Abstracting Services in Closely Defined Fields*

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The authors draw conclusions from their experience in the publishing of six abstracting services in closely defined fields, often called "project oriented," particularly emphasizing the criteria making establishment of such services desirable. The rule of abstracts in creating a balanced information system is stressed, particularly as a necessary guide for the reading in the original literature by research scientists.

The author of Ecclesiastes wrote that "of the making of many books there is no end." So also of abstracts, there is no end. The "Guide to the World's Abstracting and Indexing Services in Science and Technology," published by the National Federation of Science Abstracting and Indexing Services, has a total of 1855 entries. They range from the giants such as *Chemical Abstracts*, which this year expects to publish 208,000 abstracts, and *Biological Abstracts*, of the same order of magnitude, to services handling only a few hundred citations per year.

The services may be roughly differentiated into the broad general services, designated by the National Federation as "profession oriented,"and the more limited services covering closely defined fields called "project" or "mission oriented." It is with the latter type of service that we have had experience.

In 1959 the senior author, with Seaton T. Preston, began publication of the *Gas Chromatography Abstracting Service*. This popular service almost from the start paid its way and more. In 1961 *Instrumentation Abstracts* was organized by the same authors; but, for various reasons which will be detailed later, it did not succeed. In 1963 Lowry and Cocroft began *Food Processing Abstracts* and, later in the same year with Pasek, *Laser Abstracts*. Last year, *Microelectronics Abstracts* began publication and, this January, *Food Service Research Abstracts* was inaugurated in cooperation with the Society for the Advancement of Food Service Research. These services have been successfully published without subsidy.

Our experiences enable us to draw some worthwhile conclusions about abstracting services of limited scope. First of all, a project-oriented service should fill a real need. Such a need usually exists when a specialized field of study crosses disciplinary lines and has a voluminous and scattered literature. Our services each cover 150 to 200 journals, plus reports, meeting papers, and patents. Secondly, the service must attract an interested audience of specialists. A project-oriented service of limited scope is intended for specialists, and this consideration is governing both in the selection of subject matter and the presentation of material. There must be a considerable number of specialists having difficulty keeping up with the literature in order to justify organizing a service.

To determine whether these conditions are present, a market research study is called for before starting a new abstract service. The attitude of prospective customers should be carefully investigated. There is so much work involved in starting even a small service that one should not be started on hopes and thin air. Here is one place we were delinquent in regard to *Instrumentation Abstracts*. Although we had had past experience in marketing research, we took at face value the overenthusiasm of the instrument specialist of a major company, made no careful advance study, and found out too late that we could not interest enough instrument engineers to make the service pay.

To establish a project-oriented service there must be a lot of good promotional work done. Often this means more than just stating to parties who should be interested that the service is available. In some fields we have had to go back to fundamentals and define what an abstract is and explain its utility. Chemists may be surprised by this. We have been brought up on abstracts; turning to *Chemical Abstracts* for every literature need is second nature. One thing that made *Gas Chromatography Abstracts* so successful is that not only was the subject of wide interest, but also the abstracts generally went to chemists. Engineers, as we found out when we tried to sell *Instrumentation Abstracts*, are not so habituated to abstracts, particularly for current awareness. Probably the devoted efforts of the Engineers Joint Council will gradually make them more knowledgeable in this respect. The Council is striving valiantly. They are telling the engineer: "An abstract is an essential ingredient in a modern information handling system since it tells technical people if the article is important enough for them to read in detail."

In merchandising *Food Processing Abstracts* and *Food Service Research Abstracts*, even more missionary work was needed than with the other services. Those concerned with new developments recognized the difficulty of keeping up with the literature, but until the case for abstracts was strongly presented, most of them remained blissfully unaware of the help abstracts could give them.

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Abstracts, as has been repeatedly stated, have two main functions: to provide current awareness of new developments and to make possible retrieval of past information. Because current awareness is a particularly important function of a project-oriented service, promptness is exceedingly important. We aim to have abstracts in the mail within a few weeks after the original material becomes available to us.

Sometimes we are asked, "Why don't you make abstracts long enough to make it less necessary to go back to the original article for details?" A very intriguing idea, to be sure, but it has two strikes against it. The abstracts would be too long for easy perusal, and legally they wouldn't be abstracts—they would be digests. Digests are prohibited without the consent of the copyright owner because they tend to decrease the circulation of the original paper. Abstracts are permissible because in theory, at least, they tend to stir up interest and can actually increase reference to the original material.

There is a growing tendency to use author-prepared abstracts. This is economical, but it is a practice which should be employed with caution. It shifts responsibility for the abstracting from a trained professional to a person usually less experienced in this specialty, and sometimes so close to the trees that he can't see the forest. Moreover, sometimes it is customary for an author to prepare the abstract first, to meet a deadline, and then write his paper. The abstract therefore may not present the final paper in the truest possible light. An author's abstract, if used, should be critically examined and, if possible, compared with the original paper.

It is often urged that the editorial staffs of journals prepare or edit abstracts. As one of the qualifications of such staffs is a critical faculty, this appears to be a good idea, if time permits.

Every librarian is faced with the problem, in regard to abstracts, as to what extent he should depend on centrally prepared material and to what extent prepare his own abstracts. Cost and utility seem to be the two prime considerations. If centrally prepared abstracts can serve his needs adequately, there are substantial economies to be made by using them. Not long ago, Mohlman (*1*) compared the cost of internally and externally produced abstracts. *Chemical Abstracts* had a unit cost of six tenths of one cent. *American Petroleum Institute Abstracts* and *Gas Chromatography Abstracts* were considerably more expensive. *Food Processing Abstracts* and *Laser Abstracts* average about 14 cents apiece. The cost of preparing abstracts for a single company was much greater; Mohlman gave figures of $5.80 to $8.80 per abstract.

But utility must also to be considered. If no central group covers your field in a specialized manner; if the format will not fit your filing or retrieval system (even if there is a service you could use); if you have specialized requirements regarding style of abstracts to which the central services do not conform, you may wish to go it alone. But do not do this without careful consideration of the relative costs. Some groups use their own abstracts in the fields of their main specialization and employ centrally prepared abstracts for fringe interests.

There are stringent requirements for the preparation of abstracts in a limited field. The abstracts are not writted for the general public, even the general scientific public; they are written for specialists. Each abstract must be prepared by someone who has specialized knowledge of the field being covered. Particularly important are supervision and editing of the abstracts by a recognized authority.

The editor of an abstracting service of limited scope must be discriminating. Much of the literature, at least in the fields we cover, is of only ephemeral value, worth perhaps a mention in a newsletter but not abstracting. On the other hand much that is not obvious merits being dug out and recorded. Titles often do not tell the whole story. Particularly in dealing with gas chromatography, we acquired an instinct for knowing that certain types of articles or articles in certain fields of work, regardless of title, were quite likely to report significant novelties in technique.

We have not found it particularly difficult or expensive to get competent abstracters. Some of our abstracters hold the doctorate, some are librarians of outstanding ability, others are experienced documentalists, and one is a graduate chemist in army service near a library. They like the work not only because they are paid for it, but because it helps them keep abreast of a field of interest.

There is an undercurrent of feeling in industrial circles that the tremendous sums spent on research are not producing as great results as they should. We believe, not only from our work as information scientists, but by reason of training in research with both doctoral and post-doctoral experience, that this comes down to the creativity of the individual research worker. With all respect to instruments, computers, and research teams, the ultimate producer is the creative research worker. Consider some great recent advances in technology. DuPont's success with nylon stems from the brilliant research of Carothers. The astounding work on petrochemicals of the Carbide and Carbon Chemicals Corp., now a part of Union Carbide, originated in the work of George Curme. Armour's success with nitrogen derivatives of fatty acids, which at one time stood between the company and disaster, grew out of the work of one man, Ralston. Catalytic reforming, promoted by the Universal Oil Products Co., came from the conviction of Vlasimir Haensel that platinum catalysts were feasible in petroleum refining.

There is a connection between research and abstracting. How do you encourage creativity in a research scientist? It is fundamentally, we are convinced, a God-given gift. But we believe it can be encouraged by ample opportunity for reading and contemplation.

Richard Willstätter, Nobel laureate, distinguished investigator of chlorophyll, the flower pigments, and other natural products, wrote in his autobiography (*2*):

> "The use of books and periodicals was a habit I had learned and practiced early. Reading a good book at leisure, a book with some bearing on what I have hoped, felt, worked on, experienced, and lost, puts me in a solemn and excited mood, like looking at the restful sweep of a great, wide landscape. Often I have to put my book aside so that I can seize and hold a thought which suggests itself dimly behind the printed pages and gains clearer content and full shape only on being followed. It is only rarely that such traces of ideas betray a recognizable relationship with

> the subject of my reading, the pursuit of which they hinder. Various ideas are born of some sort of excitement through reading; often they are the beginnings of scientific experiments, or comments on a manuscript, or they even bear on events long gone and forgotten—in short something which, remote from the sentences of my book, spins out or even fulfills my plans, impressions, and oft-upset desires."

Following this line of thought, we contend that the creative research worker must read, and read widely. No information expert can do his reading for him. But the volume of original literature in even a limited field is so great that the research worker needs guidance in his reading. Here is where the information specialist comes in. It is not enough to give the researcher a machine-prepared list of hundreds of possibly applicable references. Properly prepared abstracts focused on his field, particularly from a "project-oriented" abstract service of limited scope, are his best guide. These serve not as a substitute for reading, but enable him to read what will be most helpful without time-consuming searching.

Abstracts properly organized can serve not only to assure current awareness of new developments, but also for purposes of information retrieval. All our services are published on 5 × 8 inch single row edge-notched cards. They are coded by carefully prepared classification systems.

Classification systems, as distinguished from alphabetical indexes and concept coordination, are particularly suitable if the subject matter is narrow in scope and the system will be used by only a small group of people who can learn it well and agree on standard categorizing conventions. These conditions are fulfilled in the operation of project-oriented services of limited scope.

The classification system must be worked out and tested before an abstracting service is begun. Sometimes a classification system can be added to, but it cannot be made over. Here is another place we fell down with *Instrumentation Abstracts*. We were not ready at the beginning with a classification system and the number of abstracts was so great that the users felt swamped.

There are few generalizations one can make about drawing up classification systems. Each one is individual. They must be sufficiently, but not too greatly, detailed. In *Food Processing Abstracts* we differentiate first by Processing Field, with 15 subdivisions such as freezing, heat sterilization, or irradiation. This is followed by division into Type of Food Processed, as vegetables, meat, or oils and fats. There is a third category defining the Kind of Information, whether dealing with microbiology, equipment, patent, etc. There are 49 subdivisions in all. Each abstract card usually carries two to five code numbers.

Food Service Research Abstracts are subdivided by Operations, such as storage, preparation or cooking; also by Food Used in Preparation, a classification similar to the "Types of Food Processed" in the Food Processing service. Then comes Type of Dishes Served—soups, entrees, desserts, and so on. Finally there is Type of Data, a general category covering sanitation, equipment, management and personnel problems, etc.

Laser Abstracts identifies 24 major fields of research or application, including medicine, communication, and meteorology. There are also major divisions into theory, materials, and experimental work, and segregation by type of publication, such as patent, report, or bibliography. The subdivisions total 78. *Microelectronics Abstracts* divides the literature into theory, experimental work, elements, fabrication methods, production and manufacturing, circuit considerations, and test, calibration, and auxiliary equipment.

Such classification, with coding and notching of the cards, makes possible information retrieval by use of a sorting needle. Proper use of the needle causes the abstract cards on any desired division of the general subject to drop out. This retrieval system is simple, requires no complicated equipment and—another big advantage—no preparatory work on the part of the user.

When an abstract file on coded notched cards grows to more than a few thousand entries, retrieval of information by means other than a sorting needle is desirable. We are faced with this problem with *Laser Abstracts*. Besides abstracting current literature, this service has covered the back literature from the first announcement of the laser principle in the late 1950's. We have a file of over 5000 entries. We have not solved the problem of how to improve information retrieval in this service, but we have developed several possibilities.

In considering mechanized retrieval the first question that arises is: Do we want to keep the abstract cards as an individual file or do we want to integrate them into a larger information system? If the file is to stand alone there is possible the solution used by Preston, who in cooperation with the Jonker Corp., has made an optical coincidence Termetrex index with 10,000 *Gas Chromatography Abstracts*. There is also the example of McKinney and Baird (*3*), who revised the classification system of *Gas Chromatography Abstracts* to give deeper indexing and transferred the coding to IBM punch cards. This allowed cards on any phase of gas chromatography technology to be segregated by IBM sorting equipment. From consultations with IBM representatives, we are assured that with no change in the classification systems, abstract cards in our services can be coded on IBM cards to allow retrieval by their sorting equipment.

It is also possible to retain our coding systems and microfilm the abstracts for retrieval by the Recordak or Miracode systems of the Eastman Kodak Co.

If it is desired to integrate abstract cards in a limited field with a larger information service, some concept coordination system will probably be used and the abstracts recoded by concept, making possible deeper indexing. The Engineers Joint Council Thesaurus might serve as a starting point for indexing, with the addition of special terms, or the IBM Key Word in Context System may be used. Searching can be manual or mechanical, using Miracode or IBM equipment. In any case, if automatic retrieval is used it would probably be best to transfer the abstracts to microfilm.

LITERATURE CITED

(1) Mohlman, J. W., *J. Chem. Doc.* 1, 64 (1961).
(2) Willstätter, Richard, "From My Life," trans. by Lilli Hornig, Benjamin Co., New York, Amsterdam (1965).
(3) McKinney, R. W., Baird, J. A., *J. Gas Chromatog.* 1, No. 5, 16 (1963).