Indexing Methods used by some Abstracting and Indexing Services

K. G. B. Bakewell

Various methods used for compiling the subject indexes of abstracting and indexing services are described, with particular reference to Applied Science and Technology Index, British Technology Index, Education Index, Current Journals in Education, World Textile Abstracts, Library and Information Science Abstracts, the abstracting journals issued by Anbar Publications Ltd., and Sociology of Education Abstracts. The possibilities of a standardised system are considered, and the importance of a good alphabetical index is stressed if the arrangement of the abstracting or indexing service is a systematic one.

The idea for this article came when the editor sent me an index to an abstracting journal with a request that I either submit a review of it or use it as a 'peg' on which to base an article on indexing methods used by abstracting and indexing services. I chose the second alternative since I have long felt, after several years of lecturing on this topic, the need for a comparative study of such indexes. The article is only concerned with indexes to groups of periodicals, not with indexes to specific periodicals. I am, of course, making no attempt to be comprehensive and I would welcome the views of readers not only on this article but also on their experiences of other indexes.

There are several different methods of arranging abstracting and indexing services but most are arranged alphabetically by subject or in some sort of systematic or classified order. Exceptions include Sociology of Education Abstracts, which is arranged alphabetically by author or title and supported by a classified index, and the five abstracting journals on management published by Anbar Publications Ltd., which are arranged alphabetically by journal title and supported by classified and alphabetical subject indexes.

The alphabetical approach

The two main groups—alphabetical and systematic—have several subgroups. There are many different classification systems and, contrary to popular belief but well known to indexers, there is more than one method of alphabetical arrangement. One can see this clearly by comparing Applied Science and Technology Index (ASTI), one of the many indexes published by the H. W. Wilson Company of New York, and British Technology Index (BTI), published by the Library Association. BTI is certainly an alphabetical index, but it has a built-in classified structure. Its indexing principles have been clearly explained in a number of articles, many of them in this journal. Briefly, documents dealing with complex subjects are indexed as
specifically as possible according to a pre-determined formula which owes a great deal to the classification formula developed by S. R. Ranganathan for his Colon Classification:

THING; Material: Operation: Instrument
and cross-references are provided from 'hidden' terms reading from right to left:

MATERIAL. See THING; Material
OPERATION: Material; Thing. See THING;
Material: Operation
INSTRUMENT: Operation; Material; Thing. See
THING; Operation: Material

The resulting heading can be quite formidable and the system also means that a large number of cross-references are necessary. For this reason many people find BTI difficult to use, preferring the 'broad headings' and 'multiple entry' approach of ASTI and the other Wilson indexes. But is this so helpful to the person searching for information on a specific topic? I think not and shall try to demonstrate why with just one example.

On pages 1322-8 of volume 3 of Applied Physics (September 1970) there appeared an article entitled 'Applications of photoluminescence excitation spectroscopy to the study of indium gallium phosphide alloys'. Specifically the article dealt with indium gallium phosphate lamps, though this is not clear from the title. It was indexed in the September 1970 issue of BTI under the following heading:

LAMPS; Gallium phosphate-Indium phosphate:
Photoluminescence excitation spectroscopy

with cross-references as follows:

GALLIUM PHOSPHIDE-INDIUM PHOSPHIDE; Lamps. See LAMPS; Gallium phosphate-Indium phosphate
INDIUM PHOSPHIDE-GALLIUM PHOSPHIDE; Lamps. See LAMPS; Gallium phosphate-Indium phosphate
PHOTOLUMINESCENCE EXCITATION SPECTROSCOPY; Gallium phosphate-Indium phosphate; Lamps. See LAMPS; Gallium phosphate-Indium phosphate
LUMINESCENCE; Photoluminescence excitation spectroscopy

Related headings:
ELECTROLUMINESCENCE
SPECTROSCOPY, Photoluminescence excitation:
Gallium phosphate-Indium phosphate; Lamps. See LAMPS; Gallium phosphate-Indium phosphate
Photoluminescence excitation spectroscopy

It will be seen that, at whatever term the user chooses to enter the index, he will be led to a statement which correctly identifies the subject of the article he is seeking, though unless he regards 'lamps' as the major subject he will be forced to make at least two consultations of the index. In contrast ASTI (1971) makes four separate entries for this article under the following headings:

GALLIUM PHOSPHIDE
INDIUM PHOSPHIDE
LUMINESCENCE—Photoluminescence
SPECTROSCOPY

with a cross-reference:

PHOTOLUMINESCENCE see LUMINESCENCE—Photoluminescence

Surprisingly, no entry is provided under ELECTRIC LAMPS (the heading to which we are referred from LAMPS), perhaps because lamps are not mentioned in the title.

It might be argued that, because ASTI provides entries under many headings, it is being more helpful to the user, but is this really the case? None of the four headings accurately identifies the subject of the article, as does the BTI heading. If the user consults INDIUM PHOSPHIDE or LUMINESCENCE—Photoluminescence this is of little consequence: there are only nine and fifteen entries respectively under these two headings, so that there is little difficulty in scanning all the titles and little chance that the user will miss the desired article. There are, however, two columns of entries under GALLIUM PHOSPHIDE and five columns of entries under SPECTROSCOPY, so the user might well give up the search or overlook the title.

The BTI system also provides a systematic approach to the construction of subject headings which appears to be lacking in so many other methods. For example, an article on the evaluation of mathematics instruction in the elementary classroom was indexed in Education Index (1973/74), another Wilson index, under MATHEMATICS—Teaching—Elementary schools but not under MATHEMATICS—Teaching methods—Evaluation or ELEMENTARY SCHOOLS

In contrast Current Index to Journals in Education (May 1974), produced by the American Educational Resources Information Centre (ERIC), indexed the same article under ELEMENTARY SCHOOL MATHEMATICS EVALUATION Teaching METHODS but not under MATHEMATICS MATHEMATICS EDUCATION MATHEMATICS INSTRUCTION

Another indexing method which provides a precision lacking from these two examples is PRECIS (Preserved Context Index System), which has been used for British Education Index since January 1976. The following are the kinds of entry one might expect to find for the above title in British Education Index:

ELEMENTARY SCHOOLS Curriculum subjects: Mathematics, Teaching methods. Evaluation
CURRICULUM see also Curriculum under names of subjects
MATHEMATICS, Curriculum subjects. Elementary schools Teaching methods. Evaluation
TEACHING METHODS see also Teaching methods under names of subjects
EVALUATION, Teaching methods, Mathematics. Curriculum subjects. Elementary schools

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The above examples were constructed before the appearance of an issue of British Education Index constructed according to PRECIS principles. I understand that the term ELEMENTARY SCHOOLS will be replaced by the more usual British term PRIMARY SCHOOLS and also that, for reasons of economy, curriculum subjects are not likely to be listed under type of school, a general cross-reference being provided instead.7

In the new-style British Education Index all entries are numbered consecutively and arranged alphabetically according to the heading regarded as the most significant for the particular article. The other entries, as well as the principal entry, are listed alphabetically at the front of each issue of the index, each entry (apart, of course, from general cross-references) referring to the appropriate number. The rules for the construction of PRECIS entries should ensure that the user of the index will locate the required article whatever term he consults, which is certainly not the case with Current Index to Journals in Education or Education Index.

Another method used for the construction of alphabetical subject indexes is the articulated subject index. This is a type well known to and commonly used by book indexers, consisting (in its simplest form) of a lead term followed by some modifying phrase to which it is linked by a structure word such as a preposition—for example:

abstracting journals, indexes to, characteristics of
indexes to abstracting journals, characteristics of

Professor Michael Lynch, of the University of Sheffield Postgraduate School of Library and Information Science, has developed a computerised system of articulated subject indexing8/9 and this is used in World Textile Abstracts. The following entries are taken from the 1973 volume:

<table>
<thead>
<tr>
<th>Abstract no.</th>
<th>Fibres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1888</td>
<td>production of, from films</td>
</tr>
<tr>
<td>2848P</td>
<td>freezing of solvent solutions for</td>
</tr>
<tr>
<td>8746</td>
<td>from thermoplastic resins, Forshaga process for</td>
</tr>
<tr>
<td>2648</td>
<td>spinning of</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abstract no.</th>
<th>Films</th>
</tr>
</thead>
<tbody>
<tr>
<td>1888</td>
<td>production of, from films</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abstract no.</th>
<th>Resins</th>
</tr>
</thead>
<tbody>
<tr>
<td>1888</td>
<td>thermoplastic, Forshaga process for</td>
</tr>
<tr>
<td>8746</td>
<td>production of fibres from</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abstract no.</th>
<th>Spinning</th>
</tr>
</thead>
<tbody>
<tr>
<td>2648</td>
<td>of fibres</td>
</tr>
</tbody>
</table>

The abstracts themselves are arranged under broad subject categories and are given a running number (e.g., 1888, 2648, 2848 and 8746 above—P refers to Patent). It will be seen that entries are made under most 'sought' headings, though the absence of entries under Forshaga process, Freezing, Solvents and Thermoplastics is perhaps unfortunate and something which one would not expect to happen using the BTI or PRECIS principles.

The Classified approach

There are, then, several different methods of compiling alphabetical subject indexes, but there is even more variety when it comes to systematic indexes because of the different classification schemes available for different disciplines. One of the original aims of the Universal Decimal Classification (UDC) was to provide a standard classification system which could be used for documents in all subject fields. This aim has not been achieved and in recent years a number of abstracting services which were originally arranged by UDC have changed their system of classification. Other services, which originally included UDC numbers with their abstracts, no longer do this. World Fisheries Abstracts is one service which does still include UDC numbers, as well as alphabetical subject headings and the United States Fish and Wildlife Classification System. These abstracts are arranged in random order, three entries to a page, and the entries can be cut to form five- by three-inch cards and arranged in one sequence according to one of these systems or indeed any other indexing system. Each issue of the abstracts also includes an alphabetical subject index.

A number of abstracting services are still arranged according to UDC or an amended version of UDC, including the Institution of Mining and Metallurgy's IMM Abstracts and Technical Education Abstracts, but the trend is towards specially developed classification systems.

One abstracting service of interest to the indexer is Library and Information Science Abstracts (LISA), which uses a special classification scheme for library and information science devised by the Classification Research Group as the basis of its arrangement with an alphabetical subject index compiled by the 'chain indexing' method to allow users to locate the class numbers.10 The classification system has been criticised for its complexity and the class numbers can be somewhat frightening. For
example, an article on MEDLARS (Medical Literature Analysis and Retrieval System) in Australia and New Zealand is given the class number RnOqM(61)D94+D931, where Rn means Information Services, Oq means Computers, M(61) means Medicine, D94 means Australia and D931 means New Zealand. The chain index allows users to locate this item reasonably quickly no matter what term they consult, even though the full context is not always given as would be the case with PRECIS entries:

- Australia: MEDLARS
- New Zealand: MEDLARS
- MEDLARS
- Medicine: Computerised information services
- Computerised information services RnOq

(For convenience and economy, an incorrect entry is given under New Zealand: the correct notation for an article on MEDLARS in New Zealand alone would be RnOqM(61)D931.)

The American counterpart of LISA, Library Literature, may be easier to use because of its alphabetical arrangement, but is less economical because it provides entries under three headings compared with LISA's one (though these entries are less full since Library Literature is an indexing service only and does not include abstracts). Entries are provided under

MEDLARS
INFORMATION SERVICES, Scientific and technical—Australia
INFORMATION SERVICES, Scientific and technical—New Zealand

with cross-references as follows:

- COMPUTER-STORED INFORMATION see INFORMATION RETRIEVAL SYSTEMS
- INFORMATION RETRIEVAL SYSTEMS—Medicine see also MEDLARS
- AUSTRALIA see also INFORMATION SERVICES, Scientific and technical—Australia
- NEW ZEALAND see also INFORMATION SERVICES, Scientific and technical—New Zealand

Once again the user is likely to locate the article eventually whatever term he consults, though (unlike the LISA classification, but like the other Wilson indexes) not one of the headings accurately specifies the subject of the article—MEDLARS in Australia and New Zealand. Also there is no cross-reference from MEDICINE in Library Literature, though it might be argued that this would file close enough to MEDLARS to make such a cross-reference unnecessary.

The classification system used for the five abstracting journals on management published by Anbar Publications Ltd. is less complex than the LISA system because no attempt is made to combine class numbers of multi-faceted topics. Instead each subject is entered separately in the alphabetical and classified indexes, the abstracts themselves being arranged in random order and given a running number. If, for example, the user is seeking information on information services in the petroleum industry from Personnel + Training Abstracts (1971), he first consults the alphabetical index, where he finds:

- Information services 1.91
- Petroleum 1.50

He then consults the classified index, where he finds:

- 1.50 Oil, Petroleum, allied products
- Shell Research, information-using habits CH14
- 1.91 Libraries, etc., Translation Services
- Gate-opener as opposed to gatekeeper CH14, DA58

Abstract no. CH14 is an article on an investigation by Shell Research Ltd. of the information-using habits of their scientific staff aimed at identifying those individuals who are potentially 'technological gatekeepers'.

It is interesting to note that the ANBAR classification system, although designed specifically for a published abstracting service, is used in at least one library (that of the Institute of Practitioners in Work Study, Organisation and Methods) with few problems apart from occasional lack of specificity.

However unfamiliar the classification scheme, it should not be too difficult for a user to trace items on a specific subject in either LISA or the Anbar abstracting journals. Such, I fear, is not the case with Sociology of Education Abstracts, which are arranged alphabetically by author or title and supported by a classified index. The purpose of this index is not clear; certainly it would not help this particular layman in a retrospective search, especially as it lacks an alphabetical key.

The index has the following main sections:

- ADMINISTRATION AND ORGANISATION (0)
- CURRICULUM (1)
- EDUCATIONAL RESEARCH AS AN ACTIVITY (2)
- GOALS AND FUNCTIONS OF EDUCATION (3)
- GUIDANCE AND COUNSELLING/SCHOOL PSYCHOLOGY (4)
- HISTORICAL DEVELOPMENT OF EDUCATION (5)
- PERSONNEL (6)
- THE TEACHING-LEARNING PROCESS (7)
- TESTING AND MEASUREMENT (8)
- I SOCIOLOGICAL ANALYSIS
- II PRIMARY UNITS OF SOCIAL LIFE
- III BASIC SOCIAL INSTITUTIONS
It will be seen that the first nine of these broad subject headings are arranged alphabetically while the final three headings, presumably placed at the end because they deal with sociological aspects, seem to be arranged in an arbitrary order. As stated, there is no general alphabetical index, but each of the first nine headings, apart from HISTORICAL DEVELOPMENT OF EDUCATION, is subdivided into a number of alphabetically arranged subheadings, each of which is given a three-figure notation beginning with the figure which I have placed in parentheses after the main heading. Thus under ADMINISTRATION AND ORGANISATION we find:

001 Accreditations
002 Admissions
003 Administrative goals
004 Integration
005 Inter-agency relationships
006 Leadership development
007 Materials and supplies
008 Organisational patterns of educational institutions
009 Personnel employment practices
010 School finance
011 School plant
012 School-community relationships
013 Staff relations
014 Student services—health, financial aid, etc.
015 Transport
016 School finance
017 Other administration and organisation areas

The number of abstract numbers under some headings is staggering—for example, in the 1974 volume we find:

008 Organisational patterns of educational institutions:
11 14 15 16 26 33 39 40 48 54 61 71 72 91 92 95
98 108 110 111 118 127 131 135 145 146 159 174
185 186 198 210 236 239 244 245 251 257 273 275
277 278 279 293 302 306 315 329 331 335 336 341
352 353 355 359 361 373 390 409 424 425 430 451
461 471 478 479 481 484 486 488 510 512 530 531 543
534 550 551 567 572 574 580 592 594 600 615 620
628 629 637 640 641 658 659 665 666 710 711 726
737 749 754 755 756 771 783 792 801

This is a far cry from the five or six page references which we book indexers generally regard as the maximum without subdivision! The articles covered by these 109 abstracts cover a variety of topics including Florida's black school principals, experimental schools, racism and school staffing, resources of university departments, teacher training, school democracy, selection of pupils for secondary schools, the school and the community, children's behaviour problems, comprehensive schools and university reform. Let us look at one, number 710, in greater detail.

This article, from Comparative Education Review, vol. 18, 1974, deals with the attitudes of students and teachers to the establishment of school councils in secondary schools in Finland.

We find at the end of the abstract that it is also indexed at 310 (Education and social change), 523 (Political and legal) (under III Basic social institutions), 534 (Socialisation and indoctrination) (also under Basic social institutions) and 539 (Social change) (again under Basic social institutions). The listing of classification numbers at the end of each abstract suggests that the purpose of these numbers may be to indicate the subject of the article rather than to aid in retrospective searching, but surely the abstract itself should (and in this case certainly does) give a clear enough indication of the subject.

Lest it be thought that I have deliberately sought a poor example, I would mention that as many, or almost as many, abstract numbers are listed under the following headings:

301 Social distribution of education
310 Education and social change
730 Social factors
S13 Groups (including ethnic and class)
S30 Differentiation and stratification
S34 Socialism and indoctrination

and there are many more headings with thirty or more abstract numbers.

It may be that an educational sociologist would have no difficulty in finding his way around this index but I know that I, as a librarian, would not find it easy. What surprises me is that the editors of Sociology of Education Abstracts apparently rejected the PRECIS indexing system as being unsuitable, yet surely the following PRECIS style headings would enable abstract no. 710 to be located much more easily than does the present rather cumbersome system:

FINLAND
Secondary schools. School councils. Attitudes of students and teachers
SECONDARY SCHOOLS. Finland
School councils. Attitudes of students and teachers
SCHOOL COUNCILS. Secondary schools. Finland
Attitudes of students and teachers
STUDENTS. Attitude to school councils. Secondary schools. Finland
TEACHERS. Attitude to school councils. Secondary schools. Finland

Conclusion

I have, as indicated at the beginning of the article, been very selective but the examples I have chosen clearly indicate the wide diversity of methods used for arranging indexes and abstracting services. Writing about documentation services in the field of business studies in 1969, Dews and Ford commented that 'diversified
methods of arrangement' created difficulties when searching, and this applied to one subject area only. How much more complicated is the situation facing the librarian or indexer having to use a large number of abstracting and indexing services in different subject areas.

Is there a solution and should there be a standardised system? The Universal Decimal Classification has been tried and apparently failed. The BTI system works very well in the field of technology; could it be equally successful in other areas? The PRECIS system certainly has possibilities and has been used for our national bibliography, covering all subjects, since 1971, but would it be reasonable to expect the many classification systems (those used for LISA and the Anbar journals as well as the many other systems used for services not mentioned in this article) to yield to it? I think not but, sticking my neck out, I would suggest (1) that a systematic method, be it the BTI approach, PRECIS or a classification scheme, generally makes life easier for the searcher than does a system of broad subject headings, and (2) that if classification is used, it is essential that there be a workable alphabetical index. This is the case with LISA and the Anbar journals but not with Sociology of Education Abstracts. In the case of the latter journal a considerable amount of the searcher's time must be wasted trying to find under which broad subject heading a specific subject is subsumed.

References.
7. Personal communication from Christine Shaw.

The standard applies to single-sheet maps, multi-sheet maps, maps in series and maps in atlases. It lists the essential elements required to describe modern printed maps, modern manuscript maps, early printed maps and early manuscript maps, and the supplementary elements which may be necessary for a full description. It recommends the order in which the descriptive elements should be presented. Examples of references which conform to the standard are given in an appendix.

Part 2 of the standard will deal with references in books and articles.

Copies of BS 5195 Part 1 are available from BSI Sales Department, 101 Pentonville Road, London N1 9ND. Price £2.10 including postage.