

Question 1. A terse conclusion which can act as a substitute or surrogate for a project outlines the meaning of a project in one or two sentences. The value of our present terse conclusion over the former system for reports and memos where no terse conclusion or abstract was used is of:

- Significant value and utility —
- Moderate value and utility —
- Small value and utility —
- No value or utility —

Question 2. The former brief abstract which often expressed the project as "The reaction of A and B were studied" versus the terse conclusion which would state—"A and B react to form C (an efficient antidegradant) in 90% yield utilizing catalyst X and a temperature of 100°C" indicates that the worth of the terse conclusion over the brief abstract is of:

Question 3. The present report or memo header sheets require the listing of significant references (research notebooks, memos, progress reports) which are used as citation indices to these references during retrieval. These references are of:

Question 4. The new report or memo header sheets require the listing of important keywords. It is logical to expect the author of a given report to outline the necessary keywords with high efficiency and facility. These keywords will be put into machine (computer) form and used for computerized retrieval of the author's report or memo. These keywords are of:

Question 5. The header sheets are combined at weekly intervals into a terse conclusion compendium and issued to the entire staff. These terse conclusion collections serve as an internal SDI (Selective dissemination of information) and could be utilized by management and supervision to follow the progress of any project and as aids to decision making.

- a. The terse conclusion collections as SDI (to the entire staff) are of:
- b. The terse conclusion collections as report surrogates to management are of:

Question 6. My overall opinion of the terse conclusion header sheets and the terse conclusion collections is that they are of:

Question 7. Please write any suggestions or constructive comments that you may have in this area:

Figure 4. Terse conclusion questionnaire (the value and utility portions of Question 1 also apply to Questions 2-6 below)

In conclusion, although we are still modifying Terse Conclusions to fit our own system, we use well written Terse Conclusions as: efficient report surrogates, components for communicating information to the entire staff, and key components in a computerized information-retrieval system.<sup>6</sup>

#### LITERATURE CITED

- (1) Bernier, Charles L., "Terse-Literature Viewpoint of Wordage Problems—Amount, Language, and Access". *J. Chem. Doc.* 12, 81-4 (1972).
- (2) Bernier, Charles L., "Condensed Technical Literature," *J. Chem. Doc.* 8, 195-197 (1968).
- (3) Bernier, Charles L., "Abstracts and Abstracting," "Encyclopedia of Library and Information Science," Vol. 1, pp. 16-38, Marcell Dekker, New York, N.Y., 1969.
- (4) Katter, Robert V., "Study of Document Representations:

Multi-dimensional Scaling of Indexing Terms," Final Report (TM-3627), System Development Corp., Santa Monica, Calif., 100 pp., Aug. 31, 1967.

- (5) Henderson, U. V., "The Research Report as an Aid to Planning," *Chem. Tech.*, 394-7 (July 1971).
- (6) Gordon, I., and Hogan, A.L., "Design and Implementation of a Chemical Information Center," *Proc. Amer. Soc. Inform. Sci.*, 7, 177-9 (1970).
- (7) Luhn, H.P., "The Automatic Creation of Literature Abstracts," *IBM J. Research Develop.* 2, 159-65 (1958).
- (8) Bernier, Charles L., "Newsletter of Biomedical Terse Conclusions," August 9, 1971, (Sample presented at the Third Northeast Regional Meeting of the ACS, October 11, 1971, Buffalo, N.Y.).
- (9) Rush, J. C., Salvador, R., and Zamora, A., "Automatic Abstracting and Indexing. II. Production of Indicative Abstracts by Application of Contextual Inference and Syntactic Coherence Criteria," *J. Amer. Soc. Inform. Sci.* 22, 260-74 (1971).

## Pharmaceutical Industry Viewpoint of Wordage Problems—Amount, Languages, and Access\*

L. N. STARKER\*\*

Science Information Services, Warner-Lambert Research Institute, Morris Plains, N. J. 07950

Received October 11, 1971

From the viewpoint of U. S. pharmaceutical information groups, the major portion of the literature of interest is written in English. This holds true even for an important percentage of papers written for, and published in, journals from non-English speaking countries. The language problem is further simplified by the practice of many publications of offering an abstract or summary in English for each paper published. Obviously, these brief condensations

are not enough to yield the meat of a report, but coupled with even a meager knowledge of the language, they are often sufficient for all but the most exacting needs.

Finally, when complete and exact translations are required, use is made of professionals who are expert in the languages needed. The policies of most pharmaceutical companies vary from the maintenance of in-house translation staffs that are expert in the most common languages, to having all such work done by outside service bureaus that specialize in scientific translations.

Some organizations also maintain lists of their own

\* Presented before the 3rd Northeast Regional Meeting, ACS, Buffalo, N. Y., Oct. 11, 1971.

\*\* Deceased.

The pharmaceutical industry must have access to many sources of the world's scientific literature to satisfy its research and development needs. The multi-disciplinary requirements of this field have till now required heavy reliance not only on primary journals, but also on secondary abstracting and indexing sources for complete coverage. More emphasis will be required on tertiary sources which maintain multiple computer-based files. These files are now being made available for SDI purposes, while their usefulness for retrospective searches still needs to be evaluated.

personnel with fluency in one or more languages, who are willing to serve on an occasional basis as translators.

Our approach has been to use service bureaus on an extensive basis. Interestingly, we tend to get the fastest, most economical service from a group in London. To maintain delivery periods of 2 to 4 weeks, even under overload conditions, we have established the competency of a number of these organizations with whom we can deal. We currently are using five individuals or groups for our needs. Only one of these can handle Japanese, while all can translate Russian.

In most instances, access to publications of interest is a small problem. Information needs of those pharmaceutical companies that have other than the most minor research programs, require that they routinely subscribe to 500 to 1000 journals and related publications. Without doubt these are titles that will show up on most lists of the 'core' publications in fields of science such as organic chemistry, biochemistry, analytical, and physical chemistry; the biological sciences including such disciplines as pharmacology, physiology, and microbiology; and the pharmaceutical and medical sciences and many of their subdivisions. The problem of access is not so much a matter of how to obtain the journals and literature needed, but which publications should be bought with what is almost always a limited budget. This, of course, becomes directly involved with the amount of the available literature, and how to select the publications to be purchased.

Once a choice has been made, the problem of access to publications is minimized by the existence of subscription brokers, who can handle much of the subscription load on a 'till forbid' basis for a small fee. Unfortunately, this does not suffice in all instances, since there are still a number of publishers who will accept subscriptions on a direct basis only. Therefore, one must still retain in-house personnel for processing and maintaining these partial subscription lists.

Regardless of the extensiveness of the subscription budget, there is always a demand for copies of material in journals other than those received by your own group. Access to these materials is usually obtainable by inter-library loan or by purchase of photocopies from a neighboring institution. In return, we ourselves supply items to other libraries.

I would now like to consider the problem of amount, how it is being handled, and perhaps most importantly, how it will be handled.<sup>1</sup> Earlier, I estimated that many pharmaceutical company libraries subscribe to between 500 and 1000 periodicals a year. This may seem like a substantial number of items, yet it has been estimated<sup>2</sup> that *Chemical Abstracts* found papers of chemical interest in 8500 different journals last year. Interestingly enough, 75% of the abstracts came from 1212 journals, while 50% came from only 340 journals.

The pharmaceutical information group is not however solely interested in information from the chemical literature. Just as important, is coverage of publications by the biological and medical sectors. The prime abstracting groups in these areas are *Excerpta Medica* and *Biological*

*Abstracts*. *Excerpta Medica* claims coverage of about 3500 journals while *Biological Abstracts*<sup>3</sup> covers material from 7500 journals. Both services show some degree of overlap with *Chemical Abstracts*.

It is obvious that even the pharmaceutical library that receives 1000 publications is looking at only a small percentage of the information available in their areas of expertise.

Does this mean that we must subscribe to substantially more publications and hire more personnel to read, index, and retrieve the information they contain? Hopefully—and practically—not.

The answer to a considerable extent lies in the fact that although the total number of publications in which we might be interested (and I have not considered patents and report literature) probably falls in the area of 4000 to 5000 publications, there does exist a relatively small core of periodicals that can be expected to yield a substantial percentage of the papers that are important to us in our daily work.

Thus, such abstracting and indexing services as *Chemical and Biological Activities* (CBAC) and Ringdoc cover anywhere from 330 to 600 publications. Presumably, these constitute the core of the journals in the chemical and biochemical fields and should contain the most important papers in these fields.

At this point, perhaps we should examine some of the reasons for the existence of the literature information group in the average pharmaceutical company.

1. Their prime mission is to support the R&D effort of the company. Thus the conventional library procedures of acquisition, storage, and circulation are backed up with additional services to assist the scientist in locating, digesting, sorting, and retrieving appropriate pieces of information from the published literature.
2. Aside from the scientific and medical coverage, many of these groups must also maintain collections of business journals, engineering collections, and anything else that represents a needed area of literature coverage.
3. Some library groups must also maintain other types of information such as college catalogs and market research materials.
4. A peculiar requirement of these groups is to search the world literature so as to bring to the attention of the medical scientists, for reporting to the FDA, all possible reports dealing with the company's drug products.
5. A number of peripheral services often result that are designed to aid in the implementation of these basic services. Functions such as translation services, abstracting, and indexing operations are examples.

How then do we set about fulfilling these requirements?

An organization such as the Warner-Lambert Research Library attempts to fulfill its responsibilities initially by subscribing to about 750 publications in the chemical-biological-medical area. These journals, however, represent little more than the core literature for the requisite areas.

We therefore have contracted with the John Crerar Library in Chicago to assist us by scanning the 2500 journals

Table I. Secondary Services Subscribed to by Warner-Lambert Research Library

Analytical Abstracts	de Haen Drugs in Prospect
Applied Science & Technology Index	de Haen Drugs in Research
Biological Abstracts	Derwent Farmdoc (CPI)
Bioresearch Index	Dissertation Abstracts
Business Periodicals Index	Excerpta Medica
Chemical Abstracts	Fast Announcement Service
Chemical Biological Activities (CBAC)	Index Medicus
Chemical Titles	Index to Dental Literature
Current Abstracts of Chemistry & Index Chemicus	Preston Gas Chromatography Abstracts
Current Contents	Preston NMR Abstracts
	Union List
	Unlisted Drugs

Table II. Some Secondary Services Not Subscribed to by the Warner-Lambert Research Library

Basic Journal Abstracts	International Aerospace Abstracts
CA Condensates	NASA Briefs
CARD-A-LERT	NASA STAR
Compendex	Pandex
International Abstracts of Biological Sciences	Science Citation Index
	Uniterm Index to Patents

that they receive in our fields of interest, for *all* papers that mention any of our medical products, as well as some additional product-related topics.

The advantage to us is a substantial reduction in the time spent by our own personnel in scanning the literature. Such scanning as we do, therefore, can be limited to journals not covered by John Crerar or for topics that are not considered suitable for assignment to outside personnel. One major result of this project is location of the great bulk of the references needed to work with our products. In addition, this service yields most of the references needed to satisfy the requirements of the FDA for information needed to supplement our IND's and NDA's.

These papers also serve as input to the majority of our internal abstracting and indexing efforts.

Southern of Abbott Laboratories, in a recent study,<sup>4</sup> pointed out that the pharmaceutical industry still continues to abstract and index its own literature. This is in spite of the fact that other industries have tended to rely heavily on commercially produced services. This is primarily so because of the need to maintain control, in depth, over large amounts of relatively narrow literatures. Thus, Lederle Laboratories needs to be able to retrieve in great depth the massive literature that has developed on the tetracycline drugs; Parke-Davis needs in-depth knowledge of all reports on chloromycetin; we ourselves need to control closely the literature on Coly-Mycin, etc. No commercial service, geared to service a wide spectrum of clients is likely to offer this kind of control.

And yet, the pharmaceutical industry has long been engaged in a number of cooperative efforts that have been designed to minimize the labor necessary to maintain a body of information that will be useful to many groups.

A prime mover in this respect, was the Literature Subcommittee of the Research Administration Committee of the PMA's R&D Section. This group, under the leadership of members like Eliot Steinberg, Alex Moore, Joe Clark, and others was instrumental in giving vital backing to the Institute for Scientific Information (ISI) in getting *Current*

*Contents* and *Index Chemicus* underway. Similar efforts—on a less formal basis—converted the "New Drug Project" from a cooperative effort of a number of pharmaceutical companies to a commercial venture called "Drugs in Prospect" by Paul de Haen. Extensions of this effort have given us "Drugs in Use" and "Drugs in Research." A third example of the conversion of a cooperative project to a commercial service can be seen in "Unlisted Drugs" which was transferred from sponsorship of the Pharmaceutical Division of the Special Libraries Association to Boris Anzlowar's Pharmaco-Medical Documentation Service.

In addition, the Derwent Documentation Services have benefitted substantially in both their original Farmdoc (now CPI) and Ringdoc services by a massive infusion of advice, criticism, and consultation by their pharmaceutical subscribers.

Despite this long history of cooperative effort we are still faced with the need to do much of the work ourselves for many of the reasons discussed by Southern.<sup>4</sup>

We have already discussed our use of the John Crerar Library's scanning service to implement our own journal collection. This service does not, however, relieve us of the need to locate papers on products other than those covered by them. It also does not free us of the need to search the literature for subjects of more general or less readily defined boundaries. It does not relieve us of the necessity to abstract and/or index this material for retrieval. It does not remove the need for translation, and it does not—above all—lessen the requirement for carrying out searches of varying degrees of depth and complexity for anyone from a bench scientist to the Chairman of the Board, from our home location in Morris Plains, N. J., to a local representative in India.

Our attention now must turn to the secondary literature, the abstract journals, which, together with their indexes offer a method by which we can search large volumes of literature. A substantial number of these are available. The National Federation of Science Abstracting and Indexing Services<sup>5</sup> recently reported over 1800 such services in 40 countries throughout the world. This indicates the range of publications from which a selection must be made. Table I shows some of those which we ourselves use.

Table II lists some of the secondary services to which we do not subscribe.

Consideration of these lists raises the not insignificant question—why choose certain services and not others? The answers unfortunately are not always very scientific. In most cases, the positive list is made up of services that are particularly strong in some specific field of concentration. At the same time, most services are broad enough in coverage, so that significant overlap occurs.

Thus a recent study<sup>7</sup> indicates that BIOSIS and CAS cover more than 2900 identical journals, while CAS covers 5100 journals not reported on by BIOSIS. On the other hand, BIOSIS abstracts 4300 journals not examined by CAS. We had hoped to be able to present a more comprehensive study of the overlap problem at this meeting, but unfortunately, the results of our questionnaire have not been comprehensive enough for a valid study. The scope of the problem, though is indicated, by the fact that *Chemical Abstracts Condensates* covers 12000 journals, *Chemical-Biological Activities* covers 580 journals, *Excerpta Medica* covers 2300 journals, and Ringdoc covers 330 journals.

In place of a more scientific reason for making a choice of services, I suspect that most organizations select many of their subscriptions on a historical or even an intuitive basis. Thus *Chemical Abstracts* and *Excerpta Medica* are probably rock-bottom requirements for a library supporting a pharmaceutical research effort. Derwent Farmdoc service

# PHARMACEUTICAL INDUSTRY VIEWPOINT ON WORDAGE PROBLEMS

does an excellent job of reporting on worldwide patents of pharmaceutical interest, and also offers search and retrieval systems. On the other hand, the Information for Industry's (IFI) patent service has been of less value to pharmaceutical companies, but could be more interesting to chemical and plastics companies. However, a pharmaceutical company with a more liberal budget might well add this publication to its collection.

The point to be made here, I think, is that quite often the reason for a journal or abstract service to appear on the negative list may be more of an economic than a logical one.

Thus, we have for a number of years toyed with the purchase of *Science Citation Index*. For many years, it appeared to us to be of marginal value for most of the search requests that we received. Its apparent usefulness has increased, but it is still on our marginal list of services to be purchased because of its cost. I am sure that others have followed the same reasoning in deciding on the acquisition of a new publication.

A related phenomenon, and one that is a direct result of our computer age, is the recent growth of Selective Dissemination of Information Services. The ability today, to computerize groups of index terms, or to search journal article titles on a word-by-word basis, has led to refinements

in literature selection of a very high order. In general, each recipient constructs a 'profile' which lists those terms or words that best describe his interests and needs. The computer then searches its files on a regular basis and reports those publications that contain the desired combinations of terms in the appropriate Boolean logic combinations.

As is so often the case, however, all is not quite as simple as it might appear to be on the surface. Expert care must be used in profile construction to avoid too much fallout—owing to the inclusion of too many inappropriate terms, or too few references—owing to an overly rigid profile. In the first instance, the recipient of the service rapidly finds that he is spending too much time in reviewing and discarding unwanted responses. He might do better to review Tables of Contents publications and make his selections that way. In the latter case, the recipient is given relatively few responses and finds that he is missing many papers that he should be seeing. As a result, he must still spend as much time in covering the literature as he did before.

Profile construction, therefore, becomes a dynamic and not a static process. Changes are made initially to determine a feasible ratio between looseness and tightness of requirements. And then, when a useful level of activity has been found, interests change and more modifications must be made.

We ourselves have found that our most useful results have been obtained from the ASCA services of the Institute for Scientific Information and from the Medlars SDI service of the National Library of Medicine. Experiments with SDI profiles based on the CBAC and Chemical Condensates Tapes were disappointing in that the recipients of these latter services learned very little that they had not already seen themselves in the primary literature.

The conclusion that can perhaps be best drawn is that SDI services have little use when applied to a relatively narrow area of the literature for personnel who are themselves very heavily literature oriented. Thus SDI services are perhaps best applied to those whose interests must, of necessity, cover a large volume of publications and/or who are unable to devote large amounts of time to literature surveys.

The scope of the current interest in this mode of journal coverage is dramatically illustrated by the formation of societies for groups which are heavily involved in this activity. Thus, the European Association of Scientific Information Dissemination Centers (EUSIDIC)<sup>6</sup> is about one year old now. It offers full membership to those SDI Centers that are computer based and routinely process at least 50 profiles on an economical basis. Other groups are eligible for associate status.

An American counterpart is the Association of Scientific Information Dissemination Centers (ASIDIC).<sup>7</sup>

This group has 21 full and 40 associate members. Full membership is restricted to those processing substantially larger numbers of profiles than is required by EUSIDIC. Included are many of the new centers that provide profiles based on a number of data bases.

Although the SDI services serve primarily to notify the user of the existence of an article of interest, they do point the way to a possible long-term solution of the amount phase of the literature problem.

The most probable answer, and the direction in which we must begin to direct our efforts, lies in the increased degree of computerization of secondary literature services that has resulted in the growth of SDI services. There are currently available a substantial number of these computerized services. Table III shows several that are of particular interest to pharmaceutical literature scientists.

Table III. Computerized Secondary Literature Sources of Pharmaceutical Interest

BIOSIS	Derwent Ringdoc
Chemical Abstracts (CT, CBAC, CAC)	Excerpta Medica
Datrix	ISI Source and ASCA Tapes
Derwent Farmdoc (CPI)	Medlars
	Science Information Exchange

Table IV. Tertiary Information Centers

Name of Center	Tape Holdings
Computer Research Center (IIT Research Center, Chicago, Ill.)	CAC, BIORI, BA, COMPX
Georgia Information Dissemination Center (U. of Georgia)	BA, BIORI, CAC, CAIN, CBAC, COMPX, CITE, GEOREF, NSA, ERIC, SPIN, USGRDR CHEMSTR
Knowledge Availability Systems Center (U. of Pittsburgh)	NASA, CT, CAC, ASM/IM, USGRDR
Louisville Information Referral Center (U. of Louisville)	CT
New England Research Application Center (U. of Connecticut)	NASA, METADEX, DDC, USGRDR, AFMDE, APTIC, BIORI, BA, CBAC, CAC, CT, CITE, COMPX, DATRIX, EPIC, ERIC, IFI, ISI, MEDLARS, NASA, SIE, WTA
Tape Services Branch (National Science Library National Research Council of Canada, Ottawa)	ISI, CAC, CT, INSPEC, BA, MEDLARS, PIP, MARC II
UK Chemical Information Service (U. of Nottingham, England)	CT, CBAC, CAC, MACMOL
U. of Kansas Computation Center (U. of Kansas)	CT, USCEN, KGD, KOW, KCD
3i Company (Philadelphia, Pa.)	CT, CAC, CBAC, POST-J, INSPEC, EM, COMPX, CCM

Table V. Data Files Available From Tertiary Services

Abbreviation	Title	Comments
AFMDC	Air Force Machineability Data Center	For information on machinery and material removal
APTIC	Air Pollution Technical Information Center	
ASM/IM	Metal Abstracts	Abstracts published by American Society for Metals and the British Institute of Metals
BA	Biological Abstracts Previews	Covers publications of biological interest, ahead of the printed versions of BA
BIORI	Biological Research Index	Covers citations to papers, symposium conferences, government reports, etc.
CAC	Chemical Abstracts Condensates	Covers the items in Chemical Abstracts. Appears in two groups (odd & even)
CAIN	Cataloging and Indexing Tapes	Contains material that corresponds to the Bibliography of Agriculture
CBAC	Chemical-Biological Activities	600 journals covered by CA, with special emphasis on biological and metabolic reactions of organic compounds
CHEMSTR	Chemical Structure	Files covering several collections which are available for sub-structure searches
CITE	Current Information Tapes for Engineers	A retrospective collection (1968-69 only) for electronic and electrical engineering data
COMPX	COMPENDEX	A tape system that covers the Engineering Index output from 3500 journals
COSMIC	Computer Software Management and Information Center Services	Documented computer programs developed by and for NASA, DOD and the AEC
CT	Chemical Titles	Covers 650 highly productive chemical journals
DATRIX	Direct Access to Reference Information	Yields information on U.S. and Canadian Ph.D. dissertations
EM	Excerpta Medica	Covers 3400 periodicals of biomedical interest
EPIC	Electronic Properties Information Center	Covers electronic optical and magnetic properties of materials

Since these computer services are analogous to the printed services, we face the same problems of overlap and duplication that were a factor in the printed services. The problem is further aggravated by the fact that these services are not only relatively expensive to purchase, but now require an additional outlay for personnel and computer time to make use of the tapes. For the organization that can afford this outlay, interesting possibilities open up. A large expanse of the literature can be covered on an SDI basis or on a retrospective search basis with very little manpower.

Most organizations, however, cannot afford an effort of this magnitude. I look for them to turn increasingly to the *tertiary* literature sources—to those groups that have set up multiple data bases composed of the offerings of a number of the computerized secondary literature sources.

This phenomenon is now several years old and appears to be growing at a steady pace. Most of the groups that have been established thus far are university-based. One for-profit organization, the 3i Company in Philadelphia, is now in the field, and will likely be joined by others.

These organizations offer the average scientist entry to

one or more computerized data-bases as needed. He may order an occasional search, or his company may guarantee some minimum number of requests in return for a discounted fee. In either event, the client has complete flexibility as to the kind and depth of service he requires—from one or many data bases. He pays for the services he receives and has no need to maintain his own computer systems and personnel.

Our review of the tertiary information services resulted in responses from nine groups that operate, or have access to, as many as 22 computerized data bases. The chemical orientation of these services is illustrated by the fact that, with only one exception, they all used one or more of the CAS tape services. The services and their computer holdings are shown in Table IV.

The sources which are covered in these services are briefly described in Table V.

We have here listed a total of 35 computerized search services that are available through service bureau facilities. Not included of course are those services (Derwent Farmdoc, for instance) that are not yet available in this manner.

Perusal of the list should make obvious the fact that these

# PHARMACEUTICAL INDUSTRY VIEWPOINT ON WORDAGE PROBLEMS

Table V. Data Files Available From Tertiary Services

Abbreviation	Title	Comments
ERIC	Educational Resources Information Center	Contains citations from Research in Education
GEO-REF	Geological Reference File	Contains data from about 2000 geological publications
IFI	IFI/PLENUM Corporation	Indexes of chemical and related patents
INSPEC		Covers physics and computer-related publications
INSPEC	SCIENCE ABSTRACTS	Published by Institute of Electrical Engineers and covers physics and computer fields
ISI	CITATION TAPES	Covers 2700 journals in all areas, surveyed by the Institute for Scientific Information
KCD	Kansas Clay Data	A subset of CAC that specializes in macromolecules
KGD	Kansas Groundwater Data	
KOW	Kansas Oil Well Data	
MACMOL	Macromolecular Chemistry	
MEDLARS	Medical Literature Analysis and Retrieval System	Covers 2300 journals indexed by the National Library of Medicine
NASA	National Aeronautics and Space Administration	Covers the NASA Scientific and Technical Reports (STAR) and International Science Abstracts (IAA)
NSA	Nuclear Science Abstracts	Corresponds to the printed publication and is issued by the Atomic Energy Commission
POST-J	Polymer Science Technology (Journals)	Digests reports of polymer chemistry from CA source journals
SIE	Science Information Exchange	Information about on-going research programs
SPIN	Searchable Physics Information Notices	An alerting service of the American Institute of Physics, and covers 62 journals
USCEN	U. S. Census Data	An engineering and applications file based on reports issued by DOD laboratories and contractors
USGRDE	U. S. Government R&D Reports	
WTA	World Textile Abstracts	Consolidates world-wide textile literature

services cover a broad scientific front and can easily lead to adequate coverage of many disciplines. Costs are variable but in general, are not too expensive. In many instances, SDI coverage of a broad nature could be obtained for less than \$100 per profile per year, while retrospective searches tend to be more expensive and are usually priced on a per year basis.

The major weakness of computerized search systems lies in the general inability to conduct retrospective searches over more than a few years. This, of course, will be solved with time, as backlogs begin to be built up. Hopefully, techniques will also be developed which will permit us to run longer retrospective searches at fairly standard rates.

It appears that for many companies the era of the tertiary literature service—or the computerized service bureau—permits wider literature coverage at minimum expense—at least on a current awareness or SDI basis. It is easily conceivable that a fairly large group might require no more than ½ to 1 person to be involved with generating, maintaining, and updating user profiles for operation by these service bureaus. This might readily remove, almost completely, the necessity to scan the literature on a manual basis to pick up papers of interest.

Fairly extensive staffs of literature scientists will still be necessary to carry out retrospective searches over more than a few years—unless the clientele will be satisfied with relatively short scans from computer data bases. With time, however, the problem will diminish as regards coverage, and cost will become more important. But then, one will be able to assess better the economics of the computer search *vs.* the human search.

## LITERATURE CITED

- (1) Holm, B. E., "How to Manage Your Information," Rheinhold, New York, 1968.
- (2) Baker, D. B., "World's Chemical Literature Continues to Expand," *Chem. Eng. News* **49**, No. 28, 37-40 (July 12, 1971).
- (3) Gechman, M. C., *Proc. Amer. Soc. Inform. Sci.* **7**, 97-9 (1970).
- (4) Southern, W. A., and Weinstein, S. J., *J. Chem. Doc.* **11**, 70-2 (1971).
- (5) Keenan, S., *Information* 53-6 (Jan.-Feb. 1971).
- (6) *IR & Automation Newsletter* **7** (1), 10-11 (1971).
- (7) *ASIDIC Newsletter* **11**, 3 (March 26, 1971).