Alphabetic coding is used to indicate type of experiment, for balises and for form of compound.

SEARCHING-SETREDUCTION-CHEMISTRY


The set reduction method by Sussenguth for chemical structure and substructure searching has been adopted; structure search and substructure search have been separated into distinct subroutines; 1st order and 2nd order degrees have been included in the control vector. This method is tested on structures with greater symmetry than has been done previously and it is well suited for disjoint substructures. A method is demonstrated for removing the ambiguity in events in using a bond adjacency matrix.

RELATIONS-GRAPH STRUCTURES CHEMISTRY

235. FIGLIAU (Robert) and WINTZ (Jakobh). Topological method for the representation of synthetic and analytical relations of concepts; Angewandte Chemie, international edition in English. 9, 8, 1970; 589-95.
In mechanised systems used for literature searching there is a steadily growing necessity not only to be able to formulate concepts as a search condition but also the characteristic connections under which these concepts appear in the enquiry. TOSAR (Topological representation of synthetic and Analytical Relations of concepts), is a concept. All the concepts in the graph and the connections between them are coded and introduced into the memory of a computer, and can be retrieved by any relevant enquiry with the aid of suitable machine programs. The model should considerably increase the precision of mechanised searching.

NOTATION CHEMISTRY

256. JACKSON (R H) and LUCILLE (H). Interconversion of chemical structure systems. *Chemistry in Britain*, 6,10, 1970; 427-50.

ICI's requirements for an information retrieval system from internal and external literature led to the development of the CROSSBOW (Computation retrieval of organic structures based on DISSENER), system for internal literature and a combination of crossbow and chemical Abstracts service (CAB) for external needs. CROSSBOW is based on the connectivity system of an atom and its associated based which produce a chemically significant ordering of data.
CIDS performs on line searches for chemical compounds in response to queries which may specify structural characteristics e.g. atom population of rings. A class of rings, for which screens are assigned and which is independent of structure orientation, may be defined as either the rings that are not the envelope of shorter rings equivalently as the rings that can be a member of a smallest set of smallest rings.

233. AIKENS (Qazi) and RICKARD (Rubinstein.) Alternatives to searching semantic surrogates of chemical structure. J. Chem. Docum. 11, 2, 1971; 110-16.

Chemical parameters in "BIOSTIS" data base are derived from edited, altered, specified nomenclature, necessitating semantic synthesis of keywords and fragments, and analogous to chemical synthesis in the laboratory. Using synonym indexing, Chemical Abstracts service registry numbers (available for only 62% of the total) and Wiswesser line notation, a computer file (Toxi Tapes) of general industrial and pharmaceutical toxicology was initiated and the retrieval capability of this file is at present being evaluated.

A large file containing chemical structure information in the form of fragments based on SMILES can be searched interactively using a time sharing system. The interactive searching process permits query modification until the desired results are obtained. Searches can be made on compound number, plant concentration, or activity.

MCAN (Davis B). Network or all have separately. In Lancaster (England), ed Proceedings of the 1973 chemical on library implementation of data processing; Networking and other forms of cooperation 5, 2, 1974; 1-8.

The rapid growth of the use of online information retrieval services is discussed. MEDLINE is now operating at the rate 240,000 searches per year, nearly 15 times that of MEDLARS. The problem seems to be more of training and easy access to MEDLINE. The medical user will usually take the shortest route to the information he needs.

For 4 weeks in late 1970 the medical library of the University of Virginia experimented with a new remote-access bibliographical central and retrieval system via its tele type machine. The system called ATM - TWX, utilizes a time-shared IBM 360/6 computer in Santa Monica, California. The language used is medical subject heading. Statistical results indicated that the system was used for approximately 200 minutes on 19 days and that an average of 16 searches were run on any given day or about 4-6 searches per hour of use.


Emphasises the need for precision by the researcher in defining his request and careful study of the relative detail given journals. A further point to be considered is the language knowledge of the researcher. The effects of terminological differences in various countries are mentioned; e.g. patient identification tags in the USA identification tables in Australia.

Previous research has indicated that the titles rather than index terms would, in the standard MEDLARS search give lower recall, but higher precision. The title searching technique was tested using routine queries put to MEDLARS. Thus relative retrieval efficiencies are so close that choice of method must be primarily on economic grounds.


MEDLINE was extended to Hawai in mid. July 73; by the end of the year, 504 searches had been completed. All MEDLINE articles are available through a daily messenger service between medical, hospital and university of California at Los Angeles biomedical library (a service teching 5-7 days). Its success indicates that Hawai would benefit from national information systems.


The Washington university school of medicine library used the following to create an index to the conference and symposia literature in biomedicine -MARC
cataloguing, optical character recognition (OCR), keyword indexing, and typesetting from magnetic tape. Each paper is catalogued in the normal manner and given a 7 digit number.

MEDLARS


A technique for searching a coordinate index is to compare each reference with a Boolean expression of index terms. This devides the file into retrieved and not retrieved references. This searching technique has several theoretical advantages, and with allowances made for the variations between MEDLARS and a coordinate indexing system, it performed slightly better in a MEDLARS retrieval test with N equal to the number of references retrieved by the corresponding Boolean search.

UTILITY STUDY


The value of MEDLARS services at the ANU was determined by a system recording full details of requests and results obtained. Time taken to answer requests ranged from 10 days to 4 weeks. Comment on the usefulness of bibliographies.
revealed a precision ratio varying from 16-25% and
a recall ratio of 95% of human articles. Short en-
mings in bibliographies were improved by more prec-
ire search information, and the service was found to
be of value especially for retrospective searching.

BUILDING RESEARCH

248. VALLANCE (L.). Computer aspects of the BLIPS System.
a discussion. Aslib Proc. 27,5, 1975; 294-209.
paper presented at the Building Research establishment
symposium on a comprehensive on line computer system
for special libraries, Garston, Dec 74. The problem
discussed under the following 4 headings: (1) The size
and variety of the files-specific reference is made to
the terminals; (3) hardware particularly in relation
to the communications aspect; (4) security problems.

MILITARY SCIENCE - U.S. SYSTEM DESIGNING

249. HILL (Helen N.) and POWERS (Ruth V.). Designing CIDS
the U.S. Army chemical information and Data. J.Chem.
Docum. 11, 1, 1971; 30-56.

This is a total computerised system for the input
storages and retrieval of chemical compounds and
associated information. Input is via a special che-
chemical typewriter, the chemical record is analysed
to provide a chemically verified connection table, duplicate compounds are eliminated and fragment and several search keys are automatically assigned. Retrieval can be conducted from remote consoles (on a time sharing basis); the system uses an inverted key index and a 3 level search strategy based on keys, molecular formula search and atom by atom search.

GASS TECHNOLOGY - COST STUDY


In 1970, the institute of has Technology, Chicago inaugurated a technical information centre providing the gass utility industry with a centralised repository for documents related to gass engineering and technology and as a means of inexpensive information retrieval. For indexing and retrieval the Teramatrix system is used.

SUBJECT CLASSIFICATION - ECONOMIC - DEVELOPMENT

251. WOLFE (JRM) and GALABY (J) etc. Project for a computer oriented subject classification for use in the fields of agriculture, engineering and other fields directed towards economic development. Aust. Libr. J. 19,9, 1970; 552-60.
The ASPAC Registry of scientific and technical services aims to collect information about professional groups working in fields associated with economic and to make this information available, particularly to developing countries. Retrieval criteria will range from selection by countries to groups working on a specific project. It was decided to use the control Data corporation's information oriented language (INFOL) to retrieve information on technical groups and their activities. A classification scheme was necessary. Library classification, subject headings, lists and inventories and registers used to classify scientists or match people with jobs were examined as guides in establishing headings. The resulting system set out in an appendix.
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