Foreign Literature of Chemistry

Chemical Abstracts helps the scientist to retrieve chemical information published in foreign languages.

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There are three serious problems associated with the literature of chemistry and, in fact, with all scientific literature. (i) The literature has reached staggering proportions. (ii) Much of it is difficult to obtain. (iii) More than half of it is written in foreign languages.

Chemical Abstracts provides a solution, in part at least, to the problems, especially the language problem, for it affords a comprehensive approach to the recorded knowledge of chemistry. It puts into a common form and into a common language the pertinent information contained in a large segment of the current literature, and in doing so it serves a dual role—as an alerting service for new developments and as a tool for retrospective searching. Although some may question the value of abstracting journals as a means of making scientists aware of new developments, the Chemical Abstracts Service (CAS) is making a serious effort to increase the usefulness of *Chemical Abstracts* for this task. Three hundred of the most important chemical journals are now being received by air mail, many in the form of page proof, and selections from the most productive 200 are being assigned for abstracting 4 hours or less after the journals are received. At present, 65 percent of the journals handled on this priority basis are printed in foreign languages. The Chemical Abstracts Service intends to increase as rapidly as possible the number of journals so handled.

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The production of *Chemical Abstracts* can be considered as five separate but highly coordinated operations: (i) the searching out, evaluation, and procurement of the world's chemical literature; (ii) selection and assignment for abstracting of the pertinent portion of the literature; (iii) abstracting; (iv) editing and publishing *Chemical Abstracts;* and (v) preparing, editing, and publishing the author, patent, ring, subject, and formula indexes to *Chemical Abstracts.*

Acquisitions

Acquisition of the material to be abstracted is the first concern. The Chemical Abstracts Service now abstracts articles containing new chemical information from 8679 serial publications on a regular basis and abstracts selections from over 300 nonserial volumes of collected papers each year (Table 1). Specifications of chemical patents granted in 24 countries are abstracted. During 1962, 708 journals were added to the CAS coverage, and 370 volumes of collected papers were procured for abstracting. Sixty percent of the added journals and collections were printed in languages other than English.

Of the 8679 journals regularly covered, the percentages for language of publication are as follows: English, 35; Russian, 17; German, 6.5; Japanese, 6.5; French, 5.5; other languages, 29. For the individual papers abstracted, the percentages are, English, 47; Russian, 22; German, 10; Japanese, 7; French, 6; other languages, 8 (Table 2). It is interesting to note that 29 percent of the journals but only 8 percent of the papers abstracted are published in the 45 "other languages" (*1*).

The responsibility for keeping Chemical Abstracts Services' coverage of the world's chemical literature as complete as possible lies primarily with the CAS Library. However, the Library's efforts are substantially supplemented by the abstractors and section editors of *Chemical Abstracts* who help keep CAS aware of new chemical publications. Members of the staff study catalogs, publishers' advertisements, and bibliographies, as well as other abstracting journals, in search of journals that should be covered. To insure complete coverage of suitable published papers from conference proceedings, the staff members analyze all major listings of forthcoming scientific meetings, and we write for the proceedings volumes that we believe may be of interest to our readers. Of the conference volumes received for abstracting in 1962, 42 percent were printed in a foreign language.

Chemical Abstracts Service is especially active in its efforts to insure the fullest possible coverage of the Soviet chemical literature. It subscribes directly to 193 Soviet journals, of which one-third are received by air mail. An additional 367 Soviet serial publications are received at the CAS home office in Columbus, Ohio, as the result of literature exchange arrangements between the American Chemical Society and Soviet scientific societies, libraries, and documentation centers. Through special exchange arrangements with the All-Union State Library for Foreign Literature and the Institute of Scientific Information, CAS receives a large number of otherwise difficult-to-obtain collections of Soviet research papers, as well as many selected issues of irregular serial publications. To extend its coverage of the Soviet chemical literature still further, CAS makes a regular and thorough analysis of the Soviet abstracting journals in the fields of biochemistry, biology, chemistry, geology, metallurgy, and physics. From these abstracting journals all pertinent abstracts of papers that have not been received in the original form by the CAS library are selected and translated for publication in *Chemical Abstracts.* This practice is extended to several other foreign-language abstracting journals. This is one way of learning about journals which should be on the regular acquisition list.

Chemical Abstracts is greatly aided

in its efforts to provide extensive coverage of the Oriental literature by its overseas abstractors, and especially by the 160 Japanese scientists who select and abstract papers from 575 Japanese journals printed in Japanese. Their efforts are supplemented by the receipt at the CAS Library of an additional 215 Japanese journals, printed principally in English.

Communist China had made a formidable entry into the field of scientific publication by 1958. During 1958 and 1959 the Chemical Abstracts Service regularly received and covered 108 Communist Chinese journals. This supply of journals was sharply curtailed in 1960 and was cut off entirely in 1961. Exchange negotiations with the Chinese were begun in 1960; these culminated early in 1962 in agreements with the National Library in Peking, with the Library of Academia Sinica, and with the Institute of Scientific and Technical Information. Chemical Abstracts Service now receives ten journals of interest to chemists as a result of these three exchanges, but only two or three of these journals are scholarly in nature and productive of many papers suitable for abstracting.

Table 1. Number of serial publications abstracted by the Chemical Abstracts Service as of 31 December 1961.

Rank	Countries having 100 or more serial publications covered by *Chemical Abstracts*	Serial publications (N)	Percentage of total
1	U.S.	1693*	19.5
2	U.S.S.R.	1499*	17.3
3	Japan	760	8.8
4	England	566	6.5
5	Germany	566	6.5
6	France	393	4.5
7	Italy	367	4.2
8	Poland	167	1.9
9	India	166	1.9
10	Netherlands	147	1.7
11	Brazil	139	1.6
12	Switzerland	135	1.6
13	Czechoslovakia	132	1.5
14	Spain	119	1.4
15	Canada	118	1.4
16	Sweden	118	1.4
17	Australia	112	1.3
18	Hungary	100	1.2
19	All others	1382	15.9
	Totals	8679	100.1

*The total numbers of serial publications in the U.S. and in the U.S.S.R. are similar, but analysis shows that serial publications are issued more frequently in the U.S. Frequencies for the U.S. and the U.S.S.R., respectively, are as follows: biannual, 13 and 1; irregular (more than once a year), 413 and 509; annual, 228 and 129; irregular (less than once a year), 207 and 559; semiannual, 25 and 6; quarterly, 232 and 21; bimonthly, 141 and 103; monthly, 396 and 167; semimonthly, 12 and 4; biweekly, 5 and 0; weekly, 20 and 0; daily, 1 and 0.

The Communist Chinese contribution to the chemical literature may again become important if CAS is able to regain access to the many publications it received in 1959 and 1960. However, Communist China is now of minor concern in the overall foreign-literature picture.

The chemical literature of Nationalist China is being printed in 27 journals, most of which are abstracted in Taiwan. Fourteen South Korean journals are also being covered. Language problems become formidable when one is dealing with the Oriental literature. Journal titles and author names must be transliterated into the Latin alphabet, and translations must be carefully checked for accuracy.

Through its patent-procurement program CAS received abstracts or specifications for over 32,300 chemical patents during 1962, 45 percent of them in languages other than English (Table 3). To keep pace with the need of the chemical research industry for knowledge on new chemical inventions, CAS covers all patents of chemical interest granted in the United States, Great Britain, West Germany, and Belgium, and chemical patents from 20 other countries that have been granted to resident individuals or firms. Patent coverage was extended in 1962 to include all French chemical patents for which no prior application had been made in another country, all French drug patents of chemical interest, all Hungarian chemical patents issued since 1960 to Hungarian nationals, and all patents of chemical interest issued in Belgium. Belgian patents are especially important, owing to the rapidity with which patent applications are granted in that country. This speed results from the fact that Belgian patent law places the responsibility for novelty of invention on the applicant and not on the patent office. Belgian patents are open to public inspection within either 3 or 6 months after date of grant. By covering these patents, *Chemical Abstracts* is able to provide its readers with new chemical information much more promptly than it could if it were to wait until these same patents were issued in the home country of the companies or inventors, especially if the home countries have very rigid patent inspection procedures that delay the granting of patents for a number of years. Complete coverage of all French chemical patents is contemplated.

Assignment

Once the primary publications have been acquired, it then becomes the task of CAS's assignment department to select the articles to be abstracted and to assign them to the abstractors who are best qualified, linguistically and scientifically, to write the abstracts.

Every effort is made to secure the services of abstractors with a combination of linguistic competence and the ability to prepare informative abstracts in good, idiomatic English. *Chemical Abstracts* at present has about 3300 abstractors actively contributing to its work; about one-fourth of these scientists live outside the United States.

Some of the foreign literature is assigned on a whole-journal basis to individual abstractors or teams of abstractors in various countries. This method has certain advantages: the abstractors obtain primary publications quickly, and the savings to *Chemical Abstracts* are considerable. On the other hand, the great distances between some of these abstractors and our Columbus, Ohio, office does at times cause problems.

Table 2. Languages of abstracted serial publications and papers as of 31 December 1961.

Language	Percentage of total	
	Journals	Papers
English	35.1	47
Russian	17.0	22
German	6.6	10
Japanese	6.6	7
French	5.6	6
All others	29.1	8

Table 3. Languages of patent specifications abstracted in *Chemical Abstracts* in 1962.

Language	Countries	Percentage
English	Australia, Canada, Great Britain, India, U.S.	55
German	Austria, German Democratic Republic (East Germany), German Federal Republic (West Germany), Switzerland	23.9
French	Belgium, France, Switzerland	7.5
Russian	U.S.S.R.	5.0
Japanese	Japan	4.1
All others	Czechoslovakia, Denmark, Finland, Hungary, Israel, Italy, Netherlands, Norway, Poland, Spain	4.5

The *Chemical Abstracts* chemists who select the articles to be assigned appraise each article for suitability and classify those selected into 74 subject-matter categories for assignment to qualified abstractors. Although many journals publish English tables of contents, selection is generally made from the foreign-language article itself, for better evaluation.

Recently, *Chemical Abstracts* has adopted a policy of using the author abstracts that appear in some English-language journals, provided these abstracts meet CAS standards, instead of having others written. This method of coverage reduces to a minimum the time lapse between original publication and publication of our abstracts; extension of the method in the near future to selected foreign-language journals that publish abstracts is contemplated.

The assigning of foreign-language patent literature for abstracting presents many of the same problems that are encountered in assigning journal articles. In the case of journal articles, however, CAS depends in part upon the editors of the individual publications to keep duplicate publication to a minimum. A procedure has been developed, in keeping records of authors, to eliminate duplication of abstracts in the event of duplicate publication of papers. This procedure, however, is not applicable to patents, for it is based on distinctiveness of title as well as author name, and patent titles are far too ambiguous for positive identification, while inventor names are not always listed. Moreover, duplication is more prevalent with patents than it is with journal articles, since most major companies patent the same invention in many countries. To avoid abstracting the same data in a number of patents issued in different countries, *Chemical Abstracts* has developed a system of checking application dates to catch related patents. Thus, a given invention is abstracted and indexed only once.

Whenever there is a spurt in the number of papers published in a given foreign language, the number of CAS's abstractors with competence in that language becomes inadequate. To meet this problem, the Chemical Abstracts Service conducts an active recruiting program for abstractors by advertising in the principal scientific publications of the countries where the language in question is spoken, as well as in the United States. For example, the expansion of CAS's coverage in 1962 to include all Belgian chemical patents placed serious strain on CAS's ability to handle papers and patents printed in French. The problem was solved by recruiting abstractors in the United States, Canada, and France.

In a few instances it has been necessary to turn to professional abstracting services to solve special problems of language or chemical terminology.

Abstracting and Editing

Whatever efforts are made to search out, obtain, select, or assign articles and papers on new developments, the backbone of the operation is the abstractors. These dedicated chemists, some of whom have been abstracting for 30, 40, and even 50 years, have produced almost 3 million abstracts. Working on a voluntary basis, they study the papers that are assigned to them and distil the pertinent chemical information into complete and concise abstracts.

Abstractors take pride in their work, and their abstracts, as received, are surprisingly free of serious error. However, not all abstracts are received in a form suitable for publication. Many abstracts of foreign-language papers, especially those prepared by chemists whose native language is not English, often call for some editing. The editing is done by CAS editors in the Columbus office and by section editors. The section editors are experts on subject matter who work voluntarily on a part-time basis, outside of the regular CAS offices. The abstracts are checked for form and content, and every effort is made to keep mistakes to a minimum. Because of their training and experience, the editors of *Chemical Abstracts* are able to handle almost all of the technical and language problems that arise by checking against the original paper.

The editorial staff's broad chemical knowledge is matched by its widely diversified knowledge of languages. Although only a few of the editors are proficient in more than four languages, collectively the group has a working knowledge of all the major languages of science and of a surprisingly large number of the lesser ones. Thus, editorial problems that arise when one editor is unfamiliar with a language can usually be settled by consultation with a colleague who is an expert in that language.

Working with many foreign languages introduces an array of problems that have nothing whatsoever to do with chemistry. Author names and journal titles in Chinese, Japanese, or Korean, in Russian, White Russian, Bulgarian, or other Cyrillic language, or in Hebrew or Greek must be transliterated into the Latin alphabet by means of standard transliteration systems. Since not all journals or abstractors follow the same transliteration systems, journal titles and author names must be carefully checked to assure that a reference is traceable and that an author's work is not scattered under several spellings of his name.

Considerations of cost and limitations of printing have made it necessary to introduce practices that are contrary to vernacular orthography. For instance, the Varitype-Foto List-Offset method of composition used in the preparation of our author indexes does not permit the use of diacritical marks, so the Germanic ä, ö, and ü and the Scandinavian ø are transliterated to ae, oe, ue, and oe, and other inflections have been eliminated. Studies have shown that this does not change the position of names in the indexes. The Chemical Abstracts Service had been spending thousands of dollars in an effort to follow vernacular capitalization practices, even though these vary widely from country to country and even within the same country. In 1961 it was decided to capitalize all the main words in author addresses, company names, and journal titles. No critical information was lost, and the saving in time and money has been substantial.

Indexing

An abstracting journal without adequate indexes is almost valueless as a tool for information retrieval. This fact becomes increasingly apparent with increase in the volume of abstracted literature. Each issue of *Chemical Abstracts* contains an author index and a numerical patent index, and since the beginning of 1963, each issue has contained a keyword subject index as well. Also, beginning in 1963, each issue contains a patent concordance index which shows the relationship between the patents issued in various countries. It is, however, the semiannual indexes and the collective indexes that are the deep, consistent guides to the vast stores of information locked within *Chemical Abstracts*.

The foreign-language problems encountered in indexing are considerably less than the foreign-language problems met with in the overall assembling of *Chemical Abstracts*. Nevertheless, production of the semiannual author and patent indexes requires well-devised and accurately executed techniques. This is especially true in the handling of names of foreign authors.

In the subject indexes of *Chemical Abstracts*, subjects, not merely words, make up the entries. The entire abstract is indexed, and many additional index entries are prepared from the original patent or paper. The abstract is used as an outline for these entries. The availability of good English-language abstracts enables the indexer to locate information of specific interest in the primary documents even when these documents are in languages with which he is not fully familiar. New compounds are generally characterized by their physical properties, given in numerical values, and by their chemical structures. Reactions may be illustrated, through intermediate steps, by presentation of structures—a universal language. This often enables the indexer to follow the technical and theoretical presentation of the paper even though his familiarity with the language of publication is minimal. As in the editorial department, difficult problems are referred to chemists with facility in the language in question.

From acquisition to indexing, production of an abstracting journal that covers foreign literature is a complex and a costly endeavor. Over $4 million will be spent during 1963 in the production of *Chemical Abstracts* and its indexes.

On the basis of the coverage of *Chemical Abstracts*, it can be concluded that some 60 percent of the world's scientific literature is printed in languages other than English (*2*). The practicing scientist normally has neither the time, the language ability, nor the access to vast library resources that he would need to keep informed, from primary sources, of advancements in his field. As long as this situation exists, the abstracting journal, as an assimilator of foreign scientific literature, will remain invaluable.

References

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Primary Scientific Publication and the Federal Government

The nation's principal supporter of research has a major responsibility toward publication of results.

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Two basic facts underlie the federal government's extensive, long-time participation in the original dissemination in published form of research results, that is, in primary scientific publication. First, the government supports a vast amount of scientific experimentation both in its own laboratories and through contracts and grants in nongovernment organizations. That current federal funding of scientific research approaches two-thirds of total U.S. expenditures in this field has been noted and commented upon frequently (*1*). Sometimes forgotten, perhaps, is the fact that government support of scientific research has been substantial for a great many years. Such agencies as the Department of Agriculture through its Agricultural Research Service, the Bureau of Standards and the Weather Bureau of the Department of Commerce, the Bureau of Mines and the Geological Survey of the Department of the Interior, and others, long have played important roles in the nation's overall scientific research program. The second basic fact is simply that publication, in various forms, has for decades been the principal method by which the results of scientific research have been made widely available to the scientific community. Thus, it would have been almost impossible for the federal government to avoid becoming a major publisher and supporter of publication in science and technology, even if it had wanted to.

With the immense and extremely rapid expansion in recent years of federal conduct and support of scientific research, the government's overall role in primary scientific publication has become highly complex and has posed a variety of increasingly serious problems. My intent in this article is (i) to outline the various forms that federal participation in primary scientific publication now takes, and (ii) to mention several principal problem areas and comment briefly on certain remedial steps being taken or planned.

The Government as a Publisher

Federal participation in primary scientific publication is of two general kinds. Government agencies themselves are, in effect, both the originators and publishers of scientific monographs, journals, and other documents. Government agencies support, by one means or another, the initial publication of scientific information by privately owned media.

Government agencies publish a wide range of primary scientific documents in support of, and associated with, their respective missions. These are mostly printed by the Government Printing Office. Established in 1860 to correct inefficiencies in the then decentralized government printing procedure, GPO has grown into a $127 million annual operation (fiscal year 1962) and is one of the world's largest printing establishments. Its output of scientific and technical material includes books,

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