

## BIBLIOGRAPHIC CONTROL OF SERIAL PUBLICATIONS

An important problem with serials is bibliographic control. What good does it do for libraries to select, acquire, record, catalog, and bind large holdings of serial publications if the contents of those serials remain a mystery to all except the few who have the opportunity to examine selected journals of continuing personal interest and have discovered some magic way of retaining the gist of the contents? Bibliographic control is the indexing and abstracting of the contents or guts of what is included in the serials. It is this control, provided by secondary publishing services, which this article will discuss.

Just as there are problems with serials in general, there are some easily identifiable problems connected with their bibliographic control including: volume, overlap, costs, elements and methods, and a few other miscellaneous considerations. Some history of bibliographic control will also put the current problems in a helpful perspective. Hereafter "bibliographic control" will be designated by the term "abstracting and indexing," one of these alone, or the shorter "a & i." (I do distinguish between abstracting and indexing and believe that they are *not* in order of importance and difficulty.) Although a & i do provide bibliographic control, this paper will not discuss cataloging, tables of contents, back-of-the-book indexes, year-end indexes, cumulative indexes, lists of advertisers, or bibliographies.

If there is to be control, there must always be indexing. Abstracting is a short cut, a convenience, and perhaps a bibliographic luxury which may be now, or is fast becoming, too rich, in light of other factors to be discussed, for library blood and for the users of libraries—especially for the users of indexes who may not depend upon the library interface. Abstracting, though, provides a desirable control, and one which will continue to be advocated.

*Engineering Index (EI)* is a medium-large service, although dwarfed both by *Biological Abstracts* and *Chemical Abstracts*. There are many medium-small abstracting services, and many which handle only a few hundred or a few thousand items each year. To the extent possible in this article, I will make reference to the full range of services as to size and subjects covered, although I will include almost no coverage of "social-consciousness" literature.

## VOLUME

To the usual observer there seems to be a plethora of a & i services. A directory<sup>1</sup> published in 1960 by NFSAIS (National Federation of Science Abstracting and Indexing Services)—the trade association of the field—described 500 U.S. published services in science and technology only. A second directory<sup>2</sup> issued in 1963, also by NFSAIS, identified 1,855 services published in forty countries; 365 were U.S. services. Greater selectivity was shown in this issue, for the total number examined and considered was 3,155 with only 56 percent qualifying for inclusion.

FID (Fédération Internationale de Documentation) published a revised edition of its 1965 directory, *Abstracting Services in Science, Technology, Medicine, Agriculture, Social Sciences, Humanities*.<sup>3</sup> Abstracting services only are included, and there are approximately 1,300 in volume one, which covers science, technology, medicine and agriculture. Surprisingly, 200 items will be covered in the second volume for the social sciences and humanities. (A total of 800 items was described in 1965.) Had the FID inventory included indexing services in addition, the total would have been substantially larger. Plans for a revised and continuing service are being discussed by FID and NFSAIS.

Bibliographic control by services described in these directories is provided in a wide variety of forms. Many a & i services are separately published in bulletins which are printed periodically, e.g., *Tobacco Abstracts*, *Abstracts of Photographic Science and Engineering Literature*; others are issued in card form only, such as *Polymers Digest* and the several services of Lowry-Cocroft; some appear as a regular feature in a journal, such as the coverage of plastics patents in each issue of the *SPE Journal* (Society of Plastics Engineers); some services are issued in a multiplicity of forms—printed bulletins, cards, magnetic tape, or microfilm, as are *Biological Abstracts* and *Engineering Index (EI)*. *EI* further cumulates monthly issues into annual bound volumes. As far as I can determine, no continuing service is offered on magnetic tape only, yet this is both an economic and technical possibility (*EI*'s CITE-Electrical/Electronics has been an exception in 1968-1969); searching of merged data bases from several services is also a new phenomena.

Many services have had their genesis in a journal editor's good intentions of calling to attention some pertinent articles, patents, reports, or books published elsewhere but of interest to his readership. For example *Information Science Abstracts* had its genesis in the minds of several individuals, particularly Claire Schultz, a past president of the American Documentation Institute. In the early 1960s (November 1962), the National Science

Foundation (NSF) called to the attention of a roomful of representatives of the information community that the field of documentation and librarianship was suffering from the lack of a single comprehensive a & i service, and that much of the relevant literature was not indexed at all. At this time someone at NSF identified nearly fifty publications which attempted to provide a partial indexing of literature of the field. *Library Literature* ignored almost completely the expanding field of documentation, indexed few reports and did not carry abstracts. *Library Science Abstracts* provided a minimum number of items and timeliness was a problem.

A few years went by and in April 1965, the time seemed right for some of the duplications to stop and improvement to be instituted. In Philadelphia a meeting attended by Arthur Elias (of ADI which in *American Documentation* had included a section "Literature Notes" and had decided to issue it as a separate supplement), Herman Skolnik (of the Division of Chemical Literature of the American Chemical Society, which had felt an obligation to provide an "Annotated Bibliography" in *Chemical Literature*) and this writer (then of Special Libraries Association, which, in several publications indexed and/or abstracted pertinent items relating to librarianship and documentation), *Documentation Abstracts* was conceived and a plan was written. The first issue was dated March 1966. In the meantime, the expansion of *Library Science Abstracts* based on a study of nineteen services made by H. Allan Whatley has resulted in an expanded and renamed, *Library and Information Science Abstracts* which began publication with a January-February 1969 issue. *Library Literature* has not expanded its scope.

That there is some duplication in coverage of journal titles by a & i services cannot be denied. That they differ significantly usually will be determined on closer examination, if such a study is done. A specific case study will be reported later. The broadly based services provide a coverage which inevitably will be duplicated by more specialized services. The wholesale role of the large services needs to be developed further.

The pattern of growth and proliferation is a familiar one. The broader services such as *Biological Abstracts (BA)*, *Chemical Abstracts (CA)*, *EI*, *Bibliography of Agriculture*, and *Index Medicus* are the oldest. As the need for a greater in-depth coverage of a specialized field or inter- or cross-disciplinary service is identified, or as the general service is unable to respond to a special need, or as the literature becomes too bulky to be found (or to retain an identity and be found) in the larger service, or as the price of the larger service becomes too great for the individual, or as a special service is needed to cover foreign, highly technical, difficult to acquire, or esoteric material, then other bibliographic services will likely come into being.

Just as *Information Science Abstracts* illustrates an attempt at coordination, other cooperative efforts have evolved and have improved the picture. Anglo-American interests have joined forces to improve the three-part *Science Abstracts* by forming separate parts for electricity and electronics, computer and control, and physics. *Review of Metal Literature* and *Metals Abstracts* have merged using the latter name. A merger of two publications in the photographic field is being discussed. A unique international network is

found in the field of chemistry, with Chemical Abstracts Service as the principal; there is British involvement, and most significantly, the German *Chemisches Zentralblatt*, produced since 1830, was discontinued at the end of 1969 with its efforts now merged in the larger groups. The *Bibliography of Agriculture* is studying how it might handle inputs from other services having like interests. There are other fields—education, computers and plastics to name three—which are saturated with bibliographic control titles.

### NATIONAL FEDERATION OF SCIENCE ABSTRACTING AND INDEXING SERVICES

Coordination between the scientific and technical abstracting and indexing services in the United States was long overdue. At an informal meeting in December 1957, a number of a & i services met to organize for their mutual advantage and for the ultimate advantage of the users of the services. A conference held January 1958, in Philadelphia organized the National Federation of Science Abstracting and Indexing Services (NFSAIS), by unanimous action and on April 29 of that year the Federation was incorporated with headquarters in Washington, D.C. Offices were moved to Philadelphia in December 1967, and since July 1968 Stella Keenan has served as executive director.

NFSAIS has as a basic objective the coordinating of cooperative work of the member services (eighteen as of this writing) and the seeking of new ways to improve them. The ultimate goal of the Federation is to improve communication among scientists through the documentation (abstracting, indexing, and analyzing) of the international scientific literature.

Among its activities are an annual conference, a publications program (newsletters, directories, and technical reports), a collection of statistics and scope of coverage of members, the sponsorship of seminars for members and for user groups, and the conducting of studies to assist and improve the work of member services. It further cooperates with other organizations dedicated to improved information handling.

### HISTORY

Undoubtedly the best summary of the development of the indexing and abstracting services up to the time of its publication is an article provided by Verner W. Clapp in a 1954 issue of *Library Trends*.<sup>4</sup>

Among the earliest attempts to provide control over the periodical literature was the alphabetical table to the *Philosophical Transactions* of the Royal Society and the indexes which accompanied the *Tatler*, *Spectator*, and *Guardian*. Subsequently, general indexes were issued such as the one of 1757 which indexed all three periodicals, or the cumulative indexes to the *Philosophical Transactions* which covered volumes 1-12, 12-17, and 1-70. This kind of control is a common one and generally is not what is being discussed in this paper, although in 1942 some 4,000 cumulative indexes were identified.

The next stage of development was the combined index to more than one periodical. The first of its kind was probably Jeremias David Reuss's *Repertorium*, which for the period 1801 to 1821 indexed in a classified arrangement, with author and title entries, contents of the publications of the academic societies of letters.

A few more specialized indexing publications came into being in the decades that followed. American entry, according to Clapp, was centered at Yale and in the work of the librarians of the Brothers in Unity, a literary society. In 1847 John Edmonds issued a small pamphlet, *Subjects for Debate, with References to Authorities*. In 1848, William Frederick Poole produced his first index, *An Alphabetical Index to Subjects Treated in the Reviews, and Other Periodicals, to which No Indexes have been Published: Prepared for the Library of the Brothers In Unity, Yale College*; an expanded edition appeared in 1853. Poole's efforts continued, with cooperation of a number of major libraries, and in 1882 a 1,492 page work indexing the contents of 6,245 volumes of 232 serials dated from 1802 to 1881 appeared. Supplements were issued in 1888, 1893, 1897, 1903, and 1908.

The indefatigable H. W. Wilson Company began its interest in bibliographical services in 1900, and fifty-three years later when H.W. Wilson retired as president, the company was issuing thirty current periodical and other indexing services. Its products continue to be the best known in the field.

Other major indexing projects of the period were the Royal Society's *Catalogue of Scientific Papers, 1800-1914*, *Index-Catalogue of the Library of the Surgeon General's Office*, *Index Medicus*, *Engineering Index*, *Zoological Record*, and numerous others.

Although my background in science and technology may bias me, the importance of journal literature in these fields has meant that more and larger collections of technical publications exist and that the need for indexes is more critical. Such ventures share a greater chance for fiscal success and for perpetuity.

Typical of indexes which trace their origin from twentieth century dates are *Chemical Abstracts*, 1907; *Biological Abstracts*, 1926; *Index to Legal Periodical Literature*, 1909; and the *New York Times Index* which began in 1913.

## OVERLAP

Like the words of the spiritual "Everyone's Talking about Heaven ain't Agoing There," there is a lot of talk about eliminating overlap, but getting there is another thing. It is easy for a librarian, for instance, to be concerned that 67 percent of titles indexed in one service are also indexed elsewhere, or that 53.4 percent of the journals indexed by one major service are also indexed by another major service. Although unnecessary or duplicative overlap should not be condoned, such superficial comparison is faulty and dangerous. Any overlap is reason for concern, because duplication of effort is a great waste when many journals are not indexed in any source.

This vicious circle of serials not being indexed, so libraries do not acquire them or of libraries not acquiring a certain serial, so it is not indexed, reminds me of the words of that old gospel song, "Will the Circle be Unbroken?" I cannot vouch for the regular practice of libraries, but I doubt that the other half of this circle applies other than to the Wilson indexes. Most other indexing services are rather independent, yet responsive to the needs of libraries. *CA*, for example, says it tries to cover "everything the chemist needs." I do not know the total number of journals indexed nor the number unindexed, although the number of those indexed is obviously a much smaller number. A NFSAIS inventory for ten services in 1961 counted 17,036 titles indexed.<sup>5</sup>

There exists a mistaken idea that overlap of titles indexed means a duplication or overlap of effort and approach. This is far from the real situation. Described below is a recent brief study of two services in the field of plastics (at least fifteen specialized services in the field are known). Compared were *Plastics Monthly (PM)*, published by Engineering Index, and *POST-J (Polymer Science and Technology-Journals)*, published by Chemical Abstracts Service. Four hundred and seventy-nine journals were handled by *POST-J*; 390 by *PM*; 134 were duplicated. Occasional articles from other journals were also indexed—185 journals in 1969 by *EI*. The most revealing information concerns the depth of coverage and the indexing approach applied to the duplicated titles.

The lists of journals can be divided into five types—hard core plastics titles covered in depth by both services and which produce a large number of items; applications titles (a particular strength of *EI*); hard core engineering (which *CAS* leaves alone); hard core chemistry (which *EI* would not touch with a ten foot pole); and a final category of hard core foreign titles (where *CAS* shows greater strength, particularly in Russian and Japanese).

Invariably the indexing approach is different—*CAS* stresses the chemistry (the monomers and the polymers) of plastics, while *EI* emphasizes the processing, the equipment, the final product and its use. Indexing terminology assigned also reflects this poles-apart interest.

Another example of diversity is evidenced in the depth of coverage. In one sampling of eighteen journal issues (excluding hard core chemistry) which contained 205 papers, *EI* indexed 135 for *PM*, while *CAS* indexed only forty-four in *POST-J*. If hard core chemistry titles were sampled, the balance in numbers would likely be similar and the difference in coverage would be reemphasized (in other words, relatively little real overlap).

The description above is not intended as a rationalization for what goes on, or as a claim that no overlap exists. Each time abstracters-indexers in Columbus, Philadelphia, San Antonio, Metals Park, New York, Washington, D.C., or wherever, pick up the same journal, scan or read the same article, write a similar abstract, and assign a variety of indexing terms, duplication of effort is taking place. There is concern about this from managers of the services, user groups, funding agencies, and everyone else involved in the problem.

In 1968, 759,488 items were published by NFSAIS member services; 844,500 were projected for 1969. Some of these are certain to be the result of duplicative effort. NFSAIS is concerned with this and has established a coverage study committee. Some of the a & i services are independently looking at the problem. The National Science Foundation more than once has sponsored overlap studies, such as the *CA-Nuclear Science Abstracts* comparison, and has expressed interest in sponsoring others.

SATCOM (Committee on Scientific and Technical Communication of the National Academy of Sciences) expressed its concern this way: "Ideally, efficient production of abstracts should be done but once—at least for a single broad field of coverage and a single language of abstracting—and the author should have no choice as to the basic abstracting journal that will cover a particular paper."<sup>6</sup>

Abstracting at source (i.e., by the author or in the author-referee-editor cycle) should be encouraged and thereby prevent major duplication of effort. Such efforts as those by the Engineers Joint Council (EJC)<sup>7</sup> need greater push, support, and acceptance. The EJC has urged with some, but minimal, success, the inclusion of well written abstracts along with descriptors or other indexing terms with each article appearing in a primary journal or conference proceedings. These would be used as input into secondary services and other information systems. Although they have been discussed elsewhere and are primarily tangential here, the CAS's ACCESS program, the National Serials Data Program, and the National Serials Service all have contributions to make to the elimination of unnecessary and costly overlap.

### ELEMENTS AND METHODS

Standardization and/or compatibility have long been concerns of purchasers, and to a lesser degree, users of indexing services. We are led to believe that standardization is possible and desirable. Various attempts at standardization have been tried, and current efforts are particularly aggressive. The American National Standards Institute (formerly the United States of America Standards Institute and American Standards Association) Standards Committee Z39 on library work, documentation, and related publishing practices, is presently working in twenty-three different areas. Many of its deliberations and the standards which will be developed should be of direct concern in bibliographic control. Z39 is just beginning an effort on thesaurus rules and conventions. Drafts of standards on proof corrections and bibliographic references have been circulated for comment. A draft of a standard for the writing of abstracts (the third try in the last half-dozen years) has just been distributed. A revision of the standard for periodical title abbreviations was approved earlier this year.

Manipulation of bibliographic data by electronic and optical devices has introduced a new problem. A machine, unlike a human, is less adaptable to the different ways the same thing may be done. A lack of standardization either in the data base, its format, the software, or the hardware can make it costly to use machine-readable data. Z39 has produced a standard for

bibliographic information interchange on magnetic tape which due to a technicality has not yet become a standard. At the same time, an informal group, JAG (Joint Agreements Group) is also developing standards in this field. A late comer and mystery-shrouded group, UNISIST, jointly organized by UNESCO and ICSU-AB (International Council of Scientific Unions-Abstracting Board) is studying the problems of information exchange. WFEQ (World Federation of Engineering Organizations) is still organizing, although information is receiving fairly high priority as a candidate for international cooperation. As can be seen from the above, efforts toward cooperation are receiving attention.

A particularly pertinent controversy is that of a periodical coding system for use in machine control: CODEN vs. SSN (Standard Serial Number). CODEN, although it has been around since the early 1950s did not attract the attention of librarians and bibliographers until about 1962. Three volumes of assigned codes (five capital letters and a possible additional check digit) have been published by the American Society for Testing and Materials (ASTM), and a current assignment service is offered through Franklin Institute.

Only the fields of science and technology are covered by CODEN with assignment made to some 80,000 journals. By February 1970, between 100,000 and 105,000 will be assigned with publication of a new volume scheduled for August 1970. Between 12,000 and 18,000 more journals are estimated to require CODEN and will be included. The Standard Serial Number (seven numbers and a check digit) would be a universal, all subject assignment, and would, in fact, include conversion from CODEN to SSN. There are perhaps three million to three-and-a-half million journals totally, giving an idea of the scope of SSN assignments necessary. In spite of its heavy use it is unfortunate that CODEN has not become a standard, and whether the choice is CODEN or SSN, there will be extra expense involved, particularly if the present draft of a SSN standard is approved. While CODEN has been acceded to be of interest primarily to the scientific community, the recent substitution of SSN for CODEN as a desirable magnetic tape element in a chemical information system is an interesting turn of events. There is a choice to be made between alpha and a numeric coding system.

An informal comparison made of three major *a* & *i* services, BA, CA, and EI, considered editorial aspects of seven elements: title, authors, author address or affiliation, journal citation, language, abstract body, and abstract signature. In the twenty-element breakdown only one similar practice was discovered—the German umlaut is converted to the vowel followed by “e” by each of the three services.

Earlier efforts to encourage author-written abstracts were discussed. Most services describe the type of abstract they write—indicative, informative, critical, selective, or some other designation. That there is really a difference has yet to be proven. More important is the success of the author in telling his story or the success of the abstracter (a staff member of the indexing service or less expensive but slower-producing specialist) in giving the gist of the contents, filtered through his knowledge of the technical content of the



original piece, within the style and length restrictions imposed and with his skill in the right choice of words to describe it. Who, incidentally, is training such personnel?

Indexing methodology and language will be considered briefly. Index approaches vary. Should all concepts, ideas, facts, materials, methods, uses, and processes be represented by the assignment of terms or should only a single main idea be brought out? Simple subject headings and subheadings may be assigned; descriptors chosen from a controlled thesaurus may be used; free-language indexing with terms selected from the text being indexed may be permitted; coordinate indexing or links and roles may be applied; citation indexing or the use of citation trails may be the instruction. The depth of indexing and the number and kind of terms may condition the success of the indexing. Recently a search of an EI tape service produced hits with over 80 percent relevancy as compared to 40 percent with another data base.

The form of the indexing may take many guises: an alphabetical array by subject, a classified arrangement using terms or numbers or both, a permuted index using KWIC, KWOC, WADEX (word-author index), AKWIC (author plus KWIC), or any number of other tried or untried systems. Author, area, compound, formula, patent, and ring systems may all be separate indexes. Most a & i services have prepared instructions for abstracters; most are available if one should want to discover for himself the point of view and form which a service hopes to present.

Manual methods may be the sole means of manipulation with some indexes, while in other instances input and output may be produced and controlled by data processing or computing equipment. Machine indexing may become a reality in the future and solve many of the current problems. As the computer comes into greater use for keyboarding, merging, storing, and compositing, standardization becomes increasingly important. The choice and sequence of elements is important as are abbreviation, punctuation, and codings. The possibilities of merging inputs in machine-readable form from several sources, and the creation of new products as a subset of a larger data base are a reality. There are unrealized problems which will demand attention and answers.

### OTHER MISCELLANEOUS CONSIDERATIONS

Pertinent to the success of any bibliographic control system are such matters as frequency, timeliness, intent of the service and how well this intent is satisfied, access to the service or the system, and access to the material being indexed.

Design of the a & i service may take on two, or at least two, characteristics. It is designed as a current awareness service, a shopping guide, or is it primarily a retrospective searching tool? Form and frequency then become important. Magnetic tape is of little value if a computer, systems and interface staff, the necessary dollars, and the need to have this kind of sophisticated service are lacking. Microforms also have both their advantages and limitations, and must be kept in mind.

Frequency of publication may suggest the intent and kind of use. Obviously a daily, weekly, or an on-line service accessible by remote terminals is intended for an environment where the value of information has been determined and the necessary dollar investment has been made to support the cost of the service. Annual publication obviously is intended for retrospective searching.

Most users of a & i services cannot receive their indexes too soon. Promptness costs money and is usually a major concern of most services. Time lag (or the coefficient of topicality) and particularly public time lag (the time which elapses between the actual date of publication as opposed to the date printed on the publication) must be distinguished from internal lag. Internal lag is something over which the service can provide some control—the time it takes to record receipt, abstract, index, edit, keyboard, proofread, compose, print, bind, and mail.

All a & i services are concerned about time lag and are trying to reduce it whenever possible. In a study conducted by EI two years ago on 1966 and 1967 issues, the public time lag was found to be 10.9 months for the *Monthly* and 9.8 months for *Plastics Monthly (PM)*. The range was two to fifty months for the *Monthly* and two to twenty-six for *PM*. Internal lag, however, was 8.26 and 4.33 months respectively. A later analysis of the March 1968 *PM* produced these results:

All journal literature	5.4 months
All journals and proceedings	7.1 months
U.S. journals assigned to <i>PM</i>	3.4 months
U.S. journals referred to <i>PM</i>	8.1 months
Foreign journals assigned to <i>PM</i>	6.6 months
Foreign journals referred to <i>PM</i>	13.4 months

For both publications, the lag between the date of the issue and the actual publication date ranged from 1.25 to 2 months. This lag has been controlled, and extensive controls to reduce the over-all internal lag and to eliminate the upper extremes have been instituted.

Nothing is more frustrating to a potential user than to learn that the article listed in an index is not available to him. It is not enough for an a & i service to index an article, but it must assure the user that he can examine a copy somewhere or receive a copy for his own files. A complete information service includes this feature. *Applied Mechanics Review* indexed items are available in the Linda Hall Library, *BA* items from the John Crerar Library, and *EI* items from the Engineering Societies Library. The Center for Research Libraries, Chicago, also has a program to provide copies of all items indexed by *BA* and by *CA*, and *CA* tries to provide all non-copyright (that is, Russian) items.

## VALUE AND COSTS

Indexes have been called the “magic key” that helps librarians to pluck quickly the precise information “needle” from the giant and rapidly growing “haystack” of miscellaneous data being heaped all about them. If these

indexes were not available, the cost to duplicate them or the service they provide would be prohibitive, and the service of all libraries would be severely handicapped.

There are still many individuals around who remember the year (1955) when *Chemical Abstracts* raised its price from \$80 to \$500 (or when *Review of Metals Literature* went from \$35 to \$500); there are librarians who object to the service-basis method of charge practiced by the H.W. Wilson Company; there must be those who object to a flat rate charged to all libraries; and most assuredly, all must express concern at the rising prices for a & i services.

During the past decade numerous a & i services have had substantial government funding to create new services or to maintain or upgrade existing services. Libraries and researchers, too, have benefited from this same support. Generally the day of heavy federal government support—particularly by the National Science Foundation—is past, and many services operated by not-for-profit organizations are being required to become self-supporting, a requirement which the information companies have always faced, through the sale of publications and services.

The price trend for abstracting and indexing services has been upward for some time. A major percentage increase for serial services for 1969 was reported.<sup>8</sup> The average price index for 1,031 services, excluding eleven Wilson indexes, was 198.0 compared to a 1957-1959 base of 100.0. Although all classifications showed an index increase, the range varies from a low of 5.0 for business services to a high of 111.4 for science and technology—a percentage increase of more than 23 percent in dollars. (The price of the *EI Annual* increased 167 percent during that same ten-year period.)

All a & i services have been keenly aware of increasing expenses and increased costs for their publications. In fact, NFSAIS has established in the past year, a cost study committee which is studying the problems, how comparisons might be made, and norms or bases established. There is also in early stages of discussion a proposal to develop guidelines for decision making in abstracting and indexing services based on cost/performance/benefits performance. Is it possible?

Other recent studies have looked at the costs of producing secondary services. System Development Corporation in a COSATI-sponsored study<sup>9</sup> on indexing and abstracting collected extensive information on costs, but this material or any conclusions were conspicuously missing from the final report. SATCOM considered the dollar situation of a & i services and the need to find the necessary support:

It is already feasible, and the need is urgent, to provide specialized access to information for professional groups of this size [a thousand or so] with common information requirements.<sup>10</sup>

We dare not depend on support of information transfer exclusively on the part of users to produce a system that is in over-all economic balance.<sup>11</sup>

Government support of operating deficits was identified as a possible solution. Two situations, in fact, must exist and must provide a balance of nature in the ecology of information. Profit-oriented companies must be

Average Prices and Cost Index  
U.S. Serial Services 1969  
(Based on 1957-1959 prices)

<u>Year</u>	<u>Number of Services</u>	<u>Average Price</u>	<u>Index</u>
<b>Business</b>			
1957-1959	544	\$ 78.75	100.0
1968	214	119.35	151.6
1969	231	123.31	156.6
<b>Law</b>			
1957-1959	353	\$ 28.46	100.0
1968	133	57.65	202.6
1969	147	68.86	242.0
<b>Science and Technology</b>			
1957-1959	469	\$ 13.50	100.0
1968	224	64.02	474.2
1969	224	79.05	585.6
<b>Miscellaneous</b>			
1957-1959	165	\$ 23.80	100.0
1968	108	45.65	191.8
1969	110	49.84	209.4
<b>U.S. Documents</b>			
1957-1959	123	\$ 17.51	100.0
1968	144	18.40	105.1
1969	145	21.35	122.0
<b>Soviet Translations</b>			
1957-1959	149	\$ 43.38	100.0
1968	164	90.39	208.4
1969	174	93.93	216.5
<b>Wilson Index</b>			
1957-1959	32	\$143.50	100.0
1968	11	257.00	179.1
1969	11	268.91	187.4
<b>Combined (excluding Wilson Index)</b>			
1957-1959	1,803	\$ 39.80	100.0
1968	987	70.87	178.1
1969	1,031	78.79	198.0

permitted to make a profit on self-supporting services; other organizations must be permitted sufficient grant or contract support to assure that useful, but unprofitable, services are established or kept in existence.

One table produced by SATCOM is of special interest. Subscription percentage increases between 1963 and 1968 for twelve major services and the percentage increase in price per entry are given. The subscriptions have increased from a low of 11 percent for *Nuclear Science Abstracts* (NSA, a federal government service published by AEC) to a high of 1,030 percent for *Physics Abstracts* published by a technical society in London. (A decrease of 45 percent was noted for *International Aerospace Abstracts* (IAA), a privately produced but NASA-funded service.) Increases per entry varied from a low of 0 percent for *Chemical Abstracts* to a high of 236 percent for *Physics Abstracts*. *Psychological Abstracts*, IAA, and NSA all reported a decrease in price per entry.<sup>12</sup>

At best, the pricing picture is cloudy and confused. One service, *Bibliography and Index of Geology*, published by the Geological Society of America in cooperation with the American Geological Institute, in January 1969 discontinued abstracting in order to increase the number of items indexed and to live within fiscal realities. Substitution of a published abstract in a secondary service in lieu of full publication in a primary journal is contemplated by some organizations as a way to reduce over-all publication costs. Will such actions become necessary for other services?

Various seers and sages have predicted the demise of the kind of old-fashioned bibliographic control described here. Not a demise due to lack of dollars (some way will be found to continue support), but a demise because the abstract is out of date and can never be a satisfactory surrogate for the original, so why bother. There is question, however, that anyone reading this article should be concerned. Attention, though, must be given to the improvement of bibliographic control. The creation of machine-readable data bases, of regional information dissemination centers, and a trend toward more centralization will all have a bearing. Bibliographic control of the future is in the minds of the practical genius.

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