

MAKING BIBLIOGRAPHIES MORE USEFUL.

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During the course of each year there are published a large number of bibliographies as a part of journal articles, public documents, sections or chapters of books, and similar publications. An examination of these bibliographies reveals a wide variation in their usefulness due to the kind of data included or to the arrangement used, or to both. An outstanding example of a poor publication of this type may be found in a bibliography of over 400 pages, including hundreds of entries, published by one of our national societies. Because of the manner of its compilation, very much of the possible usefulness of this collection of facts is practically lost, although much time and considerable expense was required for making it.

Since individuals writing articles or books, or directing the preparation of theses, can greatly increase the value of many of the accompanying bibliographies by devoting a little more attention to such compilations, it seems desirable to consider briefly some of the bibliographic forms, together with the information that may be included in them, with the ultimate intention of advocating the compilation of bibliographical facts in a manner suitable for their most efficient use.

For the purpose of the present discussion a bibliography may be defined as a list of references relating to a given subject or to the works of a given author. In a chemical bibliography these references relate to any or all of the following sources of information: periodicals, public documents, patents, dissertations, manufacturer's technical bulletins, and books of various kinds.

Information Included. In the usual bibliography part or all of the following information is given for each entry: author's name; title of publication; some statement, in addition to the title, indicating the exact location in the publication of the material cited—the latter includes for a book the volume, page, and year (or number of the edition); for a patent, the name of the country issuing the patent, the number, and the date; for a public document, the name of the division issuing the document, together with proper designation, number and date; and for a journal article, the title of the article, series, volume, page, and year—and an annotation indicating the nature of the material to be found in the source to which reference is made. If the bibliography is a separate publication, preferably all of the above information should be included. If it is a part of a book, often the author's name, together with some statement regarding the contents, occurs in the body of the discussion. Annotations are the exception except in separately published bibliog-

raphies. Regardless of the part of the above data included for a given entry, whatever is given is usually spoken of as a reference.

Whatever data is given for the reference or citation, it should indicate unmistakably the essential points of those mentioned above, such as volumes and pages; but, at the same time, it should be as brief as possible in the interest of efficiency in reading, proof reading, writing, and preventing error. Unfortunately, the literature of chemistry abounds in annoying examples of digression from this general principle. As instances of this kind, one needs mention only such things as the use of Roman numerals, the inclusion of the number of the issue for the ordinary chemical journal, the omission of the year, or more serious yet, the omission of the series. It is a matter not only of confusion in the older literature, but also of lack of uniformity in present practice. There are still many writers who disregard the excellent procedure followed by the editors of Chemical Abstracts. As an example of what is still happening in scientific publications two citations are quoted from a recent article,¹ calling attention to some desirable reforms. These two refer to the same article but appeared in different periodicals: (1) *Ann. Appl. Biol.*, (24 [1923], No. 2, pp. 151-193, pls. 3, figs. 31); and (2) *Ann. Appl. Biol.* 24: 151-193, 3 pl. 31 fig. 1923. The second contains 16 less characters but without sacrificing anything in essential information.

Arrangement. A bibliography is essentially only a list of references, with no specification regarding the arrangement of the separate entries in the list. Although a list not systematically arranged is to be preferred to none at all, the advantages resulting from the adoption of a definite order are well worth the extra time and effort required to put the references in this form. For most bibliographies one of the following schemes may be followed in listing references:

1. According to the order in which the references are mentioned in the text. Although this scheme is used in some important works of reference² and in many scientific papers, one must ordinarily read more or less of the accompanying discussion in order to obtain the significance of any given citation. Each entry generally includes the name of the author and data for locating the material to which reference is made.

2. Alphabetically according to the name or title of the publication containing the contribution. This is one of the least satisfactory schemes, but it may be used when the author's name is omitted.

3. Chronologically. This scheme may be desirable in some cases, especially if the time of publication of the contributions is an important point. It serves also to indicate the historical development of the subject. The various references occurring under the same year may be given a serial number.³ They may also be arranged alphabetically by authors under each year.⁴

4. Alphabetically by authors. This is the most used system, and,

¹ *Science*, 62, 419 (1925).

² Mellor—*Comprehensive Treatise on Inorganic and Theoretical Chemistry*. Abegg—*Handbuch der Anorganischen Chemie*.

³ Howe—*Smithsonian Pub. No. 1084—Metals of the Platinum Group*.

⁴ West—*Vitreous Enameling of Iron and Steel*.

in the opinion of the author, it is the best for most purposes. The following three variations in this kind of arrangement may be mentioned:

(a) A simple alphabetical list is made, with or without a serial number for each entry. This is satisfactory for short lists but not when the number of entries is large,⁵ since too much time is then required to ascertain whether a reference to some specific point is included.

(b) The arrangement is the same as in (a), including the serial number, but with the addition of a comprehensive subject index. The latter is prepared on the basis of the material contained in each entry and so arranged that the numbers under any given subject in the index indicate the serial numbers of the references in which this subject is treated.⁶

(c) The references are first classified, some procedure such as the following being used: according to the nature of the publication in which the references occur, as periodicals, public documents, patents, and books; according to some special view points of the author; or according to the natural subdivisions or particular phases of the subject with which they deal. They are then arranged alphabetically in each of these divisions. As in (a), they may or may not be numbered.

The following classification used by Schrero in his bibliography on water glass illustrates the advantage of this system:

Bibliography	Applications—(Cont.)
Patent literature	Glass and ceramics
History	Medicine and surgery
General	Paper
Properties	Structural materials
Manufacture	General and miscellaneous
Applications	Artificial stone
General and miscellaneous	Concrete
Agglutinants	Fireproofing-preservation of wood
General and miscellaneous	Paints and preservative coatings
Abrasives	Textiles
Cements	
Detergents	
Analysis	
Egg preservation	Analysis

For general, and more or less extensive, bibliographies the arrangements mentioned in 4b and 4c seem the most useful, particularly if annotations are included. In locating, for example, the references dealing with the corrosion of copper alloys in a general bibliography on corrosion, one would turn in the former case directly to the index and look for the words alloy and copper. In the latter case it would be necessary to locate the division dealing with copper alloys. Probably in most cases an individual using such a bibliography wants information only for special purposes and consequently is not interested in reading

⁵ Branner—A Bibliography on Clays and the Ceramic Arts.

⁶ Van Patten—Bibliography on Corrosion. West and Gilman—Organomagnesium Compounds in Synthetic Chemistry.

through even 50 articles to find that the valuable material is contained in some three or four which might have been immediately evident in a well arranged bibliography. If the list has no such arrangement, he must examine all references given in order to select the desired ones, or to assure himself that there are none of value included.