b sc. 12; 1975; PAPER G.

oject on Study of Subjects.

eaching in library science series. 22)

Bhattacharyya*, *Documentation Research and Training Centre, Indian Statistical Institute, Bangalore* 560003.

[Argues for the inclusion of a project on Study of Subjects in courses in library and information science. Suggests contents of the project and provides proforma for the collection and organisation of information about subjects. Lists types of information sources/reference books for study about subjects and suggests proforma for collecting information about various types of reference books, about primary periodicals, on on-going research, on institutional sources of information, and about experts, consultants etc. The suggestions are based on the experience gained in organising and guiding projects on the "Study of subjects" in DRTC.]

A Case for a Project on "Study of Subjects"

INTRODUCTION

The primary concern of a professional in the field Information Science including Documentation d Library Science, is the information work and vice predominantly pertaining to a subject or a oup of subjects. His professional work and service addition to his thorough knowledge of the branch Information Science he is specializing in, call for cessary and sufficient knowledge of some of e special facets of the subject or of the group of bjects concerned. This is an important issue ating to education in Information Science. This ue raises several vital questions. The purpose re is to consider the questions relevant to this issue, order to make out a case in favour of the need of project on "Study of Subjects" to be completed every candidate taking up a course in information ience.

ACADEMIC KNOWLEDGE AND PROFESSIONAL WORK

The first pertinent question is "Is there any arantee that the subject of professional work and rvice will, in the majority of cases, be the same as at acquired in the college or the university?" As e situation exists to day, the answer seems to be No". For example, to-day an arts or science aduate, who has done his graduation in library ience also, is appointed to do professional work d service in libraries primarily concerned with subjects — such as, aeronautics, agriculture, food technology, instruments, leather technology, machine tools, management, medicine, etc. This finding naturally leads us to the next question.

12 CHANCE OF CHANGE

The second pertinent question is "Is there any chance of this situation being changed in the near future?" Any change in the present state of affairs must be preceded by a significant social demand for such a change; and that should be followed by a well-integrated educational policy linking up basic academic qualifications with professional qualifications, in the region of employment. Such a social demand, if it at all exists to-day, must be very insignificant. Therefore, the chance of any change in the near future appears to be very low. Before leaving this question, we can examine the next question.

13 ADEQUACY OF ACADEMIC BACKGROUND

The third pertinent question is "Is it adequate if the subject-knowledge of the information scientist be the same in extension and intension as that acquired in colleges and universities for further study and research in the subject concerned?" This is perhaps the most vital question. It may be examined in greater detail.

J131 *Requirement for Research*

The objective of a research worker is to generate new information. The generation of new information may take any one of the following forms:

(*a*) Discovery of new information; or

(*b*) Interpretation of existing or new information in the light of known theories of principles, or

Present Address : School of Library and Information Science, University of Western Ontario, London N6A 3K7. Ontario, Canada.

(*c*) Revision of known theories or principles in the light of new information; or

(*d*) Application of the findings for some practical purpose.

For this purpose, a research worker is to specialise in great depth in a subject of comparatively smaller extension and greater intension, falling directly within the purview of his basic academic achievements. In addition to a thorough knowledge of his subject of specialisation, he requires a knowledge of a number of tool-subjects — that is, subjects having application to his subject of specialisation for the development of the latter. Mathematics, statistics, operations research, research methodology, general systems theory, logic, psychology, etc are usually regarded as such tool subjects. Tools subjects are selected on the basis of the need of the subjects of specialisation. The knowledge of these tool subjects, for all practical purposes, is generally made to be biased towards the subject of specialisation. In addition, a research worker, as far as practicable, requires a knowledge of the subjects that warrant the application of his research findings, or to which there is a likelihood of their application. The results of research is essentially "primary" in nature.

132 *Requirement for Information Service*

On the other hand, the objective of an information scientist is to promote the use of existing information to help generation of new information by research workers specialising in different subject-fields. For this purpose, he has to understand precisely the information need of research workers. This amounts to understanding the subjects of their respective information need. To be effective, the understanding of a subject in this context implies primarily the knowledge of

1 The denotation of the terms used in the subject, and its scope as recognised by different authorities; and

2 Its divisions, subdivisions, etc, denotation of the terms representing them, their respective scope, and their mutual interrelationships or their respective structures, as recognised by different authorities.

He requires this knowledge, also to understand the subjects of pertinent sources of information for preparing surrogates for them, and for organising them and their surrogates to serve the purpose of promoting the use of existing information on the subject concerned. As a corollary to this objective an information scientist requires to have the knowledge of the development of the subject in terms of various factors, information transfer processes in the subjects; information seeking behaviour of the specialists in the subject; documentary, institutional, and human sources of information on the subject, and of the institutional and commercial publishers of documents on the subject.

Knowledge of these facets of the subject normally does not form part of any academic curriculum. Acquiring such knowledge is not a matter of in-depth study of the subject, as it applies in the case of a research worker. In the majority of cases, such knowledge is necessary not of a single subject, but of several subjects. Again, knowledge about these facets of the subjects is very dynamic — perhaps changing everyday. Further, the extent of such knowledge is so vast and varied, that it does not readily admit of being made part of the internalised memory for ready reference. On the contrary, it requires to be recorded in an externalised memory taking the form of a specially organised, indexed, and supplemented handbook of information of the special facets of subject concerned. Documents of this species are not readily available in the market as yet. It is perhaps one of the responsibilities of the profession of information scientists to compile such documents or various groups of subjects for the benefit of individual information scientists, and to a great extent, for the benefit of the users of information.

133 *Research vs Information Service*

Obviously, therefore, the subject-knowledge acquired in colleges and universities, by itself, is not adequate for professional information work and service. Of course, the academic knowledge of a subject always proves helpful to acquire the knowledge of the special facets of the subject required for professional information work and service. There again, the range of subjects on which such knowledge is to be acquired considerably reduces the advantages of the academic background. Besides that, there is no such guarantee that one will have his employment in an information centre especially concerned with the subject of which he has acquired knowledge or gathered information. The whole situation is so peculiar, that it warrants the information scientist to be always capable of acquiring knowledge of the special facets of any subject, as fast as practicable, whenever the need arises; and of keeping it up-to-date throughout his professional life with the subject or group of subjects concerned. Such an approach towards any subject or group of subjects suggests it to be quite distinct from that employed for subject-specialisation by research workers. If in the case of a research worker, it is called "Subject Specialisation", it would perhaps be appropriate to call it "Subject Generalisation" in the case of an information scientist. However, let us consider it as a special case of "Subject Specialisation", and call it so.

14 Problem of Teaching and Learning

141 *Responsibility of Professional Courses*

Inherent in the state of affairs outlined in Section 133 above, are the problems of "teaching" and "learning" relating to this kind of subject specialisation. Considering it from all points-of-view, it may be said that there is no point in arguing that teaching of this kind of subject specialisation should be the responsibility of the academic courses on

ent disciplines offered by the colleges and uni-ies. On the contrary, this being considered tial for information work and service, it should ie responsibility of the professional courses on mation Science including Documentation and ry Science.

Responsibility of Teachers in the Profession

The question is, "Should such a course invite ct specialists to teach the topic?" Considering om all points of view, the proposition does not to be either essential or viable. It is quite from the foregoing sections that for the purpose aching or learning this kind of specialisation, the non "Methodology" associated with it and "Application" should constitute its essential ents; while the role of any specific subject or p of subjects would be that of a "guinea-pig" cientific experiments. Acquaintance with this odology and experience of its application would p the information scientist with the capability to ialise in any subject whenever the need arises. his circumstances, the role of subject specialists, the purpose in hand, seems to be of secondary ortance. Secondly, it is not possible to employ specialist for every student's specialisation. des this, experience has shown that the information ntist is better equipped to collect, systematise, index the needed information on the subject cerned to design an externalised memory for his pose. Therefore, the teaching of this topic uld be the responsibility of a teacher of infor-ion science.

Methodology of Teaching and Learning

A teacher of information science, cannot be ected to have the knowledge of the required cts of all the subjects to be used as "guinea-s". Due to this arises the problem relating to methodology to be adopted for teaching and learn-g the topic. Experience in this respect suggests t it is more helpful to emphasise the "learning" ect of it than its "teaching" aspect. Self-study" been found to be an effective method for "learning" d "guidance" in self-study has been found to be effective method of "teaching".

To make it really effective, in advanced courses Information Science the topic "Study of Subjects" ay be regarded as a part of the syllabus for a course "Guided Research Project". As a part of this oject, additionally, each student may be required design a scheme for classification, (including a esaurus and a conventional list of subject-headings), the subject concerned, making extensive use of s knowledge acquired through guided self-study the essential facets of the subject; and to use this heme for designing a classified documentation list pplemented by different kinds of index. These o parts of the project would ensure a stronger undation of subject specialisation.

144 *Method of Guidance*

The method of "Guidance" to be followed for teaching the topic may consist primarily of the following:

1 Explaining the need of a course on "Study of Subjects" for information scientists; the problems associated with it, and with its teaching and learning; explaining the methodology of "Guided self-study" to be adopted for this purpose.

2 Suggesting the kinds of document that can be normally referred to for collecting needed information.

3 Providing different proforma enumerating systematically the items (headings) under which information on the subject concerned is to be collected; prescribing and explaining how information is to be collected, systematised, and presented under each heading; and explaining the techniques of abstracting, classification, and indexing to be used respectively for collecting and systematising the information, and indexing the different parts of the handbook as well as the whole text to render it into a effective externalised memory.

4 Supervising regularly the progress of work checking by the collected information and the diary to be maintained for this purpose.

5 Helping each student to prepare for a special class seminar to present his collected information. Whenever possible, a subject specialist may be invited to preside over the special seminar. The presentation may be followed by comments and discussion.

145 *Method of Self-study*

The method of "Self-Study" to be used for learning may consist of

1 Collecting information according to the proforma using, as far as applicable and practicable, the technique of abstracting.

2 Systematising under each heading the collected information using the technique of classification.

3 Indexing the parts when necessary, as well as the whole text of the handbook using the technique of indexing.

4 Getting the progress at each stage, regularly checked up by the guide.

5 Presenting the systematised information in a special seminar.

146 *Evaluation of the Project*

After the seminar is over, each student may submit his handbook for valuation. If possible, for the purpose of valuation, the help of a subject specialist and of an information scientist working with the subject concerned, may be sought.

15 ADDITIONAL ADVANTAGES OF THE PROJECT

An additional but highly significant advantage of the course on "Study of Subjects" may be noted. The compilation of reference documents — such as, encyclopaedias, handbooks, directories, etc helps information service "Abstracting", "Classification",

and " Indexing " are the three basic techniques employed by information scientists to achieve his ultimate objective of promoting the use of existing informaion primarily for the generation of new information. The teaching and/or learning of these techniques, to be really effective, call for their demonstration and application on some subject or other. The methodology used for teaching and learning " Study of Subjects " simultaneously provide a concrete ground for applying the techniques of abstracting, classification and indexing. Abstracting is used for collecting essential information from sources of information, classification is used for systematisation of collected information, and indexing is used to make it an effective externalised memory. These are the basic techniques used for the compilation of reference books. The result of completing the project of " Study of Subjects " is a handbook of essential information required by an information scientist for his professional information work and service. Evidently, the course on " Study of Subjects " as part of a course on Information Science including Documentation and Library Science is multipurpose project that can be planned properly to make the whole course on information science more meaningful and effective.

16 A Significant Implication

The discussion in the foregoing sections draws attention to one of its significant implications. It pertains to the knowledge that an information scientist must possess to do his professional work and service. Evidently, he must possess the following:

1 Basic academic knowledge necessary and sufficient to help him to acquire (*a*) specialised knowledge of the essential facets of any subject needed for professional work and service; and (*b*) thorough knowledge of the particular branch of Information Science he is specialising in;

2 Specialised knowledge of the essential facets of the subject or subjects pertaining to which he is to perform his professional work and service; and

3 Thorough knowledge of the particular branch of Information Science he is specialising in, implying long and intensive preparation including instruction in its skills and methods accompanied by the understanding of the scientific and scholarly principles underlying such skills and methods.

Perhaps, the above implication has much to say as to what should be the minimum basic qualification of a candidate who intends to seek admission in a professional course on Information Science including Documentation and Library Science.

2 Proforma for Collection and Organisation of Information

21 Proforma

The need for a project on " Study of Subjects " has been discussed in Sec 1. The systematic proforma given below is drawn in the light of that discussion. It is primarily intended to guide the collection of information on any subject. In drawing up this proforma, necessary emphasis has been laid on the knowledge of the facets of a subject deemed to be essential for professional information work and service.

Sec Num	Purport
0	INTRODUCTION: Statement of the purpose and the plan of the project on " Study of Subjects ", indicating also the need and method of keeping the results of study up-to-date.
1	DEFINITION: Definition of the term denoting the subject concerned given in different authoritative sources. Comparative study of the collected definitions showing their similarity and difference.
2	TERMINOLOGICAL DEVELOPMENT: Terminological development of the term presently used to denote the subject, if any; its current synonyms, and different views on them. This generally applies to a subject which has been denoted by different terms at different points of time. For example, this applies to the term 'Library Science'. It started as 'Library Economy'; passed through 'Librarianship' and now it is denoted by the term 'Library Science'.
3	SCOPE: General scope of the subject as a whole. The general scope of the subject is to be taken note of under the following subheadings:
31	DIVISIONS AND SUBDIVISIONS: All subjects that are studied under the subject concerned —that is, primarily its divisions and subdivisions. For the purpose of this section, the terms (including synonyms) denoting the different broad divisions and their respective immediate subdivisions along with the definition and scope of each, are to be given. It would be convenient to take note of the divisions and subdivisions from a selection of representative textbooks and advanced treatises on the subject concerned, by analysing their contents. This would amount to taking note of the classificatory treatment of the subject concerned by the specialists, for the purpose of study, teaching, learning, etc. Definitions are to be collected from different authoritative sources.
32	APPLICATION: Subjects to which the subject concerned may be applied for their respective development. For example, when Physics is the subject of study, Engineering Sciences, Chemical Sciences and Biological Sciences are areas of its application.
33	TOOL-SUBJECTS: Subjects applicable to the subject concerned for its development. For example, when Chemistry is the subject of study, Mathematics, Statistics, Physics, etc are applicable to it as tool-subjects, for its development.

Sec Num	Purport

4 CLASSIFICATION: This section is intended to take note of how the subject concerned, and its divisions and subdivisions are treated by the different schemes for classification — general and special. The first point of interest would be to find out the rank of the subject concerned in the whole universe of subjects, as recognised by different classificationists. For example, the rank of the subject 'Chemistry' in the universe of subjects is commonly recognized as follows:

Universe of subjects
  Sciences
    Natural sciences
      Physical sciences
        Chemistry

The use of indention in the above example is to show the Superordinate-Subordinate Relationships Treatment of the subject concerned in different schemes for classification is to be noted under the following subheadings:

41 SPECIAL CLASSIFICATION: This subsection is intended to take note of if there is any special subject-classification designed by specialists for the purpose of deeper understanding of the entities falling within the purview of the subject as a whole, or of any division or subdivision of it; for example, the Taxonomical Classification in Geology, Botany, and Zoology, and the Periodic Table in Chemistry. For the purpose of this subsection, generally a summary table of comparatively broader classes, with introductory remarks and short description of the scheme, is to be given.

42 DOCUMENT CLASSIFICATION: This subsection is to take note of the treatment of the subject concerned in different schemes for document classification, including thesauri and lists of subject headings. Such a scheme may be general in scope; for example, the Dewey Decimal Classification, Universal Decimal Classification, Colon Classification, Thesaurus of Engineering and Scientific Terms, Thesaurofacet, etc. Such a scheme may be special in scope; for example, the Classification Schedule and Alphabetical Index for Packaging Documentation, the London Education Classification, the INIS: Thesaurus, the Thesaurus of Federal Aviation Agency Descriptors (USA), the Medical Subject Headings (MeSH), Subject Headings for Engineering (SHE), etc. Besides, if there is an indexing or abstracting periodical on the subject concerned, would normally expected to follow a special document classification scheme. Taking note of the treatment would consist of extracting a summary table from each of such schemes. When the scheme consists of a systematic part and an alphabetical part, it would be necessary to look for the subject concerned in both the parts, to extract relevant portions from them.

5 DEVELOPMENT OF THE SUBJECT: The development of the subject concerned is to be noted down under the following subheadings:

51 LANDMARKS: The landmarks in the development of the subject — that is, the contributions — are to be noted down as far as applicable, under its broad divisions and subdivisions. Under each division or subdivision, as the case may be, the section will consist of entries arranged chronologically. Each entry, as far as ascertainable, will consist of the following items of information: (*a*) the year or period of contribution as far as determinable; (*b*) the name of the contributor; (*c*) a short biographical note of the contributor; (*d*) each of his significant contributions; (*e*) the title and the year of publication of the original document, giving wherever applicable, its host and locus.

52 TREND OF RESEARCH: The trend of research in the subject concerned. This can be collected from review documents, indexing and abstracting periodicals, etc. The idea is to mark out the broad areas in the subject concerned in which current researches are in progress. Additionally attempts are to be made to ascertain in general (*a*) the growth of literature (documents) on the subject concerned; and (*b*) the degree of documentary scepage, and scatter of information on research results in the subject concerned.

53 TREND OF EDUCATION: The trend of education in the subject concerned. This section is intended to take note of the development of education in the subject concerned and of its different levels — such as, undergraduate, graduate, postgraduate, research, etc.

6 SOURCES OF INFORMATION: The sources of information on the subject concerned. Three varieties of sources of information are readily recognisable. They are (*a*) documentary sources; (*b*) institutional sources; and (*c*) human sources. This section is intended to take note of the various sources of information on the subject concerned. As such, the information about the various sources is to be collected under the subheadings mentioned below. For this purpose, different standard proforma are to be used. The specification of these proforma will be provided separately. Each entry pertaining to the sources of information is to be classified according to a standard scheme for classification. The entries under each subsection are to be arranged systematically according to the scheme used. Sources may not always be directly turned on the specific subject concerned. For the purpose of the subsections of this section, it would be required to take note of the sources on the (*a*) specific subject; (*b*) the subjects of extension greater than that of the specific subject and having a portion devoted to the specific subject; and (*c*) the subjects of extension smaller than that of the specific subject and dealing with a part of the specific subject.

Sec Num	Purpor.

For example, when the specific subject of study is "Chemistry", the subjects "Science", "Physical Sciences", "Chemical Sciences", etc, are subjects of greater extension; while the subjects "Inorganic Chemistry", "Organic Chemistry", "Physical Chemistry" etc, are subjects of smaller extension.

61 DOCUMENTARY SOURCES: This subsection is intended to take note of the various documentary sources of information on the subject concerned. Such sources fall in two distinct categories: (*a*) Primary, and (*b*) Secondary. Sources in each category are many. To start with, it would be necessary to take note of a selection of the outstanding documentary sources — both primary and secondary. In the primary category will fall (*a*) outstanding text-books; (*b*) advanced treatises; and (*c*) primary periodical publications. In the secondary category will fall (*a*) conventional reference books — that is, encyclopaedias, handbooks, directories, dictionaries, glossaries, etc; (*b*) ad-hoc bibliographies; (*c*) indexing and abstracting periodicals; and (*d*) review documents (annual reviews, advances in, year's work, etc.) As a part of this subsection, it would be helpful to add a list of the organisations (with addresses) specialising in the publication of documents in the subject concerned.

62 INSTITUTIONAL SOURCES: This subsection is intended to take note of the various institutional sources of information on the subject concerned. For the purpose of this section, the Conferences, and Projects turned on the subject concerned are to be taken note of. The idea is to identify the institutions, including conferences and projects, specialising in the subject by way of research, education, or organisation. As such, they are in a position to provide information on many aspects of the subject which is not readily available from other sources. Selection should include, as far as practicable, the institutions in the following three categories: (*a*) International; (*b*) National; and (*c*) Local.

63 HUMAN RESOURCES: This subsection is intended to take note of the human sources of information on the subject concerned. The idea is to identify the living persons recognised as specialists in the subject concerned because of their educational achievements and experience. Such a specialist, when consulted, may be in a position to provide specific information on the subject concerned which is not readily available from any other source. Selection should include, as far as practicable, the living persons of reputation at the international, national, and local levels.

7 INFORMATION TRANSFER PROCESSES: This section is intended to take note of (*a*) the information transfer processes among the users of information on the subject; (*b*) the information seeking behaviour of persons specialising in the subject; and (*c*) typical information queries on the subject.

Sec Num	Purport

Information about these aspects of the subject is to be collected primarily from documents dealing with these aspects as a whole, or some portion of it, or some broader subject comprehending the subject concerned. When no such specific treatment is available, general information on information transfer processes and information seeking behaviour is to be taken note of. Typical information queries on the subject may have to be formulated on the analogy of such queries in other subjects; for, in the majority of cases, they may not be readily available.

8 CONCLUSION: Conclusion may focus attention on any one of the following aspects relating to the subject concerned: (*a*) the impact of research on the growth of the primary documents; (*b*) adequacy or otherwise of the secondary documentary sources of information; (*c*) problems of physical access to the sources of information; (*d*) problems of organising information; and (*e*) remarks and suggestions relating to any aspect of the subject falling within the purview of the study.

9 REFERENCES: This section is intended to list the documents actually used to compile the handbook. For the purpose of this section, a short entry is to be prepared for each document. The entry is to be prepared according to the prescription of a standard code for cataloguing practice.

In the majority of cases, an entry for a macrodocument is to be prepared in the following style:

ATKINS (Kenneth R). Physics — once over — lightly. 1972.

If a particular portion of a macrodocument is referred to, its exact location is to be incorporated as the last item in the following style: Part 2; or Chap 3; or Sec 52; or Page 20–28; etc, depending upon what the document admits as appropriate.

Normally, an entry for a microdocument is to be prepared in the following style:

ROBERTSON (Andrew). Behaviour pattern of scientists and engineers in information seeking for problem solving. (Aslib Proceedings. 26; 1974; 384–90).

Entries prepared in the styles mentioned above are to be arranged alphabetically and serially numbered. The serial number of the document is to be used in the appropriate section of the text to indicate the sources from which the information has been collected. On the other side, the section number is to be used as a part of the appropriate entry. As a result, an entry in the Reference Section will appear in the style analogous to the following:

5 Sec 32 ATKINS (Kenneth R). Physics — once over — lightly. 1972. Chap 9.

CONTENTS AND INDEX

Evidently, for the purpose of the project on udy of Subjects", necessary information is to be ɔcted from the already existing documentary ces of information — both primary and secondary. technique to be employed for this purpose, in majority of cases, will be the technique of ɔstracting"—that is, briefly summarising the ntial contents. When the collected information ystematised according to the prescriptions of proforma, it will result into a handbook of rmation on some facets of the subject concerned, sidered to be essential for professional information k and service. In order to make this handbook into effective externalised memory, it is to be equipped

1 A detailed list of contents; and
2 A good alphabetical subject index.

preparation of the list of contents will be largely erned by the headings in the proforma. For purpose of indexing, a suitable procedure of xing is to be adopted. The Indian Standard this may be used with advantage.

Source-Documents

For the purpose of the project on "Study of jects" the following varieties of document may vide useful information:

1 Standard general dictionaries and technical saries.
2 Articles in general encyclopaedias.
3 Special encyclopaedias and handbooks.
4 Orientation books, specially written with a to the understanding of non-specialists in the ject.
5 Representative text-books and advanced tises.
6 Schemes for classification — general and special.
7 Indexing and abstracting periodicals.
8 Books on the history of development of jects.
9 Review periodicals and review articles.
10 Bibliographies.
11 Guides to reference books.
12 Directory of periodical publications.
13 Directory of institutions.
14 Directory of researches-in-progress.
15 Who's who in different subjects.
16 Documents on user studies.

Varieties of Ready Reference Books

Given below is a checklist of the varieties of dy reference books. It may be noted that every ject does not admit of all the varieties. In the text of the subject concerned, the varieties likely to st may be checked before going in search for them the guides to reference books or similar documents.

Atlas
  Geographical
  of specific subject
Bibliography (ad hoc and periodical)
  Abstracting
  *Annotated
  *Indexing
  of bibliographies
  of individual (person)
    'by'—kind
    'by and on'—kind
    'on'—kind
  on specific subjects

Biographical reference book
  Dictionary (who was who)
  who's who

Calendar
Cataloge
  Booksueller's
  Library
  Publisher's
  Union

Classification scheme
  General
  of specific subjects
Thesauri, Subject heading list, etc,
  on the subject
Code of practice
Concordance

Dictionary, Linguistic
  General
  Technical (Glossary) of specific subject
Directory

Encyclopaedia
  General
  of specific subject
Formulae
  Recipes
Gazetteer
  Guidebook
Handbook
Leading cases
Manual
Review serial
Standard and specification
Statistical reference book
Table
Yearbook

5 Proforma for Collecting Information About Ready Reference Books

51 PROFORMA

As far as applicable, the information about a ready reference book is to be collected and systematised according to the proforma given below. In the case of an *ad hoc* bibliography, item "C contents"

is to be modified. The necessary modification is given separately.

A *Bibliographic description*
1 Class number according to a scheme for notational classification and/or
2 Feature heading.
3 Title including subtitle and alternative title, if any, (Language, if not readily indicated by the title)/ (diagonal slash)
Author statement; and/or collaborator statement.— (stop, space, dash, space)
Edition statement. —
Place of publication: Name of the publisher, Year of publiication. —
Number of pages, or Number of volumes; Height in cm. —
(Name of the series; Editor statement; Number in the series).
Notes (any other bibliographical information not covered by any other heading, given above and below).
International Standard Book Number (ISBN).
Binding: Price.

B *Objective*

C *Contents*
1 Subject field with indication of emphasis, if any, and of different broad topics covered
2 Kind of information
3 Period covered
4 Geographical area covered.

D *Arrangement*
1 All-through alphabetical
2 Alphabetical under systematic arrangement of broad subject-headings
3 Systematic
4 Classified
5 Classification scheme
6 Any other peculiarities in the arrangement.

E *Aids to users*
1 Explanation of abbreviations, symbols, entries, etc.
2 Hints to pronunciation
3 Background knowledge
4 How-to-use
5 Feature headings
6 Cross references
7 Bibliography
8 Index (Subject; Name: Author, Collaborator, Title, Series; Map: Volumewise; Separate; Cumulative)

F *Special Features*
1 Features not normally expected
2 Features not implied in the title
3 Features not found in other similar publications

G *Uptodateness*
1 Closed
2 Open
Year of first edition
Periodicity of revision
Supplements
Correction slips
Correction leaves
New edition
Cumulative editions at intervals.

H *Evaluation*
1 Standard (Ordinary/ Technical, Scholarly)
2 Publisher's reputation
3 Author's / Editor's status (Qualification, Experience etc)
4 Articles (Signed/ Unsigned Dated, Undated, Impartial/ Biased, Adequately illustrated/ Poorly illustrated)
5 Bibliographical reference (Brief, Select, Adequate/ Inadequate/ Standard followed, if any).
6 Data used (Uptodate/ Outdated/ Authentic/ of doubtful-authenticity)

52 RULES

The folowing are the general rules to be followed in recording information:

1 No heading under 'A: Bibliographic description should be used in the entry. The recording of the items of information specified under 'A' is in the sequence in which they occur under it. The punctuation mark after each item of information should be as indicated after each heading.

2 Headings numbered B to H are to be used (without their numbers) in the entry. Each heading is to be underlined. The choice of information under each heading is to be governed by the subheadings enumerated under each heading. Each item of information is to be furnished in the form of a statement. In the case of multiple statements under one heading, if necessary for the sake of effectiveness, each statement may be numbered serially.

53 EXAMPLE

The following example illustrates the use of the proforma and of the rules given above:

Chemical Sciences, Encyclopaedia.

INTERNATIONAL ENCYCLOPEDIA of chemical sciences/ edited by A F Clifford and others — Princeton: D van Nostrand Co., 1964. — viii, 1331 p; 26 cm. — Full rexin: $ 32.50.

Objective: To meet the needs of all who are concerned with chemistry — chemists and nonchemists, teachers and students, those who are interested in pure or applied chemistry in chemical research, engineering or technology.

Contents: (1) Fundamentals — the ions, radicals, atoms, and molecules; the reaction they undergo; and the laws which describe their behaviour. (2) Basic topics in electronic configuration, electronics, electricty, thermodynamics, spectroscopy, etc. (3) Principles of structure and mechanism — such as, molecular orbital theory, valance bond theory, ligand field

theory and crystal field theory, conformation and configuration. (4) Each chemical element in which the structures and reactions of its compounds are organised in terms of periodic system and electronic structure. (5) Individual compounds under major element and type-compound; various standards for the nomenclature of compounds. (6) Chemical reactions including named reactions; chemical processes and operations; tests and testing methods. (7) Physical and theoretical methods of investigation of structure. (8) Nuclear magnetic resonance and electron spin resonance; mass spectroscopy; activation analysis; and chromatography in all its methods and applications. (9) Tables of radii of atoms and isotopic spin of nuclei.

Arrangement: All-through alphabetical.

Aids to users: (1) Cross references indicated by bold face type. (2) References to comprehensive sources for more detailed information.

Special features: Four multilingual indices: French-English, German-English, Russian-English, and Spanish-English, devised for use in reading the foreign literature and in finding the corresponding English entry in the main part of the book.

Uptodateness: Expected to be brought upto date through new editions.

Evaluation: (1) Standard, technical and scholarly. (2) Publisher: having reputation in the field of science and technology. (3) Contributing editors: qualified and experienced. (4) Articles: unsigned, undated, and adequately illustrated. (5) Bibliographical reference: inadequate. (6) Data used: uptodate and authentic.

54 Proforma for Bibliography

541 *Proforma*

As far as applicable, the information about an ad hoc bibliography is to be collected and systematised, according to the proforma given in Sec 1, with the following modifications of item "C Contents".

C *Contents*

1 Subject field with indication of emphasis, if any, different broad topics covered, and of the type of the bibliography, for example
- Annotated
- Indexing
- Abstracting
- Reviewing
- List of books/ articles/ periodicals/ reference books/ cataloguing, indexing and abstracting services/ reports theses/ standards and specifications/ patents/ etc
- Author bibliography / of documents by the author / of documents on the author
- Area or national bibliography of documents on the area/of documents published in the area/of documents by the nationals / of documents on the nationals / of documents in the language of the area
- Copyright list
- Printer's catalogue
- Binder's catalogue
- Publisher's catalogue
- Bookseller's catalogue
- Library catalogue
- Reading list

5 Coverage in terms of number of documents and / or entries if readily ascertainable.

542 *Rules*

The rules to be followed in recording information are the same as those given in Sec 2.

543 *Example*

The following example illustrates the use of the proforma and of the rules given above.

Botany, Bibliography — Annotated

BOTANICAL BIBLIOGRAPHIES, a guide to bibliographic materials applicable to botany / by Lloyd H Swift. — Minneapolis: Burgess Publishing Company, 1970.— xl, 804 p; 23 cm. ISBN 8016. 1960. 2. Full Cloth $ 18.50.

Objective: To provide information to facilitate the selection of information sources for botanical data.

Contents: (1) General bibliographies having portions devoted to botany. (2) Bibliographies of background literature for botany. (3) Bibliographies of botanical literature. (4) Bibliographies of literature of applied areas of plant study. (5) Bibliographies of literature of areas auxiliary to botany. Primarily an annotated bibliography of bibliographies on botany and related fields.

Arrangement: Systematic.

Aids to users: Explanation of the structure of entries. Index includes entries for subjects, titles, authors, and a few abbreviations and acronyms.

Uptodateness: Expected to be brought uptodate through new editions.

Evaluation: (1) Standard: technical and scholarly. Author: Ph D in botany; and a research associate in botany in the University of Nebraska. Data used: Those published upto 1966.

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55 Proforma for Serial Bibliography

551 *Proforma*

In the case of a bibliography published serially including a serial documentation list, as far as applicable, the information about it is to be collected and systematised according to the proforma given in Sec 1 and 41, with the modification given below. It may be noted that this modification as a whole will not apply to a review serial which also may be deemed to be a bibliography in a special form.

A *Bibliographic description*

1 Class number according to a scheme for notational classification and / or

2 Feature heading.

3 Title including subtitle and alternative title, (Language (s) if in more than one or not indicated by the title)/

Sponsor statement with address; Current editor statement with address if different from that of the sponsor or publishers. —

Year of first publication; Frequency; Last volume if ceased. —

Name of the publisher with address when it is different from the sponsor statement or editor statement. —

Number of volumes per year; coverage in terms of number of documents and / or entries if readily ascertainable;

Medium of publication — such as, printed, microfilm, microfiche, microcard, tape, etc; Height in cm of the printed medium.

Notes including change-of-title.

International Standard Serial Number or Book Number (ISSN) or (ISBN).

Circulation, if readily ascertainable.

Rate of subscription for each medium.

C CONTENTS

1 Subject field with indication of emphasis, if any, the different broad topics covered and of the type of bibliography, for example

Annotated
Indexing
Abstracting
Reviewing
List of books / articles / periodicals / bibliographies/ reference books / cataloguing, indexing and abstracting services / reports / theses / standards and specifications / patents / etc.
Area / National bibliography of documents on the area / of documents published in the area / of documents by the nationals / of documents on the nationals / of documents in the language of the area
Copyright list
Printer's catalogue
Binder's catalogue
Publisher's catalogue
Bookseller's catalogue
Library catalogue
Reading list

Local documentation list
Regional documentation list
National documentation list
International documentation list
Exhaustive
Selective with indication of criterion for selection

552 *Rules*

The rules to be followed in recording information are the same as those given in Section 2 above.

553 *Examples*

Medicine, Bibliography-Indexing, Serial (1)

INDEX MEDICUS including bibliography of medical reviews (Text in all major languages)/ sponsored, compared, edited, and published by the National Library of Medicine, 8600 Rockville Pike, Bethesda, Maryland 20014, USA. — 1960; monthly. — 1 vol per year; covers approximately 2250 periodicals; available in printed form, and on tapes and discs, access to the tapes and discs can be obtained only through the MEDLARS (Medical Literature Analysis and Retrieval System) and MEDLINE (MEDLARS-on-line) centres in USA and other foreign countries; 29 cm. Subscriptions to the Superintendent of Documents, US Government Printing Office, Washington, DC 20402, USA; Vol. 1–3, no 1 called new ser " ; supersedes the *Current list of medical literature*; issues for 1960–65 include separate section called Recent United States publications, which consist of reproductions of the National Library of Medicine catalogue cards for current titles; vol for 1963 — includes as part of 2 of the Jan issue: *Medical subject headings*; vol for 1967 — include *Bibliography of medical reviews*; cumulated annually 1960–64, by the American Medical Association under title: *Cumulated index medicus*, by the National Library of Medicine, 1965 —. ISSN 0019–3879. Circulation-5977. $ 173.05 (foreign $ 216·35) per vol; single issue $ 13.75.

Objective: To keep persons in biomedical fields aware of the current publications; and to facilitate retrospective search for information about documents in their respective fields of interest.

Contents: (1) Access to articles cited; (2) Regional Medical Libraries and MEDLARS Centres; (3) NLM literature searches; (4) Bibliography of medical reviews — subject section, and author section; (5) Index medicus — subject section, and author section; (6) National Library of Medicine publications; (7) NLM recurring bibliographies. Each entry consists of a bibliographic description of a document without any annotation or abstract; and it is cited under the appropriate subject heading. Covers periodicals from all countries.

Arrangement: The references on a particular subject are cited together under the subject heading assigned to them according to the MeSH (Medical Subject Headings); and the subject headings are arranged alphabetically.

Aids to users: (1) Explanation of entries; (2) Background knowledge as to the scope and techniques used; (3) Instruction as to how to use it effectively; and (4) Subject section followed by author section in each issue.

Special feature: Vols for 1963 — include as Part 2 of the January issue: *Medical subject headings*.

Evaluation: (1) Standard: Scholarly; (2) Publisher: One of the world's most resourceful library in biomedical field.

Informationscience, Bibliography—Reviewing, Serial.

ANNUAL REVIEW of information science and technology/ sponsored and published by the American Society for Information Science, 1140 Connecticut Avenue, N W, Suite 804, Washington, DC 20036, USA; edited by Carlos A Cuadra. — 1966; annual. — 1 vol per year; available in printed form. ISBN 0–87715–208–X. Each volume separately priced.

Objective: To descrive and appraise the developments and trends in thefield of information science during the preceding year.

Contents: Articles are presented under broad headings — such as, (1) Planning information systems and services; (2) Basic techniques and tools; (3) Applications. (4) The profession; (5) Basic support tools; etc. Information consists of description and appraisal of the developments of one year all over the world.

Arrangement: Systematic under broad headings.

Aids to users: (1) The structural elements of each contribution is featured by using appropriate headings; (2) extensive bibliography arranged alphabetically by the headings of entries; (3) A single index (subject-author-project title—etc) covers all the contributions.

Evaluation: (1) Standard: Technical and scholarly; (2) Publisher: ASIS — a professional organisation most competent to take up such projects; (3) Authors and Editors: Renowned for their qualification and experienee;

(4) *Articles*: Good examples of impertial sifting, analysis, and critical appraisal of the flood of current literature. (5) Bibliographical references: Selective on the basis of their credibility, authenticity, and relevance; Entries: according to an in-house standard.

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6 Proforma for Primary Periodical

61 PROFORMA

As far as applicable, the information about a primary periodical is to be collected and systematised according to the following proforma:

A *Bibliographic description*
1 Class number according to a scheme for notational classification and / or
2 Feature heading.
3 Title including subtitle and alternative title, (Language(s) if in more than one or not indicated by the title)/
Sponsor statement with address; Current editor statement with address if different from that of the sponsor or publisher. —
Year of first publication; Frequency; Last volume number, and the year of publication of the last volume if ceased —
Name of the publisher with address when it is different from the sponsor statement or editor statement. —
Number of volumes per year; Average number of pages per issue; Medium of publication — such as, printed, microscopy, etc; Height in cm of the printed medium
Notes including change-of-title.
Coverage in secondary periodicals (serial bibliographies documentation lists)
Circulation, if readily ascertainable
Rate of subscription for each medium.

B *Objective*

C *Contents*
1 Subject field with indication of emphasis, if any, of the broad topics covered.
2 Nature of communications — such as, editorials, research articles, short communications, review articles, discussions, letters to the editor, book reviews, news items, advertisements, etc.

D *Index*
1 Subject
2 Author
3 Title
4 Series
5 Frequency of index — such as, Annual, Semi-annual, etc
6 Volume-wise
7 Cumulative (with volume numbers and years)
8 No index

E *Special issue on specific topic*

F *Supplement*
1 Special number
2 Yearbook
3 Directory

G *Evaluation*
1 Standard (ordinary / technical / scholarly)
2 Publisher's reputation
3 Author's / Editor's status (Qualification, Experience, etc)
4 Articles (Featured, Illustrated, etc)
5 Bibliographical references (Standardised entries, Non-standardised entries, etc).

62 RULES

The rules to be followed in recording information are analogous to those given in Sec 522

63 EXAMPLE

Science, Philosophy, Periodical

BRITISH JOURNAL for the philosophy of science/ sponsored by the British Society for the Philosophy of Science (BSPS); edited by John Worral, Department of Philosophy, London School of Economics, Houghton Street; Aldwych. London WC2A 2AE, UK. — 1950; quarterly. Published by Aberdeen University Press for the BSPS, Farmers Hall, Aberdeen, Scotland AB9 2XT, UK.—1 vol per year; average number of pages per issue 90; available in printed form; 23 cm. Indexed in *British humanities index, Mathematical review, Philosophical abstracts*. Circulation — 1500 £ 7.00 (USA and Canada US $ 22.00 per vol post free, single issues £ 2.50 (USA and Canada US $ 8.00) plus postage.

Objective: The purpose of the BSPS is " to study the logic, the method and the philosophy of science as well as those of

the various special sciences, including the social sciences". The journal is the official organ of the Society.

Contents: Logic method, and philosophy of science in general, as well as of those of the various special sciences, including social sciences. Contains research articles, discussions, book reviews, and advertisements.

Index: Annual, volumewise author-title index.

Evaluation: (1) Standard: Technical and scholarly; (2) Authors: Generally recognised experts; Editors: Men of high reputation for their contributions; (3) Articles: Not featured; (5) Bibliographical references: Standardised entries according to in-house practice.

7 Proforma for Research Projects in Progress

71 Proforma

As far as applicable, the information about a research project in progress is to be collected and systematised according to the following proforma:

A *Project specification*
- 1 Class number of the subject of the research project according to a scheme for natational classification and / or
- 2 Feature heading for the subject of the research project
- 3 Name of the research project (with date of recording information) /

Name of the investigator(s) with address (es) if different from that of the institution at which work is being done;
Name of the institution at which work is being done with address;
Name of the person to whom inquiries are to be addressed if he is a person other than the investigator —
External source(s) of financial support;
Amount, if known;
Time limit of expenditure.
Date of starting the project;
Expected date of completing the project.

B *Objective and programme*

C *Scope, methodology and approach*

D *Equipment*

E *Progress and current activities*

F *Future plan*

G *References* (with abstracts, if necessary, arranged chronologically)

72 Rules

The rules to be followed in recording information are analogous to those given in Sec 522.

73 Example

Information Retrieval, (using) Computer On-line
PROJECT INTREX (INformation TRansfer EXperiments)

(July 1969)/Principal investigator: Carl F J Overhage; at Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, Mass 02139, USA. — External sources of finance: The Independence Foundation; Carnegie Corporation; National Science Foundation; US Department of Defence; Advanced Research Project Agency; Council on Library Resources, Inc. Start: 1965; Completion: 1971.

Objective and program: (1) To find a long-term solution for the operational problems of large libraries; and (2) To develop competence in the emerging field of information transfer engineering.

A planning conference held in August 1965, formulated the experimental plan for Project INTREX. The conference recommended four sets of experiments as a core programme: (1) Augmented catalogue experiments; (2) Text access experiments; (3) Network integration experiments, and (4) Fact retrieval experiments. At the conclusion of the experiments, Project INTREX will make recommendations on the functional design of a set of library services that could be implemented during 1970's.

Scope, methodology, and approach: The concept of Project INTREX is to supply to the user at locations in and remote from the library, both enriched bibliographic data and access to the full text of relevant documents. The project further envisions the linking of such system with similar systems in other locations and the possibility of providing the user with a tool to retrieve specific facts. The experimental augmented catalogue will be an enriched bibliographic data bank stored in a central time-shared computer which will be accessed by terminals in and remote from the library. The requested bibliographic data will be displayed in a cathode-ray tube at the console. The experimental text access system will give the user guaranteed rapid access to the full text of documents. The full text will be stored in microfiche in a central repository. On demand, the fiche will be scanned electronically; the resulting signal is transmitted to a terminal where it will be reconstituted into visual form. Effort has not yet been made on the network integration experiments or on the fact retrieval experiments.

Equipment: (1) Augmented Catalogue Console developed by Project INTREX to provide a terminal for remotely interrogating the digitally stored bibliographic data bank; (2) Houston — Fearless Corporation CARD retriever to provide the text access microfiche storage-and-retrieval unit; (3) Tektronix Type 611 storage display unit to provide a transient display of full text at a remote terminal; (4) Kodak MCG-II film unit and GAF Transfer Type 1206 Processor to provide a microfilm reproduction of the transmitted image of full text; and IBM 7094 computers, central time-shared, at the facilities of both Project MAC and the Computer Centre at MIT.

Progress and Current activities: The initial experimental augmented catalogue data base consists of bibliographic information on 10,000 documents in selected areas of Material Science and Engineering. Encoding of the bibliographic data of these documents was completed by the end of 1968. To determine a more useful set of entry points, a variety of data beyond these that are customary, has been selected for inclu-

sion in the experimental catalogue. The data that will ultimately be recommended for inclusion in the library catalogues depend on the results of experiments with actual library users. Storage and retrieval programs are being developed which will permit the user to query the data bank in natural and unstilted language and which will provide on-line tutoring to the new user. An experimental augmented catalogue console is also being developed to provide a terminal uniquely suited to the needs of the catalogue user. From this console the user will interrogate the data bank and will have displayed at the console the requested bibliographic data. The 10,000 documents which have been catalogued are also being reproduced in microfiche. The microfiche will be stored centrally and on remote demand the selected fiche will be retrieved from store and electronically scanned. The signal will be transmitted to a terminal where it will be reconstituted in visual form on one or more devices. A storage and retrieval system has been selected, the transmission system has been tested and evaluation of terminal devices is being conducted.

Future plan: The augmented catalogue system and the text access system on being ready, experiments with bonafide users will commence. As results are evaluated, indicated refinements to the systems will be made and further experiments conducted. Providing the necessary funding is available, the network integration experiments and fact retrieval experiments, will be undertaken. The network integration experiments will explore the feasibility of providing access to the INTREX data base to off-campus users and the possibility of linking existing external data bases to the INTREX system. The fact retrieval experiments will investigate various degrees of sophistication in providing specific factual information, as opposed to mere reference to documents, to users.

References

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MARCUS (R S). Translating computer interface for a network of heterogeneous interactive information retrieval systems. (Paper presented at the Programming Languages and Interface Meeting, Gaithersburg, Md, 4-6 November 1973).

1974 OVERHAGE (C F J), AND REINTJES (J F). Project INTREX: A general view. (Information Storage and Retrieval 10; 1974; 157–88).

Note: No reference in the above entry is accompanied by its abstract. If the abstract is to be given, it should follow the bibliographic description.

8 Proforma for Institutional Sources of Information

81 PROFORMA

As far as applicable, the information about an institution is to be collected and systematised according to the following proforma:

A *Descriptive information*
1 Class number of the subject of the institution according to a scheme for notational classification and / or
2 Feature heading for the subject of the institution
3 Name of the institution or department or division (accronym or abbreviated name, if any),
Year of foundation,
Address,
Name of the sponsor / parent body / source of finance.
Name of the present head of the institution.

B *Objective*

C *Sponsored organisations / Departments / Divisions / Projects, if any*

D *Publications.*

82 RULES

The rules to be followed in recording information are analogous to those given in Sec 522

83 EXAMPLE

Botany, Taxonomy. (1)

INTERNATIONAL ASSOCIATION FOR PLANT TAXONOMY; 1950; c/o Bureau for Plant Taxonomy and Nomenclaute, Room 280404, Jweede Trasietorium, Uithof, Utrecht, Netherlands. President: Sir G Taylor (U K).

Objective: To contribute to the advancement of plant taxonomy; and to encourage contacts between people and institutes interested in this work.

Publications: (1) *Taxon* (6/year). (2) *Regnum Vegetable* (6/year)

Chemistry (2)

INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY (IUPAC); 1919; Bank Court Chambers, 2–3 Pound Way, Cowley Centre, Oxford OX4 3YF UK. President: Dr A L G Rees (Australia).

Objective: To promote continuing cooperation among the chemists of the member countries; to study topics of international importance which require regulation standardisation or codification; to cooperate with other international organisations which deal with topics of a chemical nature; to contribute to the advancement of pure and applied chemistry in all its aspects.

Publications: (1) *Pure and Applied Chemistry* (4v/year); (2) *Computes Rendus* (biennial); *Information Bulletin* (3/year).

91 Proforma for Human Sources of Information

911 PROFORMA

As far as applicable, the information about a person, deemed to be a source of information, is to be collected and systematised according to the following proforma:

A *Name, address etc*
1 Class number of the subject of speciality according to a scheme for notational classification and/or
2 Feature heading for the subject of speciallity.
3 Name of the person. (Date of birth)
Qualifications,
Nationality,
Speciality,
Present position; Office address; Telephone Number.
Home address; Telephone number.

B *Institutes of Education*

C *Position held* (Chronologically)

D *Outstanding publications* (Chronologically)

912 RULES

The rules to be followed in recording information are analogous to those given in Sec 522

913 EXAMPLE

Physical Chemistry,

WARNER (John Christian) (28 May 1897); A.B, M A, Ph D, Hon Doc from 14 universities and colleges American. Physical chemist. Consultant to foundations and industries; 615 Oliver Building, Pittsburgh, Pennsylvania 15222, U S A; Tele: 412–471–8660. Home: 552 N Neville Street, Apt 64, Pittsburgh, Pa 15213, U S A; Tele: 412–621–2744.

Institutes of Education: (1) Indiana University; and (2) University of Michigan.

Position held: (1) 1921–24 Instructor in Chemistry, Indiana University. (2) 1924–26 Research Chemist, Wayne Chemicals. (3) 1926–28 Instructor, Carnegie Mellon University. (4), 1928–33 Assistant Professor Carnegie Mellon University. (5) 1933–36 Associate Professor, of Chemistry, Carnegie Mellon University. (6) 1936–38 Associate Professor of Metallurgy, Carnegie Mellon University, (7) 1938–49 Professor of Chemistry, Carnegie Mellon University. (8) 1945–50 Dean, Graduate