

**USING THE
CHEMICAL LITERATURE**
A Practical Guide

Henry M. Woodburn

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PREFACE

Years of personal literature searches, accompanied by supervision of the research of graduate students and the classroom instruction of undergraduates in the use of chemical literature, have proved to the author that some areas and forms of chemical literature present unique difficulties. He is also convinced that these problems are alleviated by a moderate amount of instruction coincident with or previous to the recognition of the difficulty. Since it is sometimes impossible or impractical to seek formal instruction, it is hoped that this guide will serve that purpose in an informal way.

The book has been made concise and direct in order to encourage its use. The periodicals and reference works discussed will be found in most good American libraries and are among those consulted by the majority of American chemists. No space is devoted to materials that present few problems in use and interpretation. The selection of literature to be discussed, was of course, a decision of the author's and may not satisfy all readers.

Obviously, the book is a practical guide and not a bibliography of sources. The rapid changes in chemical literature guarantee that such bibliographies will be out-of-date as soon as they are printed and they are valuable chiefly for the history they portray. The references appended to each chapter here are in support of statements in the text, but do not constitute a comprehensive bibliography. Rather they are given to permit the reader who is not satisfied by the discussion in the guide to consult original sources if he chooses.

In undertaking the preparation of the guide, the author has acceded to the urging of several members of the chemistry staff of

SUNY at Buffalo. In particular, he acknowledges the contributions of Mrs. Priscilla Clarke, who ferreted out several needed items of information and read and criticized parts of the manuscript: The assistance of many persons on the staff of the university libraries was invaluable, especially Miss Florence Gach, Mrs. Margaret Schenk, Mrs. Margaret Giles and Mr. William Henrich.

Outstanding cooperation was also displayed by individuals representing certain scientific societies and publishers, of which the following deserve thanks: The Gmelin Institut, National Academy of Sciences, Chemical Abstracts Service, Institute of Scientific Information, Sadtler Research Laboratories, Varian Associates, Springer-Verlag, Butterworth's, IFI/Plenum, and Derwent Publications.

To the extent possible, literature developments have been carried through 1973. Chapters are written from the point of view of the individual rather than that of an institutional literature-searching department, since the author believes that personal literature searching will be needed for a long time. Areas in which only a literature-searching department can be successful are clearly pointed out, but sufficient discussion of the developing science of information communication is included to precondition the individual for future developments in that field.

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CHAPTER 1
INTRODUCTION

Chemists today have the same needs for information that have been recognized for fifty years. They need to be able to find accurate physical data quickly (or to be assured that it does not exist). They need to be able to find out how a process works, whether an idea is really new, whether a concept is logical or fanciful. They need the means to keep up-to-date in their own field of interest. All of these needs are answered somewhere in the literature of chemistry.

There also is the fundamental information upon which to formulate answers to more recent questions about the mechanism of reactions, the correlation between structure and physical properties, between structure and physiological behavior, etc., etc.

But to extract this information is not an easy task. Some chemical literature is very old and was gathered together when printing space was abundant but organizing and indexing facilities were crude or nonexistent. It has required a hundred years to organize literature related to organic compounds (see Chapter 8) and 150 years to do the same for inorganic compounds (see Chapter 10). Much more of the literature, however, is relatively new and grows at an almost unbelievable rate (1). The net increase in journals considered important for monitoring by Chemical Abstracts Service has been 375 per year for the past decade. Printing 380,000 abstracts in 1972, the Service estimates that it will print 600,000 in 1980 (a cumulative total since 1907 of 7,000,000 abstracts).

Short of giving up in despair, what is the average chemist to do about it? Much space has been devoted to descriptions of developments in information processing. Phrases like "computer-readable tapes," "machine storage and retrieval of information," "information science" conjure up visions of consoles, buttons, and television screens that light up with structures, and properties, reactions, and bibliographies, and..... And, indeed, some of these dreams appear to be coming true (2). Currently the greatest barriers for the average chemist are cost and complexity. Technological advances in information processing have exceeded the chemist's ability to use them advantageously. There is no marked trend toward the use of terminals by individuals to question data bases directly. The information scientist continues to be a necessary middleman. As a result only an institution (academic or industrial) can allocate the funds needed, even for experimental programs. Perhaps one of the conclusions reached in an OECD report entitled "Information for a Changing Society" (3,4) reduces the situation to its proper dimensions:

"Existing information systems are at an experimental level of development and will remain so for many years."

So, for whatever the reason--lack of opportunity, lack of financial resources, lack of an appropriate data base--there are thousands of individuals who are and will continue to be personally involved in the use of chemical literature. But literature searching is a mentally exhausting occupation. It is also time-consuming, time that the student, the research assistant, the

working chemist, even the company executive, can ill afford to give up. Consequently, when the search must be made, it should be pursued as efficiently as possible.

Drawing on the experience of its author, this book concentrates on areas known to present problems in the location and interpretation of printed material. Where no problems exist, no space has been allotted for discussion. Thus, the reader will not find here chapters on Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry or the newer Comprehensive Inorganic Chemistry by Bailar and others. Missing also are discussions of Organic Syntheses, Weissberger's Techniques of Chemistry, Physical Chemistry—An Advanced Treatise by Eyring, Henderson, and Jost, and Treatise on Analytical Chemistry by Kolthoff and Elving.

In other words, this is not a bibliography of sources. Such bibliographies do exist in all branches of science (5, 6, 7, 8, 9) although most of them have not kept pace with the appearance of new works. In a few instances, reference is made to means for the discovery of critical source material, but in general, such materials will reveal themselves to one who follows the practices outlined in Chapters 2, 3, and 4.

The literature discussed here will be found in most good American libraries. Some of it is written in a foreign language, which may be a hindrance, but not an insurmountable one (10, 11). This is an aspect of literature searching from which there is no escape. It is hoped, however, that this book will make even those portions of chemical literature clearer and more understandable.

REFERENCES

1. D.B. Baker "World's Chemical Literature Continues to Expand," C & E News, July 12, 1971, p. 37.
2. B.E. Holm, et al, "The Status of Chemical Information," J. Chem. Doc., 13 (4), 171 (1973).
3. E.L. Brady and L.M. Branscomb, "Information for a Changing Society," Science, 175, 961 (1972).
4. Organization for Economic Cooperation and Development, Information for a Changing Society, Paris, France, 1971. Available from OECD Publication Center, 1750 Pennsylvania Ave., Washington, D.C.
5. M.G. Mellon, Chemical Publications—Their Nature and Use, 4th Ed., McGraw-Hill Book Co., New York, N.Y., 1965.
6. J.E.H. Hancock, An Introduction to the Literature of Organic Chemistry, Parts I, II, III, J. Chem. Educ., 45, 193, 260, 336 (1968).
7. H.M. Woodburn, Retrieval and Use of the Literature of Inorganic Chemistry, J. Chem. Educ., 49, 689 (1972).
8. W. Dannhauser, Bibliography for Thermodynamics, J. Chem. Educ., 50, 493 (1973).
9. A.J. Walford (ed.), Guide to Reference Material, Volume 1, Science and Technology, The Library Association, London, 1973.
10. E.E. Reid, Chemistry Through the Language Barrier (with emphasis on Russian and Japanese), Johns Hopkins Press, Baltimore, Md., 1970.

11. Z. Sobecka, W. Choinski, and P. Majorek, Dictionary of Chemical Technology in Six Languages, Pergamon Press, New York, 1966.

CHAPTER 2

LIBRARY CLASSIFICATION SYSTEMS

- I. General**
- II. Library of Congress Classification System**
- III. Dewey Decimal Classification System**

Since he will spend considerable time there, the chemist who needs to use a library should do two things. First, he should establish a good relationship with the science reference librarians. These are almost always highly trained persons, very knowledgeable in the area of information sources, and anxious to assist any serious questioner. Secondly, the chemist should learn something about the organization of material in the library he will use most often.

I. GENERAL

In the organization of a library there are two very important processes: (1) production of a card catalog and (2) arrangement of the books on the shelves.

The card catalog is prepared by the use of "subject headings." This allows a subject approach to the material held by the library. However, there are certain shortcomings in searching for information by way of the card catalog alone:

- (1) While theoretically a book could receive as many subject headings as there are subjects in the book, librarians seldom use more than two or three, in order to keep the catalog from becoming unacceptably large. Search of the catalog using narrowly defined terms may, therefore, not be productive.
- (2) In a card catalog, topics that are closely related to each other chemically, may be widely dispersed