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A GUIDE TO
THE LITERATURE OF CHEMISTRY

OTHER WORKS OF AUSTIN M. PATTERSON

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A GUIDE TO THE LITERATURE OF CHEMISTRY

BY

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PREFACE

The literature of chemistry is like a great, inspiring mountain with a core of rich ore. It is inspiring because the work of great men, of many earnest investigators, is recorded there. To obtain anything like full profit in its use one must learn how to climb this mountain and must know where and how to dig for the ore he needs. With the help of the many successful chemists who have generously contributed the results of their experience, we have attempted in this book to point the way. Experience in editing *Chemical Abstracts* has aided us. The various sources of chemical information have been classified, discussed generally and described specifically and methods of use have been outlined. Certain types of information, as the List of Periodicals and the Select List of Chemical Books, have been put in appendixes in a form which it is hoped will serve for convenient reference.

It has been our thought that the information on chemical literature, as here assembled and arranged, should be useful not alone to the student in college who is endeavoring to acquire proficiency in the chemical library as well as in the laboratory, but also to the chemist of wider experience. The literature has been produced for the service of others, for much greater use than it receives. Improved efficiency of an individual in making searches saves time, adds resource and makes for the bigger kind of progress which results from scientific advances, along with the personal gain made.

The literature of chemistry is international. It has been treated so. In certain spots, however, as in the libraries described, it has seemed unavoidable and not altogether unfitting that the book should have an American leaning.

The reader is asked to excuse the rather frequent reference to *Chemical Abstracts*. From its nature it is the American publication most intimately associated with chemical literature searches and the one best known to us and probably also to most of those who may use this book; it has therefore been easiest and perhaps most effective to draw on it now and then for examples to illustrate points discussed.

Corrections, suggestions and additions will be welcomed.

PREFACE

We gratefully acknowledge the interest, the encouragement and the very considerable material assistance given by the many chemists, librarians, editors and others who have responded so generously to our numerous requests for help. We are especially indebted to Julian F. Smith, technical librarian, for a large amount of information; to Clarence J. West, director of the Research Information Service of the National Research Council, for reading the manuscript and for assisting in other ways; to Earl T. Ragan, chemical patent expert, for advice and information regarding chemical patent literature; to Melvil Dewey, author of the Dewey Decimal System, for reading the chapter on Libraries; to D. D. Berolzheimer, chemical literature expert, for advice with reference to libraries and general searching procedure; to Charles Wells Reeder for compiling the Bibliography of Lists of Periodicals; to Ellwood H. McClelland, technical librarian, for his contribution on trade literature; and to Edgar J. Witzemann for many helpful comments.

A list of individuals who assisted in the preparation of the Select List of Chemical Books is given on pages 348-51. Among those who helped in other ways are: Jerome Alexander, Launcelot W. Andrews, W. L. Badger, F. E. Barrows, Edward Bartow, Frederick S. Beattie, Arthur R. Cade, George L. Clark, Carleton E. Curran, C. C. Davis, D. J. Demorest, Louis Derr,[1] W. O. Emery, Paul Escher, A. C. Fieldner, Colin G. Fink, Chas. N. Frey, Miss Helen Game, Miss Elsie L. Garvin, William T. Hall, Michael Heidelberger, Joseph S. Hepburn, Elmer Hockett, Paul E. Howe, Miss Ethel Hubbard, Stewart J. Lloyd, Mrs. Nellie G. Mahaffey, C. E. Munroe, W. Albert Noyes, Jr., L. A. Olney, A. Papineau-Couture, E. Emmet Reid, F. M. Rogers, Chas. A. Rouiller, A. H. Sabin, H. G. Schurecht, Atherton Seidell, Miss Marion E. Sparks, S. Tashiro, Nathan Van Patten, Sigmund Waldbott, Miss Ruby K. Worner, Gerald L. Wendt, Edgar T. Wherry, J. L. Wiley, Robert S. Williams, J. C. Witt, F. W. Zerban and Fred C. Zeisberg.

E. J. CRANE
AUSTIN M. PATTERSON

March 12, 1927

[1] Deceased

CONTENTS

CHAPTER I

THE PROBLEM AND OBJECTIVES

Introductory, 1. Purpose of searches, 2. Obstacles, 4. Direct communication, 8. Kinds of searches, 9. Plan of this book, 10.

CHAPTER II

BOOKS

The uses of chemical books, 12. Encyclopedic works, 13. Handbooks, 15. Formula lexicons, 20. General books (including textbooks), 21. Monographs, 22. Dictionaries and glossaries, 23. Books of constants, 23. Pocket-books, 24. Publishers' series, 25. Sources of information, 28. Choosing and ordering books, 30.

CHAPTER III

PERIODICALS

Their use, 32. History and classification, 36. Classified list, with descriptions, of current journals of greatest chemical interest, 46. Abstract journals (general), 76. Descriptions of individual abstract journals, 81. Obtaining papers and periodicals, 100.

CHAPTER IV

PATENTS

Introductory, 103. Nature and scope of the patent literature, 103. The sources of patent information, 107. Original specifications, 107. Official patent publications, 111. Journals containing patent abstracts, 115. Patent digests and lists, 119. Publications on patent law and practice, 121. Scientific library of the United States Patent Office, 122. Procedure, 122. How to obtain patents, 126.

CONTENTS

CHAPTER V

Other Sources

Bulletins, 128. Theses, 133. Reviews, 134. Annuals and yearbooks, 134. Addresses and lectures, 137. Bibliographies, 138. Trade literature, 140. Reprints and preprints, 143. Personal correspondence, 144. Information service, 144. Unpublished material, 146. Museum collections, 147. Committee work, 147. Personal contact, 148. Portraits, 149.

CHAPTER VI

Indexes

Introductory, 150. Kinds, 150. General characteristics, 151. General hints for use, 152. Author indexes, 154. Subject indexes, 162. Formula indexes, 188. Ring formula indexes, 192. Patent-number indexes, 193. Card indexes, 193. Existing indexes, 194. Independent indexes, 198.

CHAPTER VII

Libraries

Introductory, 203. Catalogs and classification, 203. Consulting service, 206. Lending service, 208. Special services: photoprints, translating, etc., 208. Special libraries, 210. Some European libraries, 210.

CHAPTER VIII

Procedure

Introductory, 212. Preliminary work, 213. Systematic examination of the literature, 214. The written record or report, 218. Preparation of bibliographies, 220. Experiences of other chemists, 221. Securing books, journals, bulletins, etc., 230. Filing chemical literature, 230 Foreign languages, 231 Notes by E. J. Witzemann, 234. Chronological table of abstracts and reports, 236.

APPENDIXES

		Page
1.	Bibliography of Articles on Chemical Literature	239
2.	Symbols and Abbreviations Used in Chemical Literature	245
3.	A List of American Libraries of Interest to Chemists	259
4.	A Bibliography of Lists of Periodicals	267
5.	Scientific and Technical Organizations	273
6.	Periodicals of Chemical Interest	279
7.	A List of Chemical Book Dealers and Publishers	343
8.	A Select List of Chemical Books	346

CHAPTER I

THE PROBLEM AND OBJECTIVES

Of the limited amount of information which the human mind is capable of storing away for use whenever needed it is preëminently desirable that a part consist of a thorough knowledge of how to obtain such recorded information as may be required from time to time. There is a growing realization of the importance of acquiring skill in searching the literature. A worker can now know intimately only a small part of even his own branch of chemistry. And the greatest genius cannot afford to neglect to take advantage of all that is already known in his field. Acquaintance with the sources of information, intimate in the case of the publications of greatest interest and value to an individual, and a good knowledge of methods of searching are pleasant and invaluable attainments. Skill in the library has not had as much emphasis as skill in the laboratory and its acquisition is less of a task, but it is just as worthy of effort.

In discussing "What Employers of Chemists Want" F. C. Whitmore[1] says: "Most employers of chemists say that most of their men do not know how to use the library. Obviously, the chemist seeking information should get it from the library if it is there rather than by using up valuable materials and more valuable time in the laboratory to find it out." Furthermore it is humiliating to publish something and then have someone step forward and point out that the work has been done previously.

To the student of human development the scientist is an astounding individual because of his zest for the seeking out of truths and his willingness to accept what seems proved by test, and that only, with a minimum of bias. In this respect he has stepped out ahead

[1] *Ind. Eng. Chem.*, News Ed. **5**, No. 3, p. 4(1927).

of the average individual, who still clings much more tenaciously to his inherited animal, savage and child mind characteristics, which make him opinionated without reason or test. As James Harvey Robinson[2] has pointed out, with most individuals "ideas like kisses go by favor." To them the acceptance of an idea depends not so much on truth as on its appeal. It is different with the scientist, who, to quote Robinson again, belongs to "the noble band of wonderers," the "pointers-out," in which are also the poet, the philosopher, the artist and the religious genius, "all rare variants of the human race." It is to this zest of the scientist to be on the search for new facts, his impatience to get into the laboratory and discover something new, that his tendency to neglect the literature is in large part to be attributed. Some scientists think that they are freed by the very nature of their work from a supposed taint of bookishness. There has been in some instances a kind of prejudice felt by research workers against the literature workers of their sciences somewhat like that of manufacturers against merchants.[3] Both classes of producers are fast losing this prejudice.

PURPOSE OF SEARCHES

A good knowledge of the literature and of how to use it is worth while for many reasons. In the first place the literature is produced for the **service of others.** It is produced for greater use than it receives. Human progress is made by coöperation. This is a scientific and industrial age. The great factor for progress in science and industry is research. Coöperation in research is effected chiefly by means of the literature, particularly the journal literature. The notably fine spirit of coöperation and service among scientists, and increasingly among men of industry, which prompts the publication, for the benefit of all, of the results and conclusions from their experiments and experiences, is worthy of emulation in the use that is made of this literature. Mankind in general falls far short of commanding the accumulated information and experience of the world, let alone the question of its application. History repeats itself continually and tragically. The situation is much better in science, and perhaps best of all in

[2] "The Humanizing of Knowledge," George H. Doran Co., New York (1923).

[3] Ostwald, Wilhelm: "Die chemische Literatur und die Organisation der Wissenschaft," Akad. Verlagsgesellschaft, Leipzig (1919), p. 1.

chemistry, and yet it is worth while to think over our shortcomings in this respect in terms of human progress.

From another point of view, only slightly different, namely, that of the **advancement of science,** which is more definitely the purpose in the minds of most workers in the scientific field, it is to be noted that a fuller realization is desirable of the fact that there is a direct relation between the efficiency of our information service and the rate of progress of scientific knowledge. The lack of a supply of information as complete as the records will provide is bound to result in (1) the use of inferior apparatus and experimental methods, (2) poorly planned investigations and (3) useless duplication. On the other hand, the greater the time required to get needed information or to learn that it is not to be found in the literature the less is the time available for productive work. Difficulty in obtaining adequate information may cause a busy man to become discouraged as far as research work is concerned, and may even result in inactivity in this respect. The literature is really the very foundation of every scientific inquiry of importance.

The scientific attitude and the scientist's zest for truth are arguments in themselves for thorough literature searches. All of the truth is the ultimate objective and it is only to be approached by a proper correlation of all that is known on a subject.

From a more **individualistic viewpoint** efficiency in literature searching has an importance which it is appropriate to emphasize. Such efficiency not only saves time and discouragement in the library and time and effort in the laboratory through the prevention of unnecessary work but it also sets the stage for the gaining of a more subtle advantage. The literature is not solely a storehouse of facts. It is a source of inspiration if it is gone at in the friendly and appreciative spirit which real acquaintance brings into existence. It supplies new ideas, new viewpoints and a broader vision. The literature of science as a whole merits the friendly attitude. Most of it is the product of earnest research men. Great men have usually found time to write. Familiarity with the literature of one's subject, particularly the older literature, is the only possible way of acquiring the proper historical perspective.

The **historic sense** is too often lacking. A sense of the historic setting of one's work cannot help but make it more interesting. The historic sense humanizes science. It creates a humbler and

yet a happier attitude for it makes one understand better and realize more fully the part which he is playing in a drama which is greater than had been realized. It is a good corrective of any tendency to a slavish or blind adoration of present theories which may have grown up within us. William Warner Bishop[4] has expressed the belief that "without a sense of the historic setting of his work, a man is almost as hopeless as is the man who lacks a sense of humor!" And further he affirms that "only by a combination of the historical and the experimental methods can any work of first-rate importance be produced in any field of knowledge."

While the spirit of research, the very basis of progress, ought never to be discouraged, we sometimes think that there is not so much need of hurry about the making of more experiments as there is of a fuller understanding of the meaning and significance of the data already accumulated. We fall far short of a full assimilation and interpretation of the results now spread on the records. This is largely a matter of capacity but not wholly. There is need for more great minds to be devoted to the correlation, interpretation and application of recorded facts. The literature would be for the most part their laboratory. Production has run ahead of use. Better utilization of present data would economize future work.

OBSTACLES

Aside from the question of personal skill in making searches of the literature there are several obstacles which stand in the way of the greatest efficiency. In the first place the **state of the literature** is none too good. A satisfactory information service in any branch of science, one which should enable the individual to obtain all the available information needed with a minimum of expenditure of time and effort, and one which should make it possible for him to keep in touch in a general way with the advances in his field, includes (1) journals devoted to full papers, (2) a complete abstract journal which is scientifically indexed, (3) periodic surveys of a more or less critical nature, such as some of the annual reports issued, and (4) handbooks and tables. The patent literature may be classed with journals publishing original papers and the abstract journal must cover it to be complete. There is, of course, a service to be rendered by general books, including textbooks, but these are not essential in a literature search if all of the other types

[4] *Science* **56**, 206(1922).

of publications just outlined are available. Bibliographies are often very helpful but a properly indexed, complete abstract journal should serve the same purpose. In the words of Dr. Gordon S. Fulcher, who has made a study of the subject for the U. S. National Research Council, such an array of publications would "present the new material of each science in the following various forms: (1) with all detail, (2) abstracted, (3) fully indexed, (4) critically reviewed, (5) summarized in convenient form for reference purposes." Chemistry is better equipped than any other science with facilities of this sort but there are omissions and faults, as will be pointed out later.

Language limitations present a big obstacle. One is likely to think first of the difficulty presented by the fact that in different parts of the world languages differ so that translating is necessary in the general use of the scientific literature of the world. A reading knowledge of French and German in addition to English is absolutely essential in chemical literature searching and there are important chemical journals published only in Italian, Dutch, Russian and Japanese as well as periodicals which are perhaps only of slightly less chemical importance printed in the countries using the Spanish language, in the Scandinavian countries and in the Balkan States (see pp. 46–76).

A pretty definite idea of the **productivity of the various countries** active chemically can be obtained from an examination of the table (page 6), which gives figures based on *Chemical Abstracts*, a journal which covers the current chemical literature with a close approach to completeness. These figures were originally compiled to show the effect of the World War on the chemical activity in the various countries. It is interesting to note the rapid development in the United States.

The foreign language difficulty is not the only language obstacle in the dissemination of knowledge. We are limited in our ability to express ideas with any language. Some scientists, even though careful in the laboratory, are careless in the choice of words or in their phraseology when making reports. Ambiguity is often a characteristic of "scientific" statements. Ignorance of correct meanings sometimes enters into the case. Even though a writer may be a very careful one the language which he uses will have limitations of expression. Furthermore words change in meaning with time and sometimes with place. Occasionally, as in patents,

Countries	Number of Abstracts				Per cent of Total			
	1913	1917	1918	1923	1913	1917	1918	1923
United States	3940	4602	4136	6014	21.1	43.9	45.4	32.1
British Empire	2741	1560	1531	2890†	14.7	14.9	16.8	15.4
France	2481	794	841	2214	13.3	7.6	9.2	11.3
Germany	6539	2065	1258	5064	34.9	19.7	13.8	27.0
Austria	539	112	95	151	2.9	1.1	1.0	0.8
Italy	905	305	286	499	4.9	2.9	3.1	2.7
Russia	474	264	67	234‡	2.5	2.5	0.7	1.2
Holland	328	276	326	421	1.8	2.6	3.6	2.2
Norway	15	19	22	33	0.08	0.18	0.24	0.18
Sweden	110	64	36	136	0.58	0.62	0.40	0.73
Switzerland	226	114	129	199	1.21	1.08	1.42	1.06
Belgium	185	7	2	175	0.99	0.06	0.02	0.93
Japan	71*	166	254	412	0.38	1.58	2.78	2.19
Spain	34	26	17	72	0.18	0.24	0.19	0.38
Denmark	41	20	17	8§	0.21	0.19	0.19	0.04
Argentina	Not counted	Not counted	49	26			0.54	0.14
Czechoslovakia	Not counted	Not counted	Not counted	74				0.39
Poland	Not counted	Not counted	Not counted	37				0.20
Rumania	Not counted	Not counted	Not counted	17				0.09
China	Not counted	Not counted	Not counted	16				0.09
Other countries	52	89	42	44	0.27	0.84	0.46	0.23
Total	18,681	10,483	9,108	18,736				

self-interest may affect truthfulness of expression. If a translation is involved there are at least four chances for the final user of a bit of chemical information to get the wrong meaning. (1) The original writer may not have expressed himself properly; (2) the translator may have made a mistake, at least as regards some finer shade

* The Japanese chemical literature was not covered completely previous to 1918.

† Of these 220 appeared in Canadian, 120 in Australian, 91 in Indian and 74 in South African publications.

‡ Considerable catching up on Russian journals not previously obtainable occurred in 1923.

§ When the 1913, 1917 and 1918 figures were compiled the addresses of authors were given in abstracts. These addresses have been omitted since 1921. In preparing the 1923 figures it was not possible, on this account, properly to credit a number of papers published by Danish chemists outside of Denmark.

of meaning; (3) the translator in writing down his translation may have expressed himself poorly; and (4) the final user may misinterpret some word or sentence in the translation. The intricacies of chemical nomenclature present a big opportunity for inexactness in chemical papers. Chemical nomenclature is discussed in connection with the treatment of indexes (pp. 176–84).

The great **abundance of recorded information** makes chemical literature searches difficult. Modern chemistry is only a little over a century old but its literature is truly voluminous. And it is growing at an accelerated rate. One reason for the great magnitude of the literature of chemistry is the fact that there are many active chemists. The American Chemical Society, for example, is the largest scientific society in the world. It has about 14,000 members. But a reason which is perhaps still more influential (in a sense only a different point of view) is the broad scope of chemistry. Chemistry is a fundamental science; it plays a part in many other branches of science and is a factor in many industries. In recent years the work of the physicist, involving as it does so frequently such subjects as atomic structure, radioactivity, gaseous ionization, crystal structure, spectroscopy and electron theory, has more often than not been of distinct chemical interest. Much of the literature of biology, medicine, engineering, agriculture and the like is of a chemical nature. Such important industries as those dealing with the production or treatment of metals, foods, fertilizers, fermentation products, pharmaceutical preparations, ceramic ware, refractories, cement, gas and other coal products, petroleum, paper, explosives, dyes, paints and varnishes, fats and oils, soaps, sugar, starch, leather and rubber, as well as the many inorganic and organic chemicals, have their trade journals and other literature of real chemical value. Many municipal problems, such as water and sewage treatment, are chemical problems and there are numerous publications for this field. The number of periodicals which a present-day chemical abstract journal must cover systematically to be complete runs over 1200. The number of abstracts published by *Chemical Abstracts* in 1926 totaled 29,202. When one considers these facts it is difficult to avoid a "swamped" feeling unless he knows pretty thoroughly how to select and to use the parts of the literature which may be needed.

Distribution of the literature is a great problem. The world is large. Books and journals cost considerable sums and require

shelf space. No individual can have more than a small part in his own collection. Public, institutional and corporation libraries must be depended upon very largely. The chemist is fortunate who happens to be located near a large scientific library. The photoprint service which many libraries now maintain is a great help to the chemist located at a distance. Much more will be said on the subject of distribution later. Better facilities for connecting the producer and consumer is one of the great needs of science.

The heterogeneous character of the literature, too, has its influence on the efficiency of searches. An outline of the different **kinds** of printed sources might be considered to include:

(*a*) Original articles
(*b*) Patents
(*c*) Abstracts
(*d*) Treatises
(*e*) Bibliographies
(*f*) Reviews
(*g*) Indexes
(*h*) Dictionaries
(*i*) Tables
(*j*) Trade catalogs and advertisements

These may be issued in various forms—as books, journals, pamphlets or cards (for card indexes). Some may be published in large numbers and be widely distributed and others, as dissertations, may be very much limited in number of copies and in places where they are to be found. Each kind will be discussed separately in succeeding chapters.

DIRECT COMMUNICATION

While the published record is of necessity by far the most prolific source of information, this general preliminary discussion would be incomplete if mention were not made of the advisability and utility of direct communication with other workers, either by correspondence or by conversation, as a means of obtaining information which is fittingly employed under some circumstances. This was the only way in the early days but obviously it is not practicable now beyond a very limited extent. It is justified in special circumstances. The busy worker ought, of course, never to be called on for information to such an extent as to have it become a bother. When the occasion is proper the method of direct communication is likely to be most effective. To discuss a subject with a specialist thereon for an hour or so may be worth as much as reading about the subject for several days. Such a discussion is likely to be of mutual advantage to those concerned. This constitutes one of

the great advantages of attending scientific meetings. There is time for such discussions then. Up-to-date concerns do not hesitate to send their technical men halfway across the country to meetings, because of a recognition of the value of such opportunities. The more formal discussion, during meetings, of papers read is an analogous method of benefit to all assembled.

The conversational method may be in large part an indirect way of consulting the literature. Some, either consciously or unconsciously, make it a practice to "milk" the fellow who reads a lot. Sometimes friends develop the practice of noting down during their reading points which they think will be of interest to each other. This plan is particularly effective in the haphazard method of studying the old literature. It is a valuable method of handling the literature in a casual way and is productive of material for interesting chemical conversation which is likely to lead to new ideas.

There are certain types of information obtainable only by the direct communication method. Familiarity with the agencies for such purposes, as the Research Information Service of the National Research Council (see p. 144), is a desirable part of one's equipment in the same sense, if not degree, as is familiarity with the great literature sources of information.

Lectures, exhibitions, moving pictures and the radio serve also in the dissemination of chemical information, particularly to the general public.

KINDS OF SEARCHES

The reasons which prompt chemical literature searches are many. Needs and points of view may differ greatly. A search may have as its object the location of some single bit of information, as the boiling point of benzene, or it may be an extensive state-of-the-art search on a more or less general subject. Searches by the research chemist, by the student, by the writer, by the bibliographer, by the manufacturer and by the patent investigator are likely to differ considerably. In a chemical works in addition to the requirements of the research department for information regarding the properties of substances, laboratory methods and plant processes, specifications for and uses of products, and economic data, the chemist may be called upon for a variety of information

by the patent department, the legal department, the sales and advertising department, the auditing department, the traffic department, the purchasing department or the plant or company executives. It is obvious that no hard and fast rule of procedure in making searches can be laid down. This subject is taken up more fully in the chapter on Procedure (pp. 212–14).

PLAN OF THIS BOOK

The three important points of view in considering the literature of chemistry are those of (1) **production,** (2) **distribution and** (3) **use.** Production and distribution will receive a good deal of consideration in the following pages but this will be mostly because the information supplied has a bearing on our knowledge of how to use the literature. Use will receive the main emphasis, and method (how to look things up) as compared with the description of sources (where to look) will be the phase of use most emphasized. Sources will not be neglected, however. Production is better organized than distribution and use is less systematized than either. As individuals we cannot do much to influence efficiency in production, excepting that when we have obtained new information by experiment or experience ourselves we can as a rule (1) make an effort to publish it, (2) try to avoid publication in an obscure place and (3) endeavor to be clear and scientifically accurate in our exposition. Neither can we influence distribution efficiency in any large way, though obviously we can select judiciously the limited number of books and journals for our private libraries. Use, however, is a matter of personal knowledge, and skill and efficiency in it, so often lacking and yet so important, are wholly within our control. Training in this respect has not always been considered necessary. There is much indeed that can be taken for granted as having been acquired without special thought of application to this general subject of literature searching. There is real danger, however, of going too far in one's assumptions in this respect. For example, many believe that almost anyone can use an index efficiently without any particular knowledge of indexes or of their use. No one can, not efficiently. Sometimes the obvious needs emphasis and at other times that which appears obvious is neglected whereas a careful examination would have shown that there is more to it than expected. By an analysis of the various kinds of sources of chemical information, by the em-

phasis of methods of searching, by the description of the important books, journals and other publications, by a discussion of indexes and libraries, and by the supplying of data (see Appendixes) calculated to furnish answers to the many little questions which arise in literature searches the authors hope to be able not only to help in individual searches but also to create a greater appreciation of chemical literature searching as an art and to help in the mastering of it. Practice and experience will be necessary.

CHAPTER II

BOOKS

THE USES OF CHEMICAL BOOKS

Ultimately the chemist depends on the original published sources for his information, and to these he will wish to go back in every search that is of any magnitude. Usually the source is a journal article or a patent, or it may be a thesis, bulletin or some other form of separate publication. It may be a book. Occasionally an author publishes important new contributions either of theory or fact in book form, though the practice is now uncommon.

Quite aside from this possibility, however, chemical books have most important uses. They introduce the novice to the general field of the science or of some part of it; explain new theories in the light of already known facts; and help to coordinate and systematize knowledge. They furnish information, exhaustive or not, in a form adapted to quick reference, and guide the searcher back to the original sources by means of citations. Historical works record the development of the science, popular books initiate the public into its mysteries and elicit interest and support, and treatises on the chemical arts give the reader the benefit of long experience or of the combined researches of many workers. Who shall say that the chemist can depend on journals alone? The mere fact that over a thousand new books of chemical interest are published annually proves the demand for them.

In this chapter special emphasis is placed on the books that serve as **guides to the original articles** and thus immensely facilitate literature searches. Many German books are noted for the exhaustiveness of their citations, and fortunately the general practice of giving such references seems to be on the increase. A reference book that does not cite its authorities fully should be regarded as incomplete, for it is often of great importance to verify or investigate more thoroughly a given piece of information.

Books offer convenient **starting points** in many literature searches. If the subject is new to the searcher he will naturally avail himself first of a general sketch of the topic if such exists, then go on to more detailed treatises and finally find his way into the journal literature. On the other hand, if he is looking for some very definite fact a book may give exactly what he wants and his search ends. The general advantages of books as starting points are convenience of reference and, in most cases, a more or less logical classification of the subject. Their disadvantage is that they are out of date by the time they are printed and hence they must be supplemented by the most recent journals. This is notably true for any subject which is undergoing a rapid development, as, for example, atomic structure.

In the following discussion we will consider, in order: encyclopedic works, handbooks of broad scope, formula lexicons, general books (including textbooks), monographs, dictionaries and glossaries, books of constants, pocketbooks and publishers' series; and will then take up the questions of obtaining information about new and old books and of securing the books themselves.

ENCYCLOPEDIC WORKS

During the course of the last century several encyclopedic treatises on chemistry have appeared, of which the ones most familiar to modern English-speaking chemists are known as "Thorpe" and "Watts" from the names of their editors.

Thorpe's Dictionary of Applied Chemistry (Longmans, 1921–27, 7 vols., $20 per vol.) is an indispensable standard reference work that has passed through several editions and is kept up to date well. It has many contributors of high repute. Although written from the industrial standpoint it has proved itself useful for general consultation. The entries, which are alphabetically arranged, vary in length from a few lines to scores of pages. There is a fairly good system of cross references but the contents of "Thorpe" will no doubt be rendered much more available by the general index which in this latest (6th) edition accompanies the work for the first time. In previous editions it was no easy matter to find quickly some particular topic in one of the long articles. Thorpe includes numerous references to journal articles.

Watts' Dictionary of Chemistry, the first edition of which appeared in 1863, is the counterpart of Thorpe in the field of "pure"

chemistry. The latest edition was revised and rewritten by Morley and Muir (Longmans, 1888–94, 4 vols., $50). While it contains some long articles the entries are on the average briefer than those in Thorpe. Like Thorpe it has many eminent contributors and gives numerous references to the literature. The arrangement is rather complicated and there is no index. It has been a standard reference work but is now much in need of a general revision.

The work on industrial chemistry known as **Muspratt,** from the name of its original author (James Sheridan Muspratt), has had a curious history. Originally it was a two-volume book in English, which was published in 1854–62 and is now hopelessly antiquated, though it is still prized for the fine steel engravings of chemists which it contains. But there is a fourth edition in German entitled "Theoretische, praktische und analytische Chemie in Anwendung auf Künste und Gewerbe" (a close rendering of the original English title). It was edited by Stohmann and others and was published in 1888–1922 in twelve volumes, the last of which is a general index. Although the body of the work has the alphabetic arrangement, several supplements have been issued since on individual topics, in "Handbuch" fashion. A Spanish edition is also appearing under the title of "Gran enciclopedia de quimica industrial" (Barcelona, vol. 5 in 1925).

Ullmann's Enzyklopädie der technischen Chemie (Urban and Schwarzenberg, Berlin, 1914–23, 12 vols., $88) is apparently a worthy peer of Thorpe, and it has the advantage of a full subject index in each volume. It also has a large number of excellent illustrations and many bibliographies.

Fehling's Neues Handwörterbuch der Chemie (Vieweg und Sohn) is the successor to the "Handwörterbuch der reinen und angewandten Chemie" of Liebig, Poggendorff and Wöhler (1837), the second edition of which was edited by Fehling (9 vols., 1856–64). The "Neues Handwörterbuch" began to appear in 1871 and the first eight volumes (through U) were complete in 1913. Since that date parts of Volume 9 have been appearing. By the end of 1926 this last volume had been completed. The work is of high character but much of it is now, naturally, not up to date.

The **Dictionnaire de chimie pure et appliquée** of Adolphe **Wurtz** is a French Watts and Thorpe combined. It comprises five volumes and two supplements, making fourteen volumes in all. The second supplement appeared in parts during the period 1897–1908 so that

the articles in the last part of the alphabet are considerably more recent than those in the first. Volume 1 contains a preliminary discourse on the history of chemistry since Lavoisier. Its contributors include some of the foremost French chemists of its day. As time passes the work tends more and more to become of historical interest chiefly.

Frémy's Encyclopédie chimique is now old (it was issued in 1882–1887, with an index in 1899) but has some points of special interest. It comprises 10 "tomes" or 94 "volumes." It contains several hundred plates, some of which are colored, and thousands of other illustrations. Tome I includes photographs and plans of important chemical laboratories.

Ladenburg's Handwörterbuch der Chemie (13 vols., 1882–96) was well known in its day and is still valued. The book of the same title by **Erlenmeyer** should also be mentioned here. In English, **Ure's Dictionary of Chemistry** was equally prized. It was originally published in London on the basis of Nicholson's dictionary of 1808; the last edition was in four volumes in 1867–78. The older works of general reference, though superseded, retain a certain value as guides to the literature of yesterday.

Kingzett's Chemical Encyclopædia, as it is called in its third edition (Baillière, 1924, 30s.), is a one-volume "digest of chemistry and chemical industry," with alphabetical arrangement and very short articles. It was originally called "The Popular Chemical Dictionary."

HANDBOOKS

The handbook, or "Handbuch," is typically a German institution although a few similar works exist in other languages. It seems characteristic of the German intellect to project a comprehensive work on a given subject, map it out in a logical manner by volumes, parts and further subdivisions and then proceed to compile it in any manner that seems most convenient. Frequently the different topics are assigned to individual editors and the book is issued in parts as they are ready. This may result in what appears to be haphazard publication and become the despair of the librarian. Volume 1 may be revised before volume 5 is issued, or certain portions here and there may be wanting; at best the handbook is in an incomplete state for a period of greater or less length. Beside the annoyance which this causes, the work

considered as a whole becomes out of date before it is finished. The treatment of the subject in a handbook is usually very thorough, the object being to assemble all available information.

Other writers either content themselves with a work of less ambitious scope that can be brought out more promptly or else plan a series of monographs. The difficulty is perhaps mainly psychological. Handbooks are often in effect a system of monographs; the parts should be so regarded and their dates taken into consideration. The comprehensive viewpoint of the handbook and its logical arrangement constitute arguments in its favor.

For inorganic chemistry **Gmelin's Handbuch der anorganischen Chemie** has long held the leading position as an exhaustive source book. It is a lineal descendant of Leopold Gmelin's "Handbuch der theoretischen Chemie" (1817–19), the title of which really refers to "pure," as distinguished from applied, chemistry. Hence it has a history of over a century. In the sixth edition (1872) the editorship was taken over by Karl Kraut, whence the name "Gmelin-Kraut," which is applied to the sixth and seventh editions. The latter, a series of large volumes, is still in general use but is not quite complete (parts are still appearing). It is a noncritical but very exhaustive compilation, with full references to inorganic literature. In 1921 the Deutsche Chemische Gesellschaft arranged to take over the work and decided to restore the original author's name (simply "Gmelin"), as shown in the title above, for the eighth edition. This new edition has now begun to appear (Verlag Chemie, Leipzig-Berlin) under the editorship of R. J. Meyer. Twenty-two volumes of approximately 600 pages each are contemplated. The treatment is more critical than that of the preceding edition. The elements are arranged in 70 systems, the noble gases being 1, hydrogen 2, oxygen 3, nitrogen 4, etc., and each one will be treated in turn, together with compounds with elements of lower system number than the one under consideration. Thus, compounds of oxygen with hydrogen will be found under 3, of nitrogen with hydrogen and with oxygen under 4, and so on. No. 32 (Zinc) appeared in 1924, 33 (Cadmium) in 1925 and 1 (Noble Gases), 5 (Fluorine) and 13 (Boron) in 1926; 19 (Bismuth), early in 1927, and so on. A special price is made to members of the Gesellschaft. "Systems" may be bought separately but there is not a separate index for each one. An English translation of Gmelin's Handbuch, with

many additions, was edited by Henry Watts and appeared in 1848–72 in 19 volumes.

An English competitor of Gmelin's Handbuch has arisen in the form of J. W. **Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry** (Longmans, $20 per vol.), of which seven large volumes of about 1000 pages each (covering somewhat more than half the subject matter) appeared during the period 1922–26 and early 1927. It is exhaustive in treatment but differs from Gmelin in having a somewhat wider scope, as is implied in the title. It "aims at giving a complete description of all the compounds known in Inorganic Chemistry, and, where possible, these are discussed in the light of the so-called Physical Chemistry." For the present it has the advantage over the new Gmelin of being much nearer completion. Volume 1 treats of hydrogen and oxygen, volume 2 of the halogens and alkali metals, volume 3 of copper, silver and gold and the alkaline-earth metals, and so on, the arrangement being according to the periodic table in part only. Each volume has its own index.

Abegg and Auerbach's Handbuch der anorganischen Chemie (Hirzel, Leipzig, 1905— , 4 vols., subdivided) is a less exhaustive and less expensive work than Gmelin's Handbuch and contains relatively more discussion. It has been held in high esteem on account of this critical quality. "Abegg," to use the familiar name, is arranged according to the groups of the periodic table. It still is in an incomplete state. Some of the volumes now on the market are reprints.

Dammer's Handbuch der anorganischen Chemie (Enke, Stuttgart, 1892–1903, 4 vols. with supplement 1905) was issued as a counterpart to Beilstein's work on organic chemistry and attained an important place. It may be regarded as practically superseded by the later books mentioned above.

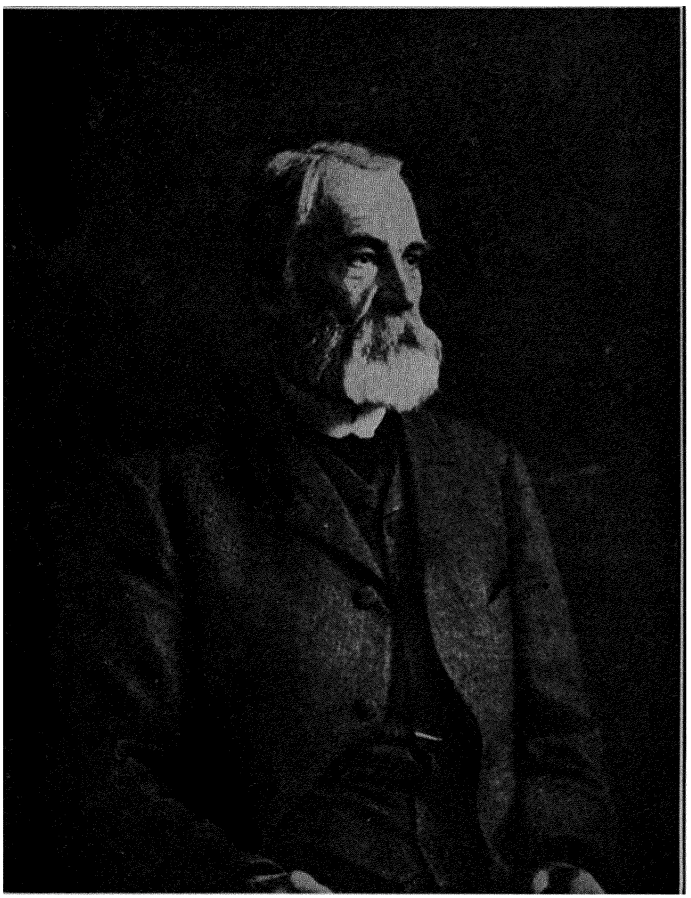
Occupying an intermediate place between the great treatises of Mellor and Gmelin and such smaller books as Roscoe and Schorlemmer is **Friend's Text-book of Inorganic Chemistry** (Griffin, 1919— , to be 10 vols.). Its selective nature enables it to be more readable than one could expect an exhaustive depository of information to be, yet it is full enough and gives sufficient selected citations to be a satisfactory reference work. It was largely completed in 1926 and volume 1 had reached a third edition. **Evans' Metals and Metallic Compounds** (Arnold, 1923, 4 vols., 71s.) is

similar in character although it covers a more restricted and somewhat different field.

The best known French treatise on inorganic chemistry is **Moissan's Traité de chimie minérale,** a set of five volumes issued in 1904–1906 with the help of several collaborators of repute. Copies are now becoming scarce.

In the organic field, **Beilstein's Handbuch der organischen Chemie** reigns supreme as the general reference book. One may well pause to pay tribute to the founder, Friedrich Konrad Beilstein, as a compiler possessed of monumental patience and industry. He was a Russian by birth and was a professor in the Technological Institute, St. Petersburg (Leningrad), but he studied in Germany and the handbook has always been in German. The first edition appeared in 1881–83 in two volumes and the second in 1886–90 in three; these were prepared without help. With one assistant he issued the third edition in 1892–99 but thereupon gave over the task of continuing his labors to the Deutsche Chemische Gesellschaft. The latter organization now conducts the editorial work at its headquarters at Hofmannhaus, Berlin, along with that on the Gmelin Handbuch and other enterprises. Beilstein lived just long enough to see the supplement to the third edition finished under the direction of Jacobson in 1906.

The latest completed edition of Beilstein is the *third* (Voss, Hamburg, 1893–1906), in four main volumes and four corresponding supplementary volumes, together with a fifth supplementary volume which is an index to the whole work and which also contains a treatise on the use of the Handbuch. The arrangement can best be learned by an examination of the tables of contents of the four volumes. In each class, for example that of aliphatic hydrocarbons which opens the first volume, compounds of the same general empirical formula are found together, C_nH_{2n+2} coming first, then C_nH_{2n}, etc. The supplemental volumes refer to the corresponding pages of the main volumes, and all the pages give the date to which they record the literature (this ranges from April, 1892 to July, 1903). The occurrence, formation, preparation and physical and chemical properties of the various compounds are noted, with journal references (for physiological properties Abderhalden's Biochemisches Handlexikon may be consulted; see p. 19). The third edition will continue to find use until the fourth one is completed (and perhaps later because of the references to it by Richter's Lexikon;



F. Beilstein.

see p. 20). Purchasers should distinguish between the original printing and the somewhat blurry but less expensive photographic reprint.

A *fourth* edition of Beilstein (Springer, Berlin, special price to members of the Deutsche Chemische Gesellschaft) edited by Prager and Jacobson (the latter is now deceased) began to appear in 1918. It is expected that when completed it will comprise 15 volumes or about 16,000 pages. Its arrangement is based on an elaborate classification of compounds by their structure.[1] By means of it the entire host of organic compounds is divided into 4877 "systems," which will be treated consecutively in the volumes as they appear. Each volume will have its own index in addition to the general index to the whole edition which will ultimately be published. The third edition covers the journal literature with moderate completeness down to 1899 or later, depending on the particular topic. The fourth edition will include in addition references to German patents and will bring the survey of the literature down to the end of 1909, that is, to the same date as edition three of Richter's Lexikon (see p. 20). To care for the literature later than 1909, supplementary volumes are already in preparation. "Beilstein" is invaluable to the organic chemist, its chief disadvantage being that it is, and will continue to be, several years behind the original records of research.

In biochemistry Emil **Abderhalden's Biochemisches Handlexikon** is a standard authority (Springer, Berlin, 1911–24, 12 vols.). It was issued as seven volumes in 1911–12, and additional volumes have been appearing as supplements from 1920 on. Being more recent than the third edition of Beilstein and being partly modeled on that work, it is valuable for organic as well as biological chemists. All compounds occurring in connection with living processes are classified according to their chemical structure, and physiological properties receive special consideration. References are very complete. Each volume has an index but there is no general index. The same author's **Handbuch der biologischen Arbeitsmethoden** (Urban and Schwarzenberg, Berlin, 1910—) is a collection of treatises by various authors on all manner of laboratory procedures in

[1] For a description of this system in English see *Chem. Met. Eng.* **22**, 256–258 (1921). F. Richter tells in *Z. angew. Chem.* **38**, 1096–7 (1925) how to use the new edition, and volume 1 of the work itself explains the principles of the classification.

biochemistry. It has been appearing in parts for some time and was still incomplete at the end of 1926.

Carl **Oppenheimer's Handbuch der Biochemie des Menschen und der Tiere** (Fischer, Jena, 1924—) is also standard. It is now passing through its second edition, of which there are to be nine volumes (in ten parts). It was about two-thirds completed at the end of 1926. Volume 1 treats of the chemical constituents of animal substance, volume 2 of the biochemistry of cells, volume 3 of antigens and antibodies, and so on. A general index is promised. Oppenheimer is a very complete reference work on its subject.

For information as to other handbooks, see the Select List of Chemical Books (Appendix 8).

FORMULA LEXICONS

Even with the simplified system of chemical nomenclature introduced by Guyton de Morveau and his associates there is still a great diversity of names for compounds, especially organic ones, and, moreover, names are often different in different languages. If a chemist wishes to get information about a certain compound from one of the great handbooks just described he must know the name that the book uses for it, and this constitutes a difficulty in consulting them. On the other hand chemical formulas correspond exactly to composition and are international. Hence there is a field for books which arrange chemical compounds according to their empirical formulas by a simple system, so that if the formula is known, the description of the compound can be turned to at once (see Chapter VI, pp. 188–92).

Max Moritz **Richter's Lexikon der Kohlenstoffverbindungen** performs this useful office for organic compounds. It appeared originally in 1884; the third edition is in four volumes and brings the literature down through 1909 (Leipzig, 1910–12, $54). It is a formula index to Beilstein and refers to the third edition of that work in its very brief entries, but it also includes some years of the later literature. The method of arrangement is explained in the preface in four languages. The fourth edition of Beilstein will be coextensive with Richter as to the period covered.

Richter's Lexikon has a supplement in Robert **Stelzner's Literatur-Register der organischen Chemie** (Verlag Chemie, Berlin). It consists of five volumes issued 1913–26 and covering the period 1910–21. The formulas are arranged in the same manner as in

Richter but the entries give considerably more data about the compounds and full references to the literature. It is one of the publications of the Deutsche Chemische Gesellschaft. "Stelzner" will not be continued in independent form but will be combined with the *Chemisches Zentralblatt* as a cumulative formula index to the latter.

The inorganic field is similarly covered by M. K. **Hoffmann's Lexikon der anorganischen Verbindungen** (1910–19, 3 vols. bound as 4). As explained in its introduction (volume 1, part I) the elements are numbered from 1 to 81 in the order: H, O, Cl, Br, I, F, S, Se, Te, N, P, C, Si, etc., the platinum group coming next to last and the argon group last. The formulas are so written that the element of *highest* number comes first, then the next highest, and so on. The lexicon contains references to the seventh edition of the Gmelin-Kraut Handbuch (see p. 16). There is a list of bibliographies at the end of volume 2. The book is published under the direction of the Verein Deutscher Chemiker, assisted by the Deutsche Chemische Gesellschaft. Although very useful it does not seem to hold quite the same place with inorganic chemists that Richter does with the organic specialists. Doubtless the reason is to be found in the difference between the two fields.

GENERAL BOOKS (INCLUDING TEXTBOOKS)

In addition to the giant handbooks there is a great host of books on chemistry in all its aspects and applications. Some are reference books on a smaller scale, some are textbooks, some are practical manuals; historical and popular works also belong to the number. The more important of those now in use will be found in the Select List of Chemical Books (Appendix 8). It will suffice here to mention a few books which have exercised a decided influence on chemistry in the past. Wilhelm Ostwald has treated these interestingly in his book, "Die Chemische Literatur und die Organisation der Wissenschaft," from which the following notes are taken:

Lavoisier's Traité élémentaire de chimie (1789) used the new nomenclature of Guyton de Morveau (which we have inherited), and thus helped to simplify chemical thinking. He made more definite the conception of a chemical element and gave a table of the elements, among which light and heat appear.

Berzelius' Lehrbuch der Chemie (first German edition, 1821) constituted the next great advance. It was based on the author's electrochemical theory and exerted a tremendous influence by its definite arrangement of the elements in an electrochemical series. In arrangement and manner of treatment the book was an improvement over any of its predecessors and justly became a classic.

Gerhardt's Précis de chimie organique (1844) did much to give organic chemistry permanent form; later progress has been a development of his system. **Kekulé's Lehrbuch der organischen Chemie** (begun in 1859, never completed) gave this branch of the science another great impetus by developing the modern structural theory.

To this list we might well add Lothar **Meyer's Moderne Theorien der Chemie,** which first appeared in 1864 and went through many editions and translations. It contributed greatly to the advance of theoretical chemistry.

MONOGRAPHS

The monograph is a rather full treatise on a special topic. Owing to its limited range it can give the detailed information that is demanded by the research worker and yet be of manageable size and be issued as a whole instead of in parts. As compared with the handbook, a series of monographs on a particular subject offers a more flexible framework. The continuity of the whole is not injured by the addition of new volumes or the revision of old ones to any extent desired. Such series appear to be growing in favor. As an example of a general series may be mentioned the American Chemical Society Monographs (Chemical Catalog Co.) of which 33 had been published by June, 1927 and a number of others were in preparation. One advantage of such an arrangement is that monographs which are not tempting to publishers because of their special nature may still be carried to success by the prestige of the organization and the maintenance of a high general standard of quality. An example of a series on a particular subject is the highly valued Monographs on Biochemistry edited by Plimmer and Hopkins (Longmans). For others see under Publishers' Series, pages 25–7. In the Select List of Chemical Books (Appendix 8) monographs are in general treated as separate volumes and classed under the appropriate subjects.

DICTIONARIES AND GLOSSARIES

When chemical dictionaries are spoken of, the thought of Watts, Thorpe and Wurtz springs to mind; but these, as we have seen, are encyclopedic in scope. There has been in modern times no adequate general dictionary or *wordbook* of chemistry analogous, for instance, to the medical dictionaries of Dorland, Gould and others—a book which gives the meanings of the large and increasing number of technical words. An excellent beginning has, however, been made in recent years by such books as the "Chemical Age" Chemical Dictionary and by such dictionaries of substances as The Condensed Chemical Dictionary and Gardner's Chemical Synonyms and Trade Terms, from which it seems likely that chemistry will be well served in the future in this direction. (For data about individual books see Select List 2A, Appendix 8.)

Information about dictionaries for use in translating will be found in Select List 2M, Appendix 8. For dictionaries of solubilities see page 24.

BOOKS OF CONSTANTS

Chemical workers constantly have occasion to use the numerical data which have been obtained in the investigations by their fellow scientists relative to the chemical and physical properties of substances. Such data are to be found in many places but books have been compiled in which they are the main feature. Until recently the compilation of most importance for chemists the world over has been **Landolt and Börnstein's Physikalisch-chemische Tabellen,** now in its fifth edition (Springer, Berlin, 1923, 2 vols., $45). The chief drawback to this work is that data have been admitted without sufficient critical examination.

In 1926 the first volume of **International Critical Tables** made its appearance and an effort will be made to complete the set of five volumes within two years (McGraw, $12 per volume). This publication, edited by E. W. Washburn and others under the auspices of the National Research Council of the United States, is a project that grew out of the meeting of the International Union of Pure and Applied Chemistry in London in 1919. It is being very competently done with the coöperation of a large number of experts and will undoubtedly take first rank for books of its class as fast as it appears. As the title implies, the data in the literature are examined critically before being included in the Tables, if

enough determinations have been made to warrant this. Volume 1 includes weights and measures; symbols, basic constants, etc.; atomic data; laboratory technic; physical properties; radioactivity; astronomical, geodetic and aerodynamical data. Volume 2 covers the properties of industrial materials and volumes 3 to 5 will cover the usual constants of physics and chemistry.

The **Tables annuelles de constantes et données numériques de chimie, de physique et de technologie,** to give its full title, is also an international undertaking, in French hands. It is edited by C. Marie (9, Rue de Bagneux, Paris VI); the McGraw-Hill Book Co. is the American agent. It is complementary to the International Critical Tables and there is an interchange of information between the two editorial offices. It will form a supplement to the Critical Tables from year to year. Volumes 1–3 cover the literature for 1910–12, volume 4 for 1913–16, volume 5 for 1917–22 (published in 1925–26). Volume 6, covering 1923–24, is due to appear in 1927, and volume 7 (covering 1925–26) in 1928, after which it is expected that annual publication, interrupted by the War, will be reëstablished. The purpose of the Tables annuelles is to cover all the numerical data of chemistry, physics, engineering and biology appearing in the periods covered; there is no attempt at a selection of the data as in the Critical Tables.

There are cheaper and partial substitutes for the great tables; some of them are listed, together with the ones already described, in Select List 2F (Appendix 8). The same list contains information about **dictionaries of solubilities,** a form of literature that has been developed to meet the needs of chemists and that has proved very useful to them. See also the following section.

POCKETBOOKS

By this name is to be understood the rather well defined class of books of small format, containing miscellaneous information in handy form for the use of technical men. The most renowned pocketbook for chemists is the **Chemiker-Kalender** founded by Biedermann (Springer, Berlin). It is issued annually and contains tables of constants and data of various kinds, together with a diary, almanac and notebook, and an index. The 1926 and 1927 editions are in three parts (instead of two as formerly). This divided state is somewhat inconvenient. The Chemiker-Kalender

is probably relatively less used than formerly, owing to the appearance of other pocketbooks.

Van Nostrand's Chemical Annual, edited by J. C. Olsen, is really not an annual as it is revised about once in four years (sixth edition in 1926). It is a single volume full of valuable data and is much used, especially by American chemists. Its British counterpart is **Atack and Whinyates' Chemists' Year Book** (Chemical Catalog Co.), revised annually. Chemical pocketbooks of general nature are listed in Select List 2G (Appendix 8), while a few of special nature may be found in the select lists on the subjects to which they belong.

For Annual Reports and Yearbooks, see pages 134–6.

PUBLISHERS' SERIES

Scientific books are frequently issued as members of a series, all of which are on the same general subject. Such series are usually arranged by the publishers, but they may be the result of a joint arrangement between the publisher and some scientific organization. Many of them are edited by well-known individuals. Some of the chemical series, such as the American Chemical Society monographs, the biochemical monographs edited by Plimmer and the textbooks of physical chemistry edited by Ramsay, become very well known. Libraries often place standing orders for the members of a series, to be delivered as the books are published. Below is a list of chemical book series, classified by publishers (for a more extended list of publishers, see Appendix 7).

Baillière, J. B., et Fils, Paris:

Encyclopédie de chimie industrielle. Camille Matignon, ed.

Baillière, Tindall and Cox, London:

Industrial chemistry series. E. de Barry Barnett (formerly Samuel Rideal), ed.

Barth, J. A., Leipzig:

Handbuch der angewandten physikalischen Chemie in Einzeldarstellungen G. Bredig, ed. 13 vols. 1905–24.

Monographien aus der Geschichte der Chemie. Georg W A. Kahlbaum, ed. 8 vols. 1897–1904.

Benn, Ernest, London:

Chemical engineering library. 5 vols. in 1925. 6s. each (boards).

Chemical industry pamphlets. 8 subjects in 1925. 6d. each.

Monographs on the chemistry of the oil and colour industries. R. S. Morrell, ed. First vols. in 1925.

Resources of the Empire. 12 vols., 1924. 21s. each. "A business man's guide planned and supervised by the Federation of British Industries."

Cambridge University Press, London:
Cambridge agricultural monographs.

Chapman and Hall, London:
D. U. (Directly Useful) technical series.

Chemical Catalog Co., New York:
American Chemical Society monographs. W. A. Noyes, ed. scientific group; H. E. Howe, ed. technologic group. 32 vols in May, 1927. $3.50 to $10 each (10% discount to Society members).

Constable and Co, Ltd.:
Outlines of industrial chemistry. Guy D. Bengough, ed. 6 vols. in 1926.
A treatise of electro-chemistry. W. H. Woodcock (formerly Bertram Blount), ed. 4 vols. in 1926.
The "Westminster" series. 26 vols in 1926 Uniform extra crown 8vo volumes, a number of which are chemical.

Enke, F., Stuttgart:
Bibliothek für Chemie und Technik unter Berücksichtigung der Volkswirtschaft. L. Vanino, ed 10 vols. 1920–26
Die chemische Analyse B M. Margosches, ed. 24 vols. 1907–24.
Sammlung chemischer und chemisch-technischer Vorträge F. B. Ahrens, original ed.; W. Herz, present ed 28 vols 1896–1925. M18 per vol. The well-known "Ahrens' Sammlung," including a wide range of topics and various authors.

Frowde, Hodder and Stoughton, London:
Oxford technical publications.

Gruyter, Walter de, and Co, Berlin and Leipzig:
Sammlung Goschen. Over 900 small volumes on a great variety of subjects, some of which are chemical. M1 25 each.

Gurney and Jackson, London:
Chemical monographs A C Cumming, ed.

Hirzel, S., Leipzig:
Chemie und Technik der Gegenwart. W. Roth, ed. 5 vols. 1923–25.

Knapp, W., Halle a. S.:
Kohle, Koks, Teer (monographs on fuels). 5 vols. 1924–25.
Laboratoriumsbücher für die chemische und verwandte Industrien. L. M. Wohlgemuth, ed. 25 vols. 1908–24. M3 to 10.50 per vol.
Monographien uber angewandte Elektrochemie. 46 vols. 1902–21.
Monographien über chemisch-technische Fabrikationsmethoden. L. M. Wohlgemuth, ed. 39 vols. 1906–22.

Lockwood, Crosby, and Son, London:
Manuals of chemical technology. Geoffrey Martin, ed. 10 vols. in 1926.

Longmans, Green and Co., New York and London:
Monographs on biochemistry. R. H. Aders Plimmer and F. Gowland Hopkins, eds. 14 vols. in 1926.
Monographs on industrial chemistry. Sir Edward Thorpe, ed. 17 vols. in 1926.
Monographs on inorganic and physical chemistry. Alex. Findlay, ed. 8 vols. in 1926.

Monographs on physics. Sir J. J. Thomson, ed. 8 vols. in 1926.
Rothamsted monographs on agricultural science. John Russell, ed. 5 vols. in 1926.
Text-books of physical chemistry. Sir William Ramsay, ed. (now deceased). 8 vols. in 1926.

Macdonald and Evans, London:
Reconstructive technical series.

McGraw-Hill Book Co., Inc., New York:
Chemical engineering series. H. C. Parmelee, ed. First vol. in 1926.
International chemical series. Henry P. Talbot, ed. 31 vols. in 1926.
Mellon Institute technochemical series. 4 vols. in 1926.
Metallurgical texts. Announced in 1926.

Murray, J., London:
Imperial Institute monographs on mineral resources.

Pitman, Sir Isaac, and Sons, Ltd, London and New York:
Common commodities and industries 3s. each. Elementary; for the beginner or general reader.
Technical primer series.

Routledge, George, and Sons, Ltd., London:
Twentieth century chemistry series. William Tilden and J. C. Philip, eds

Spamer, O., Leipzig:
Chemische Technologie in Einzeldarstellungen A. Binz, ed.

Steinkopff, Theodor, Dresden and Leipzig:
Technische Fortschrittsberichte. Fortschritte der chemischen Technologie in Einzeldarstellungen. B. Rassow, ed 9 vols. 1923–25.
Wissenschaftliche Forschungsberichte Naturwissenschaftliche Reihe. Raph. E. Liesegang, ed. 14 vols. 1921–25, the majority of which are chemical.

Van Nostrand, D., Co., New York:
Library of modern sciences. 6 vols. in 1926. For non-technical readers who wish a general survey of science.
Monographs on the theory of photography from the research laboratory of the Eastman Kodak Company. 5 vols. 1921–24.

Vieweg, F., und Sohn, Braunschweig:
Neues Handbuch der chemischen Technologie. 8 vols. 1912–24.
Sammlung Vieweg. Tagesfragen aus den Gebieten der Naturwissenschaften und der Technik. Octavo. 77 vols. 1914–25. Includes many chemical subjects.
Die Wissenschaft. Sammlung von Einzeldarstellungen aus den Gebieten der Naturwissenschaft und der Technik. Eilhard Wiedemann, ed. 73 vols. 1905–25, of which many are chemical.

Williams and Wilkins Co., Baltimore: World wide chemical series. E. E. Reid, ed. Announced in 1927.

Wissenschaftliche Verlagsgesellschaft, Stuttgart:
Monographien aus dem Gebiete der Fettchemie.

SOURCES OF INFORMATION

There are various ways of obtaining the necessary data about current books. Appendix 8 at the end of this volume is a list of some 1600 chemical books, selected from about 4200 with the advice of experts and carefully classified. The Chemical Engineering Catalog contains a list of about 2000 books arranged by names of authors, with a subject index (the contents of the books were formerly given but this feature was discontinued in the 1926 edition). Shorter classified lists may be found in Van Nostrand's Chemical Annual and elsewhere.

Chemical Abstracts is the only abstract journal, apparently, that has always included titles of chemical books; it frequently refers the reader to a review of the book and it indexes the book by both author and subject. *Chemisches Zentralblatt* started this practice in 1927. Many journals publish titles or reviews of the books in which they are interested or which happen to come to them.

The *Technical Book Review Index* (Carnegie Library, Pittsburgh, quarterly, $1 a year) lists and gives brief extracts from American and foreign book reviews and is very useful to those who wish to select books; its issues are at present about five months behind time.

New Technical Books is a quarterly selected list of books added to the New York Public Library. It contains characterizations and extracts from reviews but the number of books treated is comparatively small.

Bibliographia chimica, a valuable monthly classified list of chemical books of the world (issued by the Verlag Chemie, Leipzig, with the coöperation of several of the German societies) was discontinued at the end of 1926.[2] Similar lists are, however, issued by other German publishers, such as *Chemische Novitaten* (Gustav Fock, Leipzig); *Polytechnische Bibliothek* (J. A. Barth, Leipzig); *Bremer Literaturberichte fur Technik, Chemie und verwandte Gebiete* (G. A. von Halem, Bremen); these are distributed free through book dealers.

The British Science Guild of London publishes a *Catalogue of British Scientific and Technical Books* (ed. 2, 1925, books in print December, 1924, 12s. 6d.; supplement, 1926, 166 pp., 2s. 6d.). It is

[2] The data which it used to give about new books will hereafter be found in the *Chemisches Zentralblatt*, at the ends of the appropriate sections of abstracts.

classified, with author and subject indexes. By writing for them one can obtain the latest catalogs of publishers of scientific books and can be put on the mailing lists to receive notices (a list of the principal publishers with their addresses is given in Appendix 7). It is possible also to trace chemical books by means of such general book guides as the *United States Catalog* and its continuation, the *Cumulative Book Index* (H. W. Wilson Co.; consult any library), *The Publishers' Weekly* (New York), *English Catalogue of Books*, *Publishers' Circular* (London), *Deutsches Bücherverzeichnis* (previous to 1911, Kayser's Vollständiges Bücherlexikon), or *Catalogue mensuel de la Librairie Française* (Agence Générale de Librairie, Paris).

For information about the **older books** various catalogs may be consulted, some of which are given in Select List 2N3 (Appendix 8). The fullest list of chemical books yet published is Bolton's *Select Bibliography of Chemistry*, issued by the Smithsonian Institution. With its supplements it covers the period 1492–1902 in eight sections as follows: (1) bibliography, (2) dictionaries, (3) history, (4) biography, (5) chemistry, pure and applied, (6) alchemy, (7) periodicals, (8) academic dissertations. The main collection appeared in 1893 and the supplements in 1899, 1901 and 1904.

Ferguson's *Bibliotheca Chemica* (Maclehose, Glasgow, 1906), a two-volume catalog of the alchemical, chemical and pharmaceutical books in the collection of the late James Young, is very valuable, not only for its full descriptions but for its excellent notes.

Zeitlinger and Sotheran's *Bibliotheca Chemico-Mathematica* (1921) covers a wider field than chemistry and is a bookseller's catalog, but it has been carefully prepared and contains a great deal of information about chemical books of all ages, with many plates. Sotheran's current catalogs (the latest No. 800, 1926) are valuable for their full data and their notes. Useful catalogs of second-hand as well as new books are also issued by other dealers (for names and addresses of dealers see Appendix 7).

Most **libraries** have card catalogs which may be consulted by the public (see page 203). Lists of library collections are not available in book form as a rule, but the published catalogs of the Chemical Society of London (1903), the Deutsche Chemische Gesellschaft (1920, with the *Berichte*), the Chemiker-Verein (1901), the British Patent Office (1911) and the Carnegie Library of Pittsburgh (1907–22) are exceptions.

The Library of Congress prints and distributes its cards, and

many libraries include these cards in their card catalogs even when they do not have the books themselves. Anyone may order the cards; a booklet explaining how to order and use them may be had from the Card Division of the Library. On June 30, 1925, the Library had in stock over 67,500,000 cards representing 964,488 titles; 37,000 new titles were added in 1924–25. The price per card varies from $1\frac{1}{2}$ ¢ to 4 ¢ or more, depending on the labor of selecting them. The John Crerar Library of Chicago also issues printed cards which can be purchased at cost price.

For catalogs or indexes of chemical literature in general and not of books merely, such as the Royal Society Catalogue of Scientific Papers and the Index-catalogue of the Library of the Surgeon-General's Office, see Chapter VI (pp. 198–202) and also Select List 2N3(Appendix 8).

CHOOSING AND ORDERING BOOKS

It is well to remember, in choosing books to purchase, that most scientific books are either short-lived or else are revised to bring them up to date. Hence it is a good rule not to buy a book until one actually has need for it and expects to use it. The depreciation on books is in general greater than on periodical files. After the first drop to second-hand value, the volumes of a standard journal set increase in value year by year as more customers enter the market, while the value of books diminishes steadily unless they have some peculiar merit or become rarities.

Books may be ordered **direct from the publisher,** and this is often the best plan for those engaged in teaching, who usually obtain a substantial discount. Some publishers, for example Van Nostrand and the Chemical Catalog Co., make a specialty of supplying scientific books of any publisher. In addition there are dealers in scientific books, some of them carrying second-hand stocks, some having certain connections abroad, etc. (for names and addresses, see Appendix 7).

In ordering from catalogs it is useful to know what is meant by the **terms quarto, octavo, etc.** These now usually denote merely a size and not the way in which the sheet is folded. According to the standard adopted by the United States book trade a *folio* book is one 30 or more centimeters in height; *quarto* (4to, 4°), 25–30 cm.; *octavo* (8vo, 8°), 20–25 cm.; *duodecimo* (12mo, 12°), 17.5–20 cm.; *sixteenmo* (16mo, 16°), 15–17.5 cm.

The **date** on the title page of a book is not a safe guide to its age. United States books are copyrighted and the latest copyright date is the date of the last material revision. British books do not usually bear copyright dates but German books are often copyrighted for the United States. In the absence of a copyright date, the date of the latest preface is a useful indication of the time of publication.

American **prices** of British books seem relatively very high at the present time, averaging about one dollar to three shillings. Apparently chemists on this side of the Atlantic would do well to order direct from the British publishers if they can manage to wait during the necessary interval.

CHAPTER III

PERIODICALS

THEIR USE

The journal literature is the storehouse of a large mass of reports of comparatively small and usually independent pieces of experimental work and interpretations thereof, of discussions of observations and conclusions from wider experience, and to a much lesser extent of reviews and general write-ups and of statements of news and opinions. It is the **source book** of the collection which makes up the whole of the literature of chemistry, the original material. It differs most markedly from the book literature in its relatively unorganized state and in its prompter and more regular advancement upon the frontiers of our knowledge. A book is soon out of date but a live journal can and does keep up with the onward march. On this account every literature search of a comprehensive nature must at least be finished by an examination of the journal literature. Since it is the ultimate source, on which books are largely based, searchers will usually want to go back over the journal literature in a thorough search even though books dealing with the subject under consideration may be available. This may be done (1) to locate information on points which have not gotten into the book literature, at least that available, or (2) to obtain more detailed information than the books may carry.

The question always arises as to **how far back one should go** in using the journal literature. This of course depends a good deal on the nature of the subject and of the search, as discussed in the chapter on Procedure (p. 217). Some searchers consider that it is usually safe to assume that everything of value in the journal literature has been made a part of the book literature after a period of about twenty years. A factor in such a decision is the realization that the development of a science is very rapid, so that

much of the older literature is now close to useless because of discredited or at least greatly inferior methods, changed points of view, inadequate theories, and the like. Some even go so far as to assert that we would be better off if we could scrap the older literature as it becomes that. There are times when one will feel justified in ignoring all but the more modern literature but to do so always would be a mistake. The older literature is not always valueless by any means and books cannot be depended upon to glean everything that has lasting value. Ideas and facts are still to be found there even though the methods, interpretations, and theories may practically all have been outgrown or carried over into the more recent literature. Just as it can be said that the journal literature is never out of date because of the continuous appearance of units of it, so it can also be said that the older parts of it are never really entirely out of date because it is original material. A source book cannot be cast aside nor revised.

The **bulk** of the journal literature is almost staggering in its proportions and it is increasing rapidly. There are over twelve hundred journals now appearing which publish at least an occasional paper of chemical interest. The number of journals of direct chemical interest can be judged by glancing at the descriptions on pages 46–76 of this chapter. As a means of visualizing the bulk of the journal literature Robert B. Sosman[1] has estimated that merely the three journals of the American Chemical Society for a single year (1920) would require 514 hours, or 64 working days of 8 hours each, to be read aloud at reasonable speed. There is such a mass of this literature that the task of keeping abreast of even that part of interest in one's special field and of using it effectively when needed is a heavy one. It behooves the chemist to see to it that he learns how best to make use of the means which have been provided to make this sea of information navigable. Otherwise he is likely soon to be lost at sea. This need is on the increase, too.

In emphasizing to students the **importance of keeping in touch** with the journal literature E. Emmet Reid[2] has said: "By reading the journals the student sees science in the making and observes

[1] *J. Wash. Acad. Sci.* **11**, 80(1921).

[2] Introduction to Organic Research, Van Nostrand, New York (1924), pp. 68–9.

how one fact is added to another as bricks are laid in a wall, though in science the structure is never finished nor does it grow according to blue prints previously prepared.* * * *The student should cultivate the habit of reading them [journals]. Of course he can not read all of the journals that are published even if he has access to them, but he can browse through several, at least reading the articles which appeal to him most.* * * *To be sure the research chemist spends a large part of his time searching the literature for things that bear directly on his own problem and necessarily so, but he cannot afford so to narrow himself as to see one small segment of chemistry. The man of one idea has not a whole idea for his one idea is incomplete without its relations to other ideas; the zenith is related to the whole horizon. One must read broadly of many things in order to think deeply on one thing. The research chemist must read everything about his own field but he cannot afford to neglect the rest of chemical literature. It is remarkable how much light is thrown upon a problem from distant sources; one can hardly read a piece of investigation of any sort without finding something that suggests an idea about his own problem.

"By reading the **old journals** we come in contact with the masters of experimentation and of reasoning who have gone before; their results may have been superseded by more modern observations but they laid the foundations of the science of today and they have much to teach us as to methods of thinking and working. The young artist spends much of his time copying the productions of the painters of centuries ago or of sculptors of ancient Greece; so the young chemist must study the masterpieces of investigation for inspiration and guidance. In the old journals we have the works of these ancient worthies told in their own words and in the reading of them there is great reward."

In the use of journals it is sometimes helpful to have in mind the fact that with considerable frequency papers are published in more than one periodical. If one has a reference of interest but cannot locate the journal, another reference to the same paper can sometimes be found. Occasionally a paper before being reprinted is translated; this is of course helpful if the original language is one which gives the reader difficulty.

Titles of papers are often inadequate, sometimes even misleading (see page 167).

When papers are mentioned in **references** it is customary to ab-

breviate the journal names. Until recent years there has been no international standard, the abbreviations used being consistent usually in a given journal, book or other place where references accumulate but being different in different places. In 1922 the **abbreviations** used in the List of Periodicals Abstracted by *Chemical Abstracts* were adopted as a standard by the International Union of Pure and Applied Chemistry. They have not been accepted universally but their use is increasing. The great variety of journal name abbreviations in the literature, and in particular some of the briefer abbreviations, lead to difficulty in identifying journals at times. To help in such circumstances, abbreviated words which occur in journal abbreviations are given with the other abbreviations which make up Appendix 2.

In references there is also great variety in the method of designating the place in the journal where a given paper is to be found. There may be furnished a series number, volume number, number (Heft), page number and date and the form in which these are given varies greatly. Series numbers are frequently given in brackets and placed first. Volume numbers are sometimes given in Roman numerals, more often in bold-face Arabic numerals. The number (Heft) is at times given in parentheses, or is preceded by "No." Pages inclusive are usually furnished. The date may be given in full, just the month and year may be given or, as is most common, the year only may be given. Part of this information is frequently left out of references as unnecessary; just the volume number followed by page number with perhaps the year at the end or in front of the volume number (giving the year is quite helpful) are furnished. This is enough if the pagination of the journal involved is not started anew with each number as is sometimes the case. Here are some examples:

Am. J. Sci. [5] **3**, No. 6, 378–81 (June, 1922).
Am. J. Sci. [5] **III** (6), 378–81 (1922).
Am. J. Sci. 1922, **3**, 378–81.
Am. J. Sci. **3**, 378–81 (1922).

A few journals do not have a volume number; the year is used in its place in such cases. For example, *Collegium* **1926**, 421–24. Some journals have more than one series of pages, as the R (Reviews), T (Transactions) and A (Abstracts) series formerly published in the *Journal of the Society of Chemical Industry*. If difficulty is experienced in locating a paper this may be the source of trouble.

With volume and year both given it is usually comparatively easy to find a paper even when a mistake has been made some place in the reference.

Sometimes when there are more than one series of pages in a periodical, as, *e. g.*, for "Proceedings" and for "Transactions," a reference is written before the parts are separated and bound and the name of the journal given in accordance with the name on the cover of the journal, whereas the bound parts are given slightly different names to designate the different parts. This leads to a type of confusion which one has but to understand to straighten out with ease.

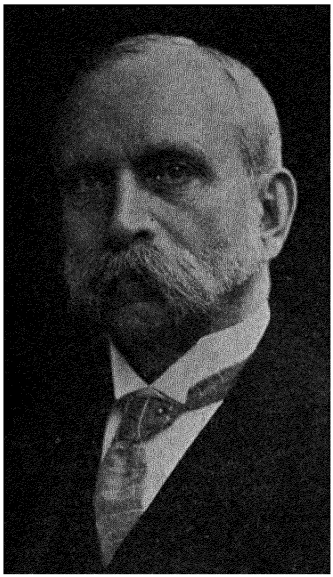
There is a growing tendency for editors of chemical journals to publish **abstracts at the beginning of papers** included in their columns. These are helpful time savers. Dr. Gordon S. Fulcher, formerly editor of *Physical Review*, is deserving of much credit for his able advocacy of this plan. He has published rules for the writing of such abstracts.[3] Some of the chemical journals published in languages read by comparatively few scientists, as Russian and Japanese, provide abstracts in English, French or German in connection with many of their papers. This is a most commendable practice and its extension is being urged. Possibly some day an international language will be used for this purpose (see p. 231, footnote).

The chapter on "Procedure" (p. 212) is the place to look for more specific information about the use of journals.

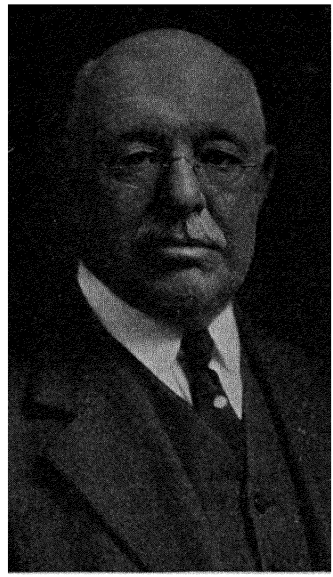
HISTORY AND CLASSIFICATION

The present practice of communication among scientists by means of journals, their main method of coöperation, is a development from a period when personal contact and correspondence were the only means. Correspondence in the form of "letters to the editor" is still a means utilized to a minor degree. The **first journals** were published by scientific societies whose members came to realize the need of some more effective way of announcing results and of exchanging ideas upon scientific topics than letters and their meetings provided. The *Philosophical Transactions of the Royal Society*, begun in 1665 and still appearing regularly, is the pioneer scientific journal. Its influence has been very great. The *Comptes*

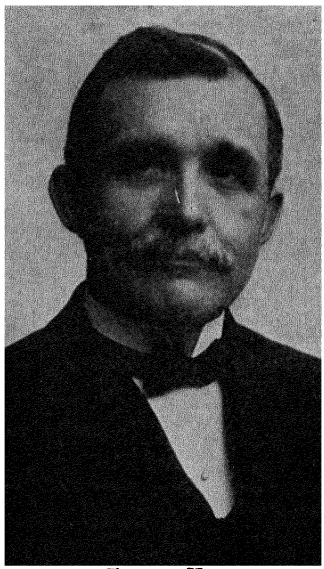
[3] *Science* **54**, 291–5(1921). Cf. also *Ibid.* **46**, 678–80(1922).



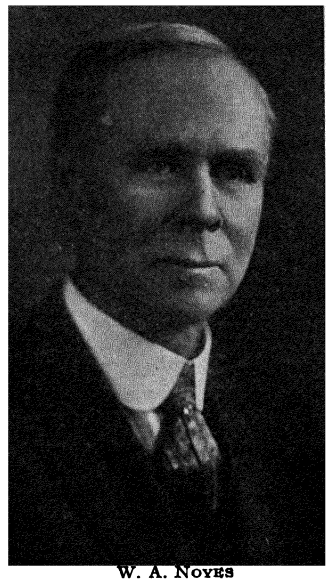
CHARLES F. CHANDLER



IRA REMSEN



EDWARD HART



W. A. NOYES

PIONEERS IN THE PUBLICATION OF CHEMICAL JOURNALS IN AMERICA

Dr. Chandler published from 1870 to 1877 *The American Chemist*, the first American chemical periodical.

Dr. Remsen founded *The American Chemical Journal* in 1879 and was its editor until it was combined with the *Journal of the American Chemical Society* in 1914.

Dr. Hart founded the *Journal of Analytical Chemistry* in 1887. He was also the first editor of the *Journal of the American Chemical Society*.

Dr. Noyes was the first editor of *Chemical Abstracts*, the first editor of *Chemical Reviews*, and was the editor of the *Journal of the American Chemical Society* from 1902 to 1917.

rendus hebdomadaires des séances de l'académie des sciences, publication of which was begun in 1835, is another early journal whose influence has been notable. The Academy of Sciences of Paris was established in 1666 and published, irregularly, certain proceedings before the starting of the *Comptes rendus*. The first scientific journal in the United States was *Silliman's Journal*, now known as the *American Journal of Science*. It was started in 1818. Not long after, in 1826, *The Franklin Journal*, now called the *Journal of the Franklin Institute*, was established. These scientific journals, which are the earliest in their respective countries and which are still being published, were and still are devoted to science in general. With the development of scientific knowledge and its increasing division into branches, the tendency which grew up was for the scientific society and the scientific journal to become more specialized, and this specialization, which is steadily increasing, extends into the present.

The **first chemical journal** apparently was the *Chemisches Journal* started in 1778; it was later (1784) called *Crell's Chemische Annalen*. The oldest chemical journal which is still being published is the *Annales de chimie*, begun in 1789. It appeared from 1816 to 1914 under the name *Annales de chimie et de physique*, when it was divided into two separate journals, *Annales de chimie* and *Annales de physique*. Another early chemical journal of much importance which is still appearing is Justus Liebig's *Annalen der Chemie*, which was founded in 1832 under the name *Annalen der Pharmacie* and passed during the period from 1840 to 1874 under the name *Annalen der Chemie und Pharmacie*. Dr. William A. Noyes[4] in a presidential address before the American Chemical Society has expressed the opinion that it was the most valuable journal for the development of chemistry through the middle of the nineteenth century.

The **first American chemical periodical** was the *American Chemist*, which was published from 1870 to 1877 by that venerable pioneer among American chemists, Dr. Charles F. Chandler, and his brother. It was an outgrowth of an unsuccessful venture on the part of the London *Chemical News* which involved the issuance of a monthly reprint in New York City with an appended American supplement prepared by Dr. Chandler. The *American Chemist*, which was a monthly, contained not only original papers by Amer-

[4] *J. Am. Chem. Soc.* **42**, 2101(1920).

ican chemists but also abstracts from American and foreign journals. This journal was discontinued because of the decision of the American Chemical Society to publish a journal. While the *American Chemist* seems properly to be considered the first American chemical *periodical* mention should be made of the single volume of the *Memoirs of the Columbian Chemical Society* issued in 1813. The *American Chemical Journal*, founded in 1879 by Dr. Ira Remsen, another eminent patriarch of chemistry in America, has had a strong influence on the development of chemistry in America and has contributed much towards the recognition in Europe of the work of American chemists. It was for many years better known than the *Journal of the American Chemical Society* among foreign chemists. It was incorporated with the latter journal in 1914. Another American chemical journal of interest from the historical point of view is Dr. Edward Hart's *Journal of Analytical Chemistry*, begun in 1887. Its name was changed to *Journal of Analytical and Applied Chemistry* in 1891. It also was incorporated with the *Journal of the American Chemical Society;* this was done in 1893, when Dr. Hart became editor of the latter journal. *The Journal of the American Chemical Society* was established in 1876 and has become one of the world's most valuable journals devoted to so-called pure chemistry (see p. 50).

In the earlier days of chemistry in America a number of chemists in the United States made it a practice to publish their papers in German journals, a tendency which has just about died out since the beginning of the twentieth century.

A class of journals started early, which has developed into the most important group of all, is that made up of the **journals published by the chemical societies** in the various countries. These journals, like practically all of the others mentioned above, have been devoted on the whole to the entire field of chemistry except the industrial side in so far as that can be separated from pure chemistry. On this account and because of their wide distribution and use they have had a notable educational influence and broadening effect in addition to their value as storehouses of information. The first of these journals was the *Quarterly Journal of the Chemical Society of London*, begun in 1847; it now appears monthly as the *Journal of the Chemical Society*. Chemical societies in the other countries where chemistry has been developing have followed this example. The order is· *Bulletin de la société chimique de Paris*

(1858), *Berichte der deutschen chemischen Gesellschaft* (1867), *Journal of the Russian Physical-Chemical Society* (1869), *Gazzetta chimica italiana* (1871), *Journal of the American Chemical Society* (1876), *Journal of the Chemical Society of Japan* (1880), *Bulletin de la société chimique de Belgique* (1887), *Svensk Kemisk Tidskrift* (1899), *Chemisch Weekblad* (1903) and *Helvetica chimica acta* (1918). In addition to these there are publications of chemical societies in several other countries where chemical activity is not so great as well as publications in about all of the countries represented above sponsored by societies interested primarily in industrial chemistry or some specific branch of chemistry, as suggested below.

Just as the starting of periodicals devoted to science in general was followed after a considerable period by the appearance of journals devoted to chemistry only (the whole of it), so after a while in the trend towards specialization there began to appear **journals limited** in their scope **to specific branches of chemistry.** The broadest branch of chemistry, if branch it is, is industrial chemistry, and so it seems natural that the first of these specialized publications should have been one devoted to the technical side of chemistry. It is Wagner's *Jahresberichte uber chemische Technologie*, which was founded in 1855; it is not a journal in the true sense. The next publication to put in its appearance, a still more specialized one, was Fresenius's *Zeitschrift für analytischen Chemie*, which was started in 1862. These have been followed by other journals devoted to the same fields and by representatives of almost every other branch of chemistry. The journals described on pages 49–76 are classified according to branches of chemistry and illustrate this point.

Many of the more important general industrial journals and a few of the journals devoted to more specialized branches are published by organizations of chemists specially interested in the respective fields involved. Examples of these are the *Journal of the Society of Chemical Industry*, published by the Society of Chemical Industry (London) since 1882; *Die Chemische Industrie*, started by the Verein zur Wahrung der Interessen der chemischen Industrie Deutschland in 1878; *Transactions of the American Institute of Chemical Engineers*, established in 1909; *Chimie & industrie*, published by La Société de la Chimie Industrielle since 1918; *Giornale di chimica industriale ed applicata*, published by the Associazione Italiana di Chimica Generale ed Applicata and the Società di

Chimica Industriale di Milano and used as the official journal of these societies and of the Federazione Nazionale della Associazione fra Industriali Chimici since 1919; *The Analyst*, the official organ of the (British) Society of Public Analysts, issued since 1877; and the *Transactions of the American Electrochemical Society*, published by this Society since 1902. A type of journal of chemical interest showing still further specialization is the **journal devoted to some specific industry,** the conducting of which involves chemistry and chemical engineering. There are journals, in some cases many of them, for practically all of the large industries involving chemistry, as the petroleum journals, the paper journals, the dye journals and the rubber journals. Some of these are published by organizations of scientific and technical men interested in the industries involved, for example the *Journal of the American Leather Chemists' Association* and the *Journal of the Society of Dyers and Colourists*. These industrial publications sponsored by societies are usually filled with original papers, with sometimes sections devoted to abstracts, the papers being many times close to if not indeed pure science products. The number of privately published industrial journals, the majority of which are more commonly called trade journals, is very large. In the United States alone there are over 1200 journals devoted to industry in one phase or another. Since chemistry is involved in so many industries many of these hold an interest for the chemist.

The journal literature is of course the chief source of that type of trade information which is supplied in the form of **advertisements.** Many journals carry indexes to their advertising sections. Advertisements are to be regarded as a part of the chemical literature. They have their value.

Most scientific and technical journals have sections devoted to **book reviews** or at least publish lists of new books. Thus, just as the book literature is dependent very largely on the journal literature for its assembled information, so is it also dependent to some extent on the latter for its distribution.

The journals of interest to the chemist might be **classified** with some appropriateness in a number of ways. For convenience of discussion the journals devoted to abstracts will be considered separately from those publishing original papers and other first-hand material. There is really no distinct line to be drawn as many journals publishing original papers also have abstract sections.

Either group may in a general way be **classified as scientific** or "theoretical" (devoted to pure science) **and industrial** or technical (applied science). Again there is no distinct line; some are both. And it must be kept in mind that there is no distinct line to be drawn between these fields. The industrial chemist has perhaps more reason to be interested in the pure science journals than has the nonindustrialist to concern himself with the industrial journals but both may well respect both types.

Journals may be **classified as philanthropic and for profit,**[5] which is very nearly the same as a classification into society organs and journals published as private enterprises. Some privately published journals are really of the philanthropic class, as was the *Journal of Physical Chemistry* before it came to be, in January, 1924, sponsored by certain scientific societies (see page 50). The *American Chemical Journal* was another example. Government publications and the bulletins and circulars issued by university and similar experiment stations, like society publications, are classed as philanthropic. The journals of this class are usually devoted almost exclusively to original papers (with sometimes abstracts and with society proceedings if society journals) and as far as the purely scientific and technical side of chemistry is concerned they make up by far the most valuable part of the journal literature. As a rule these journals have the first right to the publication of papers presented at the meetings of the organizations responsible for them. Most of the great outstanding contributions have appeared in journals of this type. The fact that a journal is published by a scientific society is a pretty sure indication that it is a reliable source of valuable information. Such a journal may be expected to stand for whatever the sponsoring society stands for and to report the best work of its members in so far as this work is disclosed at all.

As one would expect, most of the **journals published for profit** are of an industrial nature. This class includes the numerous trade journals. A situation to be reckoned with in evaluating the journals published for profit is the fact that, with the exception of a few journals with high subscription rates, as the *Zeitschrift für physikalische Chemie*, the profit comes mainly from advertisements. The natural tendency is to publish material of a character calculated

[5] Sosman, *J. Wash. Acad. Sci.* **11**, 80(1921).

best to carry the advertising and an amount just sufficient for that purpose. Quality has sometimes been lowered. The wise editor recognizes, however, that a high standard of business ethics and practice, with the establishment of a reputation for supplying useful, up-to-date and accurate information, is the best policy in the long run from every point of view. It is the trade journal that can be depended upon with respect to these qualities that lives and prospers. Long establishment is at least a partial test of reliability.

These journals are usually devoted largely to industrial and trade news and statistics, commonly of economic or business interest, although many of them are sources of valuable new scientific and technical information at times. They frequently contain copied articles or parts thereof and general write-ups of interest to the more or less casual reader but of little value to the investigator. Editorial sections are usually included and sections devoted to reviews of a limited number of patents are common. Industrial and trade news has its value of course but since this value lacks the same degree of permanency which characterizes new scientific and technical information the back files of the trade journals are of lesser importance.

A comparatively recent development is the publication for profit of strictly **technical journals** for the chemical and allied industries. *Chemical & Metallurgical Engineering* is a conspicuous example. The journals of this class are usually well edited. They obtain by contribution, special reporting and reprinting (sometimes translations from foreign journals) first-class material and their importance is not to be underestimated. As contrasted with the trade journals these periodicals have served more as tools of the profession than of the industry. The expression "have served" is used because the present tendency is for them to give attention to the business and economic problems of industry and thus become more like the trade journals. The business and economic problems of the industries have become more prominent than the technical ones largely as a result of the World War and the technical journals are recognizing and meeting the new situation. The scope of the modern technical journal is well summarized by H. C. Parmelee,[6] editor of *Chemical & Metallurgical Engineering*, who, in speaking of the "new relation to industry"

[6] *J. Ind. Eng. Chem.* **14**, 153–6(1922); *Chem. Met. Eng.* **26**, 197–200(1922).

of the technical journal says that as a result of the conditions brought about by the War the technical journal "became a magazine of opinion on labor problems, on the tariff, on wages, on the cost of living, foreign trade, government policies, the patent system, revenue legislation and finance, and many other matters formerly regarded outside its editorial scope. It discusses industrial waste in all its forms, the necessity for better cost accounting, for greater safety in industry, for improved housing and sanitation, for more skillful management, for more research."

A difference between the philanthropic journal and the journal published for profit which has some significance as regards the **quality of the material published** is the fact that in the former class high-grade material for publication usually pours in without editorial effort whereas for the latter class material has in many cases to be sought. Good material is usually got by many of these journals but others have used material whose chief value is to fill space. Some trade journals are largely parasites on the philanthropic journals as far as their scientific and technical information service is concerned.

It is not intended to give the impression that privately published journals are the only sources of the kind of business and economic news and information valued by industry. The **most valuable journals serving chemical industry** are published by chemical societies in the various countries (see page 39). Some believe that the independent journal as a magazine of opinion—the mouthpiece of its industry—may be more valuable than the society journal because of its freedom from allegiance to any group. A society journal may be expected to speak for the sponsoring society. On the other side it may be said that the society representative is likely to feel privileged to exercise a good deal of editorial freedom and anyhow the society is likely to stand for the best interests of the industry as a whole and a group opinion is perhaps safer than an individual one.

Still another **classification** of journals of some interest is one **based on the countries** in which they are published. The more important journals of chemical interest now appearing are arranged by countries as a secondary classification in the grouping by subjects or fields covered as shown on pages 46–76. This arrangement gives one an idea in a rough way of the extent of chemical activity in the various countries active scientifically (see also

page 6). A **classification by languages** would correspond very closely with this classification by countries. The Swiss journals are partly in French and partly in German, with occasionally an Italian paper. Some of the Japanese journals have editions published partly in English and partly in German. The Scandinavian journals occasionally carry papers in English or in German. The *Verslag koninklijke Akademie van Wetenschappen te Amsterdam* is issued in an English edition as well as in the Dutch. The *Recueil des travaux chimiques des Pays-Bas*, published in Holland, is, as the name indicates, printed in the French language, with occasional papers in English or German.

Classification of current periodicals **according to subject or field covered** has been done in the arrangement of the descriptions given below of the more important journals used by the chemist (see pp. 46–76). The broadest classification of this sort is of course the separation of the strictly chemical journals from those of related sciences but still of distinct interest to the chemist. As in the Select Book List (Appendix 8) the more or less familiar classification used in arranging abstracts in *Chemical Abstracts* has been used in this journal classification. Some journals of course are of general interest, fitting into none or all of the special classes according to one's point of view. Of the related science journals it is worthy of note that those of physics and the various branches of biology are particularly prolific sources of papers of direct interest to the chemist. The work of the physicist and the physical chemist, as in the field of atomic structure, is often very much the same. The line, if any line at all can be drawn, between physics and chemistry is becoming less distinct every day. Wilder D. Bancroft[7] defines chemistry as "the science which deals with all properties and all changes of matter that depend on the nature of the substances concerned" and adds that "chemistry, as thus defined, may be interpreted to include all of what is known as physics except the law of gravitation, the laws of motion, and a few other abstract formulations." Some physicists maintain that chemistry is really a branch of physics. The point is that the chemist and the physicist may both have a direct interest in the same things and therefore in the same journals. Accordingly the most important physical journals are listed with the chemical ones. The

[7] *J. Ind. Eng. Chem.* **14,** 156(1922).

number of biological journals is unusually large and almost every one of them serves as a source of information of biochemical interest.

As Appendix 6 there is given an alphabetical list of 1889 journals of more or less interest to the chemist. For those which were being published in 1926, when the list was compiled, there is supplied information as to standard[8] abbreviations of names, frequencies of appearance (weekly, monthly, etc.), 1926 volume numbers, prices and publishers (with addresses). For the 626 journals listed which are no longer appearing the time and place of publication are given when they could be learned; also the name abbreviation which has probably most commonly been used is indicated. In the classification (primarily by subject or field, secondarily by country) given below only the currently appearing journals of greatest interest and value to the chemist have been selected for entry. [Abstract journals, as mentioned above, are treated separately at the end of this chapter.] The comments accompanying most of these entries are made in an effort to give in a few words an impression of the nature, scope and usefulness to the chemist of the journals as gained by the authors in their constant use of them in their work on *Chemical Abstracts*. Correspondence with the editors has been a further source of information. Some journals fit into one class only a little better than into another. Cross references from class to class have not been attempted. The classification of *Chemical Abstracts* has been departed from only in that "General and Physical Chemistry" and "Subatomic Phenomena and Radiochemistry" have been grouped together and placed ahead of "Apparatus and Plant Equipment" and a "General Science" class has been introduced. No attempt has been made to describe the journals in detail. Students would do well to examine copies of those available; use of them is the best way to get acquainted. A few of the journals are listed without comment; when this has occurred it is to be interpreted to mean that the journal involved is considered to be more or less on the borderland between those journals of great importance to the chemist and those of hardly sufficient chemical value to be entered in this special list.

[8] Approved by the International Union of Pure and Applied Chemistry.

CURRENT JOURNALS OF GREATEST CHEMICAL INTEREST, CLASSIFIED ACCORDING TO SUBJECTS OR FIELDS AND SECONDARILY ACCORDING TO COUNTRIES

1. GENERAL SCIENCE

United States

American Journal of Science, The. This pioneer American scientific journal, which was started by Benjamin Silliman in 1818 and which has often been spoken of as *Silliman's Journal,* has played an important rôle in the development of science in the United States and continues to be a valuable journal to the chemist as well as to other scientists. It is "devoted to the physical and natural sciences, with special reference to physics and chemistry on the one hand, and to geology and mineralogy on the other." Papers on geological and mineralogical subjects now strongly predominate. There are collective indexes.

Journal of the Franklin Institute. This is another pioneer journal. It was established in 1826 as *The Franklin Journal* by the Franklin Institute. Beginning with 1828 its present name was adopted. The journal is devoted to "science and the mechanical arts." Many of the papers are of chemical interest. They are usually comparatively long papers of a comprehensive nature, sometimes addresses. Brief advance notes are published on work done at the U. S. Bureau of Chemistry, Bureau of Mines and Bureau of Standards and at one or two other important laboratories such as that of the Eastman Kodak Company. There is a collective index to Vols. 1–120(1826–1885).

Journal of the Washington Academy of Sciences. This journal superseded in 1911 the *Proceedings* which was begun when the Washington Academy of Sciences was organized in 1898. The *Proceedings* consisted of papers of varying lengths issued quarterly in the form of separate brochures. The *Journal* consists of (1) short papers covering the results of current research in Washington, D. C., or by members of the Academy outside of Washington, (2) brief abstracts of papers published elsewhere by Washington scientists, (3) proceedings of Washington scientific societies and (4) scientific notes and news. There is a collective index to the *Proceedings* in Vol 13 of the *Journal.*

Memoirs of the American Academy of Arts and Sciences. Published since 1783.
Proceedings of the American Academy of Arts and Sciences. Published since 1846.
Proceedings of the National Academy of Sciences. Publication was started in January, 1915. This general science journal specializes in short papers which ordinarily do not exceed 3000 words. Papers for publication must be recommended by a member of the Academy or of the National Research

Council. Often the papers are advance reports of work published later in greater detail elsewhere. The National Academy of Sciences published several volumes of *Proceedings* many years ago which consisted only of reports of meetings; these are not to be confused with the present journal of the same name.

Proceedings of the American Philosophical Society. Established in 1838.

Science. *Science* was started by Mr. A. Graham Bell and Mr. Gardiner G. Hubbard in 1883. It was not a financial success and publication was suspended in 1893. In 1895 the journal was started again (as a new series) with the backing of the American Association for the Advancement of Science, whose official organ it became. It deals to a considerable extent with the broader aspects of thought and culture. Addresses, biographical notes, scientific news, book reviews, reports of meetings, discussions in which several readers sometimes join and brief contributions reporting experimental work are included in its pages. It is a good, readable journal for use in keeping in touch with the activities of scientific men in general.

British Empire

Nature. This London journal closely resembles *Science* (see preceding description). "*Nature* surveys the whole field of scientific activity and is at once authoritative, accurate and topical." It is good reading, a good journal for keeping in touch with scientific advances in general. Its "Letters to the Editor" section has developed into a particularly interesting and valuable medium for scientific comment and announcement. Many scientists of high standing contribute to this section and important results are not infrequently announced in advance of full papers by use of this section. *Nature* was established in 1869.

Philosophical Magazine and Journal of Science, The London, Edinburgh and Dublin. This valuable journal is a combination of the *Philosophical Journal,* established in 1797 by W. Nicholson, and the *Philosophical Magazine,* started in 1798 by A. Tilloch. The combination took place in 1814, when the name became *Philosophical Magazine and Journal.* A second series was started in 1827, the name then being changed to *The Philosophical Magazine or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science.* In 1832 a third series was started and the name was changed to *The London and Edinburgh Philosophical Magazine and Journal of Science.* In 1840 the word "Dublin" was added to the title. Men of very high scientific standing, as Sir Oliver J. Lodge and Sir Joseph J. Thomson, have been editors of this journal and many important papers have appeared in it and are appearing there. In recent years a considerable proportion of the papers have dealt with the structure of the atom and the ultimate constitution of matter. There are no collective indexes.

Proceedings of the Cambridge Philosophical Society.
Transactions of the Cambridge Philosophical Society.

Proceedings of the Royal Institution of Great Britain.

Proceedings of the Royal Irish Academy.

Proceedings of the Royal Society of Edinburgh. Begun in 1832.
Transactions of the Royal Society of Edinburgh. Begun in 1783. There is a collective index for the period 1783–1908.

The number of papers of chemical interest in the above group of six society publications is not great but a large proportion are valuable.

Proceedings of the Royal Society (London).
Transactions of the Royal Society (London).

The Royal Society in its *Proceedings* (started in 1840) and also in its *Philosophical Transactions* (established in 1665) publishes two sets of papers under separate covers: "Series A Mathematical and Physical Sciences" and "Series B. Biological Sciences" Most of the papers appearing in Series A are of chemical interest and the average of quality is high. The *Philosophical Transactions* was the first scientific journal.

Proceedings and Transactions of the Royal Society of Canada.

Germany

Naturwissenschaften, Die. This journal fills the place in Germany which *Science* fills in the United States and *Nature* in Great Britain Brief early announcements of results of research are probably more numerous in it than in *Science.* It was established in 1913.

France

Comptes rendus hebdomadaires des séances de l'académie des sciences The Académie des sciences founded in 1666 by Colbert) started this publication in 1835 and it has appeared continuously ever since, two volumes of twenty-six numbers each appearing each year. The proceedings of the Academy for the period prior to August, 1835, are contained in *"Procès-verbaux des sciences de l'académie tenues depuis la fondation de l'Institut jusqu'au mois d'août, 1835."* *Comptes rendus,* as the journal is usually called, has played a notable rôle in the development of science in France. While the whole field of science is covered, the number of chemical papers is large. All papers are brief; a considerable number of them appear elsewhere in greater detail. There is a collective index for the period 1835–1895. The indexes are not satisfactory, being of the nature of so-called tables of contents.

Italy

Atti della reale accadèmia nazionale dei Lincei. There are several scientific academies in Italy which publish papers of chemical interest but the above publication is the only one which publishes such papers in any considerable number. Publication of this journal under its present title started in 1873. It was then labeled Series II. Series I, dating back to 1847, has the title *Atti dell' accadèmia pontifica de Nuovi Lincei.*

Switzerland

Archives des sciences physiques et naturelles. In this little bimonthly journal (established in 1795) may be found, besides long original papers, brief reports of work presented at meetings of the Société de physique et d'histoire naturelle de Genève.

Austria

Sitzungsberichte der Akademie der Wissenschaften in Wien. There are four parts. One is devoted to chemistry (Abteilung IIb); the *Monatshefte* (see page 54) publishes much the same material. In Abteilung I are published papers on mineralogy, crystallography, plant physiology, zoölogy, geology, etc.; in Abteilung IIa papers on physics are included; and in Abteilung III papers on animal physiology and medicine are to be found.

Holland

Verslag koninklijke Akademie van Wetenschappen te Amsterdam. This important publication has an edition (*Proceedings of the Royal Academy of Sciences of Amsterdam*) in which most, though not all, of the papers are published in the English language. The *Verslag* was begun in 1853. Papers of physico-chemical interest predominate among the many valuable chemical papers published.

Japan

Journal of the Faculty of Science, Imperial University of Tokyo.
Memoirs of the College of Science, Kyoto Imperial University.

Russia

Bulletin de l'académie des sciences de l'Union des Républiques Soviétiques Socialistes (formerly called *Bulletin de l'académie des sciences de Russie*). Though this French title is placed on copies for foreign distribution the papers are always in the Russian language. Papers of mineralogical interest seem to predominate among those of chemical bearing published.

Belgium

Bulletin de la classe des sciences, académie royale de Belgique.

Philippine Islands

Philippine Journal of Science, The. The Bureau of Science, at Manila, P. I., has been issuing the *Journal* since 1906. It was preceded by a series of 36 bulletins issued from 1902 to 1905 by the Bureau of Government Laboratories. For the early years the *Journal* was divided into sections (separate publications), Section A (General Science) being the one of most chemical interest, but since January, 1919, the *Journal* has appeared monthly without sections. There is a collective index to the first ten volumes (1906–1915), issued as Bureau of Science Publication No. 8.

2. GENERAL AND PHYSICAL CHEMISTRY, SUBATOMIC PHENOMENA AND RADIOCHEMISTRY

United States

Chemical Reviews. The title tells the purpose. Very valuable reviews by men of the highest scientific standing are published. This journal first put in its appearance in 1924. It is a publication of the American Chemical Society.

Journal of the American Chemical Society, The. The American Chemical Society started its journal in 1876. In 1893 the *Journal of Analytical and Applied Chemistry* was incorporated with it and in 1914 Dr. Ira Remsen's valuable *American Chemical Journal* was made a part of the *Journal.* There can be no question about the fact that the *Journal of the American Chemical Society* deserves a place of high standing among the world's most important chemical journals. It publishes a large percentage of the papers in the field of pure chemistry published by American chemists In 1925, *e. g.*, there were published 195 papers on "general, physical and inorganic" chemical subjects and 243 papers on "organic and biological" chemical subjects. The proceedings of the American Chemical Society and book reviews (63 in 1925) make up the rest of the journal. There is a collective index to the first twenty volumes. The Golden Jubilee number published in August, 1926 (this year marks the fiftieth anniversary of the American Chemical Society) is of great value to anyone interested in the history of the American Chemical Society and of chemistry in America.

Journal of Chemical Education. From a modest beginning in 1924 under the earnest directorship of Dr. Neil Gordon this journal rapidly developed into one of much value to teachers of chemistry. In addition to numerous original papers on chemical education, abstracts for this field are now published (starting with the 1925 volume).

Journal of Physical Chemistry, The. This is really an international journal now. It was established in October, 1896, by Wilder D. Bancroft and J. K. Trevor at Cornell University, Ithaca, New York, and up to 1924 was a private publication. In that year, however, though still edited by Dr. Bancroft at Ithaca, it became a charge of the American Chemical Society, the Chemical Society (London) and The Faraday Society, which now sponsor it. Dr. Trevor was joint editor until 1910 In addition to its importance as a source of original papers on physical chemical subjects (many of them written by Dr. Bancroft), it is of special interest on account of the book reviews written for the most part by Dr. Bancroft There were abstracts of physical chemical papers in the first ten volumes.

Physical Review, The. In recent years this organ of the Physical Society has published many valuable papers of distinct chemical interest. In fact most of the papers now appearing are abstracted by *Chemical Abstracts* and the abstracts are most often placed in the section on Subatomic Phenomena and Radiochemistry. Each paper is preceded by an analytic abstract thereof. Brief advance reports of papers by members of the Physical Society are published in the Proceedings section.

British Empire

Chemical News and Journal of Industrial Science, The. This long-established weekly is, at present at least, of minor importance. Most of the papers published are copied, with credit, from American publications and those not copied are, on the average, of lesser value. The journal was started in 1859 by Sir William Crookes who personally controlled it until within a

few weeks of his death in April, 1919. Abstracts of papers presented at the meetings of various learned societies have been published. There is a collective index to the first 100 volumes (two volumes per year).

Journal of the Chemical Society (London). See under "Abstract Journals," page 83. Beginning with 1926 the abstract section of this important journal has been published as "*British Chemical Abstracts.* A. Pure Chemistry."

Journal of the South African Chemical Institute. This journal, when it was begun in 1919, was called *Journal of the South African Association of Analytical Chemists;* the above name was adopted in 1922. It is published at Johannesburg. It is a small journal which appears only twice a year. The Institute publishes its *Proceedings* as a separate publication; this does not contain papers.

Proceedings of the Physical Society of London Like *Physical Review,* this journal, in recent volumes, has reflected the fact that the work of the physicist is coming more and more to resemble that of the physical chemist. An abstract accompanies each paper.

Quarterly Journal of the Indian Chemical Society. This comparatively new chemical society publication (started in September, 1924) compares favorably with other such journals, except that of course the number of papers is small compared to the number published in the journals of the larger chemical societies.

Transactions of the Faraday Society. The Faraday Society (named in honor of Michael Faraday) was founded in 1903 "to promote the study of electrochemistry, electrometallurgy, physical chemistry, metallography and kindred subjects" The *Transactions,* started in 1905, contains the full papers read before the Society and the discussions thereon. A separate monthly *Proceedings* contains official notices and abstracts of the papers read during the previous month and of discussions. It is the practice of the Society to print all papers before they are read at a meeting and send them as advance proofs to members. The Faraday Society undertakes in particular the discussion of "borderland" subjects, the full consideration of which involves many branches of science and technology, and the bringing together of men engaged in work of so varied a character as to render such discussions outside the scope of the more specialized scientific and technical societies. The Society aims in a special degree at the coördination of science with practice. Special general discussions on subjects of particular current interest are organized. The *Transactions* is of great value.

Germany

Annalen der Physik. This is another purely physical journal which has considerable present chemical interest.

Berichte der deutschen chemischen Gesellschaft. The *Berichte* started publication in 1868, when the name was *Berichte der deutschen chemischen Gesellschaft zu Berlin.* The "zu Berlin" was dropped in 1877. From 1868 to 1883 the

journal was divided into three distinct parts: (*a*) proceedings, (*b*) reports on chemical research and (*c*) abstracts. From 1883 to 1896 this arrangement was modified in that the abstracts were published separately each month. The publication of abstracts was discontinued after 1896, the *Chemisches Zentralblatt* having become a publication of the German chemical society in 1897. Since 1898 there has been an annual formula index. While general, inorganic, physical, colloid and physiological chemistry are represented among the many papers published each year in this *especially important journal* papers in organic chemistry strongly predominate. Collective indexes have been published every ten years; the volumes of the first three ten-year periods were indexed by subjects and by authors, but since 1896 the decennial indexes have been author indexes only.

Chemiker-Zeitung. See under "Abstract Journals," page 90.

Fortschritte der Chemie, Physik und physikalischen Chemie. Critical reviews of important work in the fields indicated by the journal name are published. The *Fortschritte* is a continuation, since 1909, of the *Physikalisch-chemisches Zentralblatt,* which was begun in 1905. There is a collective index for Vols. 1–5 and one for Vols. 6–16.

Kolloidchemische Beihefte. This journal publishes long papers, sometimes of the nature of monographs, on pure and applied colloid chemistry. It was started in 1910 as a kind of companion journal to *Kolloid-Zeitschrift* (see below).

Kolloid-Zeitschrift. When Dr. Wolfgang Ostwald, the editor of this journal and of *Kolloidchemische Beihefte,* was at the University of California during the period 1904–1906 he resolved to establish a journal for the new field of colloid chemistry on his return to Germany. He found on his return that the publishing house of Steinkopff and Springer had started the *Zeitschrift für Chemie und Industrie der Kolloide* in the summer of 1906 Dr. Ostwald's interest in the new subject became known and he was made editor of the new journal, beginning with its second volume; he later (1913) changed the name to *Kolloid-Zeitschrift.* In addition to numerous papers (uniformly short) on pure and applied colloid chemistry, *Kolloid-Zeitschrift* publishes good comprehensive abstracts of papers in its field. Bibliographies appear from time to time.

Physikalische Zeitschrift Another good physical journal of chemical interest. In January, 1924, the *Jahrbuch der Radioaktivitat und Elektronik* (established in 1904 by Johannes Stark) was combined with this journal.

Zeitschrift fur anorganische und allgemeine Chemie. For many years this journal, founded in 1892, was devoted exclusively to inorganic chemistry, the "und allgemeine" of the present name not having been added until Vol. 92 in 1915. For the specialist in inorganic chemistry this is perhaps the most important journal published. Metallography is given particular attention. There are collective indexes to Vols. 1–50, 51–100 and 101–150. There were abstracts and book reviews in the first 37 volumes, but none has appeared since.

Zeitschrift für Krystallographie (Kristallgeometrie, Kristallphysik, Kristallchemie). This journal was founded in 1877 under the name *Zeitschrift für Kristallo-*

graphie und Mineralogie. The change to its present name occurred after the completion of double number 5/6 of Vol. 55. Papers on mineralogy have not been published since 1919. Abstracts are published. There is a collective index to the first 50 volumes.

Zeitschrift fur Physik. This physical journal, which publishes many papers of chemical interest each year, was formerly called *Berichte der deutschen physikalischen Gesellschaft.* As this indicates, it is the organ of the German physical society.

Zeitschrift fur physikalische Chemie, Stochiometrie und Verwandtschaftslehre. Wilhelm Ostwald and J. H. van't Hoff started this very valuable journal in 1887. Many important papers appear in it and it has done much to help in the development of physical chemistry. Abstracts were published up to 1906. There is a collective index for Vols. 1–24 (1887–1897) and one for Vols. 25–50(1898–1905).

Zeitschrift fur wissenschaftliche Photographie, Photophysik und Photochemie.

France

Annales de chimie. This is the oldest chemical journal still appearing. It was established in 1789. It appeared from 1816 to 1914 under the name *Annales de chimie et de physique,* when it was divided into two separate journals, *Annales de chimie* and *Annales de physique.* The number of papers published is not large but as a rule they are long, frequently comprehensive discussions of results obtained over a comparatively long period and reported part at a time previously, usually in the *Comptes rendus.* There are collective indexes, in most cases for ten-year periods.

Annales de physique. See preceding description.

Bulletin de la société chimique de France. See under "Abstract Journals," page 89.

Journal de physique et le radium. This organ of the Société française de physique is a combination (in 1920) of *Journal de physique pure et appliquée* (founded in 1872, called later *Journal de physique théorique et appliquée*) and *Le radium* (radioactivité, radiations, ionisation) (founded in 1904). Extensive abstracts are included. This combination parallels the combination of *Jahrbuch der Radioaktivität und Elektronik* with *Physikalische Zeitschrift* and both serve to indicate the chemical interest of the physical journals, for the *Jahrbuch* and *Le radium* were both looked on as primarily chemical journals.

Revue générale des colloides et de leurs applications industrielles. This journal (started in 1923) resembles *Kolloid-Zeitschrift* (see p. 52) in subject matter and in the fact that it publishes a considerable number of abstracts.

Italy

Gazzetta chimica italiana. The *Gazzetta* is published by the Associazione italiana di chimica generale ed applicata. It was started in 1871 by Emanuele Paternò. At that time Cannizzaro was the only brilliant light chemically in Italy. He was urged to accept the editorship of the proposed journal; he did so but with so much reluctance that he did not allow his name to appear on the journal, fearing its failure. Paternò really did the work and

soon became editor. This journal, the only strictly chemical journal published in Italy until recent years and still the only one publishing papers in pure chemistry, has been a big factor in chemical development in Italy. It is a valuable publication, reflecting Italy's growth to a place of prominence in chemistry among the nations. Abstracts of foreign papers were published up to 1881. Paternò then started an abstract journal under the name *Appendice alla gazzetta chimica italiana;* it was suspended in its sixth year. Papers on applied as well as pure chemistry were published up to 1913; after that, on account of the establishment of the *Annali di chimica applicata,* only papers in pure chemistry have been given space. There are collective indexes for Vols. 1–20 and Vols. 21–40

Switzerland

Helvetica chimica acta. From its beginning in 1918 this has been a journal full of valuable papers. It belongs in every chemical library. It is published by the Société suisse de chimie; a sum of money furnished by several Swiss chemical works made its strong beginning possible. All of the three national languages of Switzerland are used, namely, French, German and Italian, and an occasional paper is printed in English. Each year there is published a "Liste bibliographique des travaux de chimie faits en Suisse."

Journal de chimie physique. Ph. A. Guye, a Swiss chemist, founded this journal in 1903 at Geneva and was its editor up to the time of his death in 1922. It is now published under the auspices of the *Société de chimie-physique.* It is edited by a committee of Belgian, French and Swiss chemists and is really an international journal. It is the only journal devoted to physical chemistry published in the French language. During the first four or five years a bibliographic analysis of physical-chemical papers was published It is a good journal

Argentine Republic

Anales de la asociación química argentina. This is the organ of the Sociedad química argentina. Besides original papers a few abstracts, mostly of South American publications, are printed.

Austria

Mikrochemie. This little journal at time of writing is the only journal devoted to microchemistry. It was started in 1923 by Pregl.

Monatshefte für Chemie und verwandte Teile anderer Wissenschaften. The *Monatshefte* contains the papers presented before the Akademie der Wissenschaften of Vienna. It is a good journal. The first volume appeared in 1880. Most of the papers deal with organic chemistry, papers of notable value on the radioelements have been published. There is a collective index for the first ten volumes (1880–1889) and for Vols 11 to 22(1890–1901).

Belgium

Bulletin de la société chimique de Belgique. This journal was established in 1887. The *Bulletin de la fédération des industries chimiques de Belgique,* started in 1921, appears bound with it.

Czechoslovakia

Chemické Listy pro vědu a prumysl.

Denmark

Comptes-rendus des travaux du laboratoire Carlsberg.
Kongelige Danske Videnskabernes Selskab, Mathematisk-fysiske Meddelelser, Det.

Holland

Physica. This resembles the other physical journals in containing a good proportion of papers of chemical interest. It was started in 1921.

Recueil des travaux chimiques des Pays-Bas. The *Recueil* was established in 1882 as a private publication; in 1920 it was adopted by the Nederlandsche Chemische Vereeniging. From Vol. 16(1897) to Vol 38(1919) the name was *Recueil des travaux chimiques des Pays-Bas et de la Belgique.* The papers are published, not in Dutch, but in French, English and German (in this order as to frequency). Scientific papers in the field of general, inorganic, organic and analytical chemistry are published; these are mostly by Dutch chemists but not infrequently by chemists of other nations. Many valuable contributions appear in this journal.

Japan

Bulletin of the Chemical Society of Japan This companion journal to the *Journal of the Chemical Society of Japan* (see second description below) had its beginning in January of 1926. It publishes in English, French or German papers communicated to the Society and abstracts of papers published in Japan. It is obviously published for the purpose (a very commendable one) of presenting Japanese chemistry to the world in available form.

Japanese Journal of Chemistry. This is a publication (in English, French and German) of the National Research Council of Japan. Abstracts of Japanese literature as well as full papers are published. It was started in 1922.

Journal of the Chemical Society of Japan. (Nippon Kwagaku Kwai Shi). Because of the great difference of the Japanese language from that of the other countries in which there have been notable chemical advances and of the former greater isolation of Japan this journal is comparatively little known outside of its home country. It was started in 1880 as the *Journal of the Tokyo Chemical Society;* the change to its present name took place in 1921. The Japanese language only is used. Original papers (applied chemistry as well as pure chemistry was covered up to the time of the formation of the Society of Chemical Industry of Japan in 1898) and abstracts (mostly foreign papers) are published.

Poland

Roczniki Chemji. Established in 1921.

Rumania

Buletinul de chimie pură si aplicată, societatea română di stiinte.
Buletinul societătei de chimie din România.

Russia

Journal of the Russian Physical-Chemical Society. Many valuable papers have appeared in this journal. "Physical-Chemical" in the title does not mean that the field of the journal is physical chemistry. There is a chemical part and a physical part (separate publications). The chemical part covers about the same field as the *Journal of the American Chemical Society.* This journal was suspended for a while as a result of the World War but the volumes for the war years have been made up. It was established in 1869. The Russian language only is used. There is usually given a table of contents in French.

Spain

Anales de la sociedad española de fisica y química. The chemical productivity of Spain is not large. This journal is the only Spanish chemical journal of importance.

Sweden

Arkiv for Kemi, Mineralogi och Geologi. This little irregularly appearing publication of the K. Vetenskapsakademiens Nobelinstitut sets a high standard of requirement for its papers. It was started in 1902, being called "*Bihang,*" etc., during the first year. There are three other similar publications, the only one of chemical interest (and that only occasionally) being *Arkiv for Matematik, Astronomi och Fysik.*

Meddelanden från K. Vetenskapsakademiens Nobelinstitut. Its field is physical chemistry. Publication was started in 1905. Sv. Arrhenius has been chief of the Institute for many years.

Svensk Kemisk Tidskrift.

3. APPARATUS AND PLANT EQUIPMENT

Germany

Chemische Apparatur. This is the only chemical journal devoted exclusively to apparatus. It was started in 1914. A few abstracts, including patents, are published.

4. ELECTROCHEMISTRY

United States

Transactions of the American Electrochemical Society. There is a volume for each meeting of the Society, which was organized in 1902. Two meetings per year are held. The papers are issued in preprint form. In the bound *Transactions* discussions of the papers are included. There is a collective index to the first twenty volumes and one to Vols. 21–40 inclusive(1912–1921).

Germany

Zeitschrift fur Elektrochemie und angewandte physikalische Chemie. Zeitschrift für Elektrochemie (the original name was limited to this) was started by

Arthur Wilke and W. Borchers in 1894. It was soon taken over by the Deutsche Elektrochemische Gesellschaft. In 1904 the journal name was added to as shown above and also the name of the society was changed to Deutsche Bunsen-Gesellschaft. In the early volumes many papers and abstracts on pure electrochemistry were published but for many years now the field of this journal has really been general and physical chemistry. Books are reviewed now but no abstracts of papers are published. Collective indexes are published.

5. PHOTOGRAPHY

United States

Transactions of the Society of Motion Picture Engineers.

British Empire

British Journal of Photography. A good journal containing full papers, abstracts of British patents, book reviews and trade news

Photographic Journal. Full papers only. This is one of the best of the scientific photographic journals.

Germany

Photographische Industrie. Besides full papers and trade news this journal publishes abstracts of German patents of photographic interest.

Photographische Korrespondenz. Previous to 1921 this was the leading German photographic journal. It has been issued irregularly since then. A return, under new management, to its old standard has been predicted.

France

Bulletin de la société française de photographie. A limited number of abstracts is included.

Revue française de photographie.

Switzerland

Camera (Luzern).

6. INORGANIC CHEMISTRY

[The only journal devoted exclusively to this field is the former *Zeitschrift fur anorganische Chemie*, now the *Zeitschrift fur anorganische und allgemeine Chemie*, described on page 52.]

7. ANALYTICAL CHEMISTRY

British Empire

Analyst, The. In 1876 *The Proceedings of the Society of Public Analysts* was started. In the next year *The Analyst*, which had been started by Dr. Muter, was acquired by the Society of Public Analysts; it took the place of the *Proceedings*. This society is now called the Society of Public Analysts and Other Analytical Chemists and *The Analyst* is a journal of everything

connected with analytical chemistry. Extensive abstracts in addition to full papers and notes are published. There is a collective index to the first twenty volumes and one for each ten volumes thereafter.

Germany

Zeitschrift fur analytische Chemie. This journal, sometimes called Fresenius' journal, was founded by Remigius Fresenius in 1862 and has since been edited and published in turn by him, his sons Heinrich and Wilhelm, and their respective sons Remigius and Ludwig. Full critical abstracts in addition to original papers are published. Ten-year collective indexes are issued.

France

Annales de chimie analytique et de chimie appliquée et revue de chimie analytique réunies. This little journal with a big name was begun in 1893. In 1899 *Revue de chimie analytique* was incorporated with it. Abstracts are published.

8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY

United States

American Mineralogist, The. Edgar T. Wherry, first editor, says that this journal was started in July, 1916, by a "group of amateur mineralogists." It is a good little journal. In January, 1920, the name "*Journal of the Mineralogical Society of America*" was added. The field of mineralogy is covered both from a scientific and a nontechnical point of view. Abstracts are included.

Bulletin of the Geological Society of America.

Economic Geology.

Journal of Geology, The.

British Empire

Geological Magazine, The.

Mineralogical Magazine and Journal of the Mineralogical Society. This journal has a supplementary abstract journal, *Mineralogical Abstracts,* which is described under "Abstract Journals" (see page 94). Ten-year collective indexes are published.

Quarterly Journal of the Geological Society, The.

Germany

Centralblatt fur Mineralogie, Geologie und Paläontologie. This has been published since 1900 as a kind of supplement to *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie* (see below).

Fortschritte der Mineralogie, Krystallographie und Petrographie. A good review journal.

Neues Jahrbuch für Mineralogie, Geologie und Paläontologie. This journal is a continuation of *Taschenbuch für die gesamte Mineralogie,* founded in 1807.

From 1825 to 1830 the title was *Zeitschrift fur Mineralogie;* then it became the *Jahrbuch fur Mineralogie, Geognosie, Geologie und Petrefaktenkunde. "Neues"* was added to this title in 1833. The present title was adopted in 1861. Abstracts are included.

9. METALLURGY AND METALLOGRAPHY

United States

Blast Furnace and Steel Plant, The. A trade journal.

Engineering & Mining Journal. After the combination (in 1922) of *Engineering Mining Journal* and *Mining and Scientific Press* this journal was called *Engineering & Mining Journal-Press* till July, 1926. Papers of metallurgical and occasionally of geological interest are published

Iron Age, The. A valuable trade journal which carries a prodigious amount of advertising.

Mining and Metallurgy. In this publication of the American Institute of Mining and Metallurgical Engineers are published abstracts of Institute papers and items of interest to members. It was started in its present form in 1919. Previous to that the Institute (organized in 1871) published a *Bulletin* in which the papers appeared in full. See *Transactions* immediately below.

Transactions of the American Institute of Mining and Metallurgical Engineers. This is perhaps the most important publication appearing in the field of mining and metallurgy. The many papers published each year are issued first in preprint form; discussions of them are included in the *Transactions.*

Transactions of the American Society for Steel Treating

British Empire

Bulletin of the Institution of Mining and Metallurgy. Long discussions usually accompany the papers. An "Index of Recent Papers" (titles and references) is published.

Journal of the Chemical, Metallurgical and Mining Society of South Africa. Long discussions of papers are usually published. There are a few abstracts.

Journal of the Institute of Metals. This publication has been appearing since 1909. It deals with the whole of nonferrous metallurgy after the metal has assumed the ingot form. Extensive abstracts are published. There is a collective index to the first 25 volumes (1909–1921).

Journal of the Iron and Steel Institute In 1869 the journal was started as the *Transactions;* from Vol. 3(1871) the present name has been used. Beside papers and discussions, many abstracts are published; the field of iron and steel metallurgy is covered thoroughly. There are collective indexes. Commencing with 1909 the Institute has been publishing also the *"Carnegie Scholarship Memoirs,"* an annual volume usually, in which are reported the results of work carried out with the aid of a grant presented by the late Mr. Andrew Carnegie.

Germany

Metall und Erz, Zeitschrift für Metallhüttenwesen und Erzbergbau einschl. Aufbereitung.

Stahl und Eisen. A good journal.

Zeitschrift für Metallkunde. This journal was called *Internationale Zeitschrift fur Metallographie* at first (founded in 1911) but the above name was substituted in 1919. Good papers and good abstracts are published.

France

Revue de métallurgie. This is the only important French metallurgical journal. In addition to valuable papers it publishes many abstracts which often are quite long. It was founded by Henri LeChatelier in 1904.

10. ORGANIC CHEMISTRY

[Several of the journals described above in classes 1 and 2 are of special interest to organic chemists, being devoted in large part to this subject. Worthy of special mention in this connection are the *Journal of the American Chemical Society*, the *Journal of the Chemical Society*, the *Berichte der deutschen chemischen Gesellschaft*, the *Monatshefte fur Chemie und verwandte Teile anderer Wissenschaften*, the *Bulletin de la société chimique de France*, the *Comptes rendus*, the *Gazzetta chimica italiana*, the *Helvetica chimica acta*, the *Recueil des travaux chimiques des Pays-Bas*, the *Journal of the Chemical Society of Japan* and the *Journal of the Russian Physical-Chemical Society*. The two German journals briefly described below are the only current journals devoted exclusively to organic chemistry.]

Germany

Annalen der Chemie, Justus Liebigs. The *Annalen*, as this well known journal is usually called, was started by Justus Liebig in 1832 under the name *Annalen der Pharmacie*. It was in a sense a continuation of *Archiv des Apothekervereins im nördlichen Teutschland* and the *Magazin fur Pharmacie und Experimental Kritik*. In 1834 the *Neues Journal der Pharmacie fur Aerzte, Apotheker und Chemiker* was absorbed by the *Annalen*. With the thirty-third volume (1840) the name was changed to *Annalen der Chemie und Pharmacie;* this name was continued until Vol. 173 (1874), when the present name was adopted. This journal has played a big rôle in the development of chemistry It is now devoted exclusively to organic chemistry but in the earlier volumes, in fact up to within the last decade or two, it furnished its readers with papers reporting investigations in various fields of chemistry. Many of the papers are long and of special importance. There are collective indexes for the following series of volumes: 1–116, 117–164, 165–220, 221–276, 277–328, 329–380.

Journal für praktische Chemie. This periodical dates back to 1834. In the early volumes various branches of chemistry are dealt with but for many years the papers published have been almost exclusively in the field of organic chemistry. It is a good journal. There are collective indexes to Vols. 1–30, 31–60, 61–90 and 91–108 of the old series and to Vols. 1–50 and 51–100 of the new series.

11. BIOLOGICAL CHEMISTRY

[The number of journals devoted to biology or medicine or some specific phase thereof is large. Most of them contain at least an occasional paper of chemical interest, some of them a good many such papers. Only those of special value to the chemist are listed here.]

United States

American Journal of Physiology, The. This is of course not really a chemical journal but each year it publishes many valuable papers of definite chemical interest.

Journal of the American Medical Association, The. This valuable journal publishes a considerable number of papers and abstracts of biochemical or pharmaceutical interest.

Journal of Biological Chemistry, The. This is America's most important biochemical journal. It was founded by Christian A. Herter in 1905 and is "edited for the American Society of Biological Chemists." The Proceedings of this society (brief advance reports of papers) as well as numerous full papers are published. There are collective indexes for Vols. 1–25(1905–1916) and Vols. 26–50(1916–1922).

Journal of General Physiology, The. Most of the papers appearing in this physiological journal are of chemical interest.

Journal of Metabolic Research, The.

Journal of Pharmacology and Experimental Therapeutics.

Journal of Urology, Experimental Medical and Surgical.

Stain Technology.

British Empire

Biochemical Journal, The. This is the only important British biochemical journal. It was started in 1906. On the formation of the Biochemical Society in 1912 this journal was taken over by the new society. All subjects included in the chemical aspect of animal and plant physiology, excluding special bacteriology, come within the scope of *The Biochemical Journal.* Ten-year collective indexes are published.

Journal of Physiology, The. This is another physiological journal of considerable chemical interest.

Germany

Archiv für experimentelle Pathologie und Pharmakologie.

Archiv fur die gesamte Physiologie des Menschen und der Tiere (Pflügers).

Biochemische Zeitschrift. Since its beginning in 1906 this journal has been a prolific publisher of biochemical papers. They are usually brief. Several volumes are issued every year. In 1908 Hofmeister's *Beiträge zur chemischen Physiologie und Pathologie* was merged with it. A collective index is published at each 30-volume interval.

Chemie der Zelle und Gewebe. This was formerly the *Zeitschrift für technische Biologie.*

Fermentforschung. This journal was established in 1916. It publishes good papers on enzymes and their action.

Protoplasma. Internationale Zeitschrift für physikalische Chemie der Protoplasten. Started in 1926

Zeitschrift für Immunitatsforschung und experimentelle Therapie.

Zeitschrift fur physiologische Chemie (Hoppe-Seylers) This was the first of the important current biochemical journals to appear. It was started in 1877 by Hoppe-Seyler. The papers appearing in this journal are usually longer and more comprehensive than those appearing in *Biochemische Zeitschrift.* The whole field of biochemistry is covered. Thirty-volume collective indexes are published.

France

Bulletin de la société de chimie biologique The *Bulletin* was founded in 1919. Some of the papers appear first in the *Comptes rendus hebdomadaires des séances de l'académie des sciences*

Comptes rendus des séances de la société de biologie A great many of the brief papers published in this journal are of chemical interest

Journal de physiologie et de pathologie générale

Japan

Journal of Biochemistry (Japan) This journal was started in 1922. It is published in English, French and German.

12. FOODS

United States

Cereal Chemistry. This was formerly called *The Journal of the American Association of Cereal Chemists,* the new name having been adopted in 1924. The chemistry of flour and bakery products receives the most attention.

Journal of Dairy Science. Journal of Dairy Science was first published in 1918. Studies dealing with the chemistry of milk and its products are very frequently reported in this journal. Feeding experiments relating to milk production come within the scope of the journal.

Germany

Zeitschrift für Untersuchung der Lebensmittel. This was called *Zeitschrift für Untersuchung der Nahrungs- und Genussmittel sowie der Gebrauchsgegenstände* from 1898 to 1926. It was established in 1882 as *Vierteljahresschrift der Chemie der Nahrungs- und Genussmittel.* It is the most important journal devoted exclusively to scientific studies of foods. It is not a trade journal. There is an abstract section.

France

Annales des falsifications et des frauds, Les. A considerable proportion of the papers published in this journal relate to foods. It was started in 1908. There is an abstract section.

Switzerland

Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene. This journal deals mainly with the analytical chemistry of foods. It is published by the Swiss Board of Health and was started in 1910.

13. GENERAL INDUSTRIAL CHEMISTRY

United States

Chemical & Metallurgical Engineering. Several changes in name and frequency of appearance of this journal have occurred. When it was started in September, 1902, its name was *Electrochemical Industry.* In January, 1905, the name was made *Electrochemical & Metallurgical Industry;* five years later it was made *Metallurgical & Chemical Engineering.* The rearrangement to the present name occurred in July, 1918. The men mainly instrumental in establishing this journal were Carl Hering, J. W. Richards, W. D. Weaver and E. F. Roeber. *The Iron & Steel Magazine* was combined with *Electrochemical & Metallurgical Industry* in 1906. The field covered by this journal has also varied. as the names suggest. From its original position as an exponent of the electrochemical industry, it expanded to take in electrometallurgy. It helped in establishing the commercial success of the electric furnace, which it championed through the period when there were many who thought that the electric furnace would never be more than a scientific toy. With the development of chemical industry in the United States this journal began to devote space to other phases of chemistry besides electrochemistry and electrometallurgy. Its present field has been described as "the technology of industry." It is more a technical journal than a trade journal. "Chem. & Met ," as the journal is often called, may be said to be strong on chemical engineering. It is a good source of chemical news, statistics and of more or less general information of interest to the chemical engineer. The number of reports of research work published is somewhat limited. "Chem. & Met." is a useful and well managed journal.

Chemicals. This is a trade journal formed by the consolidation in 1925 of *Chemical, Color and Oil Record, Chemical Age and the Chemical Engineer* and *Color Trade Journal and Textile Chemist.*

Industrial and Engineering Chemistry. This publication of the American Chemical Society is of very great value. It publishes more good papers reporting new work of value to the industrial chemist than any other journal in the world. It was started in 1909. Originally the name was *Journal of Industrial and Engineering Chemistry;* the shorter name was adopted in 1923. The first editor was W. D. Richardson. This journal has counted among its editors such other able men as M. C. Whitaker, Charles H. Herty and Harrison E. Howe. "I. E. C.," as this journal is sometimes called, is not a trade journal in the usual sense of this expression It serves the chemical industry in part by providing trade information, as price lists, by its editorials, by its many advertising pages, by letters from foreign correspondents and in other ways employed by trade journals but it differs from them in that it publishes so many original papers reporting research work. It

has first claim on all of the many papers of industrial aspect presented before the meetings of the American Chemical Society. Every phase of industrial chemistry is represented. Frequently symposiums on chemical subjects, as fuels, are reported in the form of the group of papers presented, making these numbers of special value to those interested in the subjects involved. The September number in recent years has contained a considerable number of reviews on industrial chemical subjects. The book reviews are numerous and valuable; lists of new books are also given. A page or two in each number is devoted to a review of the publications of chemical interest issued by the U. S. government bureaus. An interesting feature is the "American Contemporaries" section in which there appears each month a brief biography, with portrait, of a chemist who has made valuable contributions to American chemistry in one way or another. These are usually written in interesting style by men who are themselves prominent in chemistry and if collected and published separately would make a valuable biographical collection. The reading of them by students is recommended for their inspirational value. Beginning with January, 1923, there has been published a semi-monthly *News Edition* of *Industrial and Engineering Chemistry*. Its name tells its function. News relative to American Chemical Society affairs receives particular attention. An employment service for chemists is conducted.

Mechanical Engineering. Valuable papers on fuels and other chemical subjects are frequently to be found in this journal.

Official Gazette of the United States Patent Office, The. See under "Patents," page 113.

Proceedings of the American Society for Testing Materials. This useful publication was started as a *Bulletin* in 1898 by the American Section of the International Association for Testing Materials. In 1902 the American Section was formally organized as the American Society for Testing Materials. The *Bulletins* issued from 1898 to 1902 are collected as Vol. 1 of the *Proceedings*. Original papers and numerous committee reports dealing with engineering materials, with particular reference to the standardization of specifications and methods of testing, are published. Most of the information is of more or less interest to chemists. Collective indexes are published.

Transactions of the American Institute of Chemical Engineers. Valuable papers and discussions are published in this journal, which was an annual up to 1920, when it started appearing in two parts each year. The number of papers is not large, however, and a considerable proportion of them appear previously in journals of more frequent appearance. The *Transactions* first appeared in 1909. The Institute also publishes *Bulletins* (since 1913) in which the proceedings of meetings, including committee reports, are published.

British Empire

Canadian Chemistry and Metallurgy. In May, 1917, *Canadian Chemical Journal*, as this publication was originally called, was started. Its present name was

adopted in 1921. This was the first journal of its kind to be published in Canada. It is now the official organ of the Canadian Institute of Chemistry, though not backed financially nor controlled thereby. An effort is made to serve the whole of Canadian chemistry and chemical industry. Articles of varied nature and field are published Surveys of chemical progress in Canada are presented.

Chemical Age, The (London). The object of the publishers of this journal (they started it in 1919) has been to provide a "technical journal which should deal particularly with developments of industrial and engineering chemistry and their commercial applications, and serve as an independent review of the 'politics' of British industrial chemistry." The number of first-hand reports of research published is not large.

Chemical Trade Journal and Chemical Engineer, The. As the name suggests, this is strictly a trade journal. It is filled with trade statistics and news. Most of the new chemistry is quoted.

Chemistry & Industry. See *Journal of the Society of Chemical Industry*, page 84.

Engineering. This is such a good engineering journal that it deserves brief mention among the chemical journals. Almost every number contains at least one paper of chemical interest, metallography being the subject most frequently treated.

Illustrated Official Journal, The. See under "Patents," page 114.

Journal of the Society of Chemical Industry. See under "Abstract Journals," page 84.

Germany

Kunststoffe. Zeitschrift für Erzeugung und Verwendung veredelter oder chemisch hergestellter Stoffe. Established in 1911.

Zeitschrift für angewandte Chemie. This journal, which was preceded by *Repertorium der analytischen Chemie* (1881–1887), was started in 1888 as the organ of the Deutsche Gesellschaft für angewandte Chemie. The name of this organization was changed in 1896 to Verein deutscher Chemiker. *Zeitschrift für angewandte Chemie* resembles the *Journal of the Society of Chemical Industry* as to contents, except that the abstract section no longer appears. There is a section devoted to original papers in the field of applied chemistry with occasional reviews, and one devoted to trade statistics and news and the like. The earlier so-called "Wirtschaftlicher Teil" was replaced during 1921–2 by *Chemische Industrie*, which appeared previously in separate form as the organ of the Verein zur Wahrung der Interessen der chemischen Industrie and now appears separately again. Abstracts were published in considerable number up to the end of 1918, when they became the "Technischer Teil" of *Chemisches Zentralblatt.* Patents (see page 117), as well as papers in the field of applied chemistry, were covered. This journal is Germany's most important industrial chemical journal.

Zeitschrift des Vereines deutscher Ingenieure. This is another very good engineering journal which usually contains at least one paper per week of chemical value.

France

Chimie & industrie. This is by far the best industrial chemical journal of France. For description see under "Abstract Journals," page 90.

Industrie chimique, L'.

Revue de chimie industrielle, La, et le moniteur scieniifique Quesneville.

Revue des produits chimiques, La.

Italy

Annali di chimica applicata This journal was founded at Rome in 1914. Its name was changed in February, 1920, to *Giornale di chimica applicata* and then in March, 1920, it was combined with *Giornale di chimica industriale ed applicata.* Since 1923 it has been separated again and appears under its original name. It is a valuable little journal.

Giornale di chimica industriale ed applicata. The *Giornale* was started in August, 1919, with the name *Giornale di chimica industriale,* by the Società di chimica industriale. It is in a sense a continuation of *Industria chimica mineraria e metallurgica* (1914–1919), which in turn followed *L'industria chimica* (1903–1914), a journal preceded by *La chimica industriale* (1899–1902). Starting with March, 1920, the name was made *Giornale di chimica industriale ed applicata,* when it became a joint publication of the Società di chimica industriale (Milan) and the Associazione italiana di chimica generale ed applicata (Rome), the latter society's *Giornale di chimica applicata* being then discontinued. This journal publishes good papers and is useful in spite of its protean changes in name.

Switzerland

Technik und Industrie und Schweizer Chemiker-Zeitung.

Belgium

Bulletin de la fédération des industries chimiques de Belgique.

Holland

Chemisch Weekblad. This publication of the Nederlandsche Chemische Vereeniging was established in 1903. Before this society took over the *Recueil des travaux chimiques des Pays-Bas* in 1920 *Chemisch Weekblad* was devoted in large part to pure chemistry but since 1920 this journal has resembled other industrial chemical journals published by societies, being now a source of trade news and reviews as well as of original articles. Dr. W. P. Jorissen, for many years its editor, has described *Chemisch Weekblad's* field as "chemical-economical" and "chemical-industrial."

Japan

Chemical Technology, The (Japan).

Journal of the Society of Chemical Industry (Japan). Kogyo-Kwagaku Zasshi (the transliterated name) was established in 1898. Chemical products of special interest to Japan naturally receive most attention. The monthly

issues of this journal run about 80 pages of original papers, 40 pages of abstracts of journal articles and patents and 10 pages of miscellaneous notes. Except for English or German abstracts of the original papers the journal is printed in Japanese only.

Russia

Journal of the Chemical Industry (Russia).

14. WATER, SEWAGE AND SANITATION

United States

American Journal of Hygiene, The.

American Journal of Public Health

Engineering News-Record. This engineering journal makes a sort of specialty of that branch of municipal engineering which deals with water supply and sewage disposal. It is a combination of the former *Engineering News* and *Engineering Record.*

Journal of the American Water Works Association. This excellent journal has an extensive abstract section. In this section more attention is given to the engineering side of water purification and supply than is given by *Chemical Abstracts.* The journal has been appearing since 1919.

Journal of Industrial Hygiene. Because limited to industrial hygiene this journal is of more interest to chemists than the other hygiene journals. There is a fairly extensive abstract section. The journal was established in 1920.

Municipal and County Engineering.

Public Works.

British Empire

Journal of Hygiene, The.

Water and Water Engineering.

Germany

Archiv fur Hygiene.

Wasser und Gas.

15. SOILS, FERTILIZERS AND AGRICULTURAL POISONS

[The number of agricultural journals is very large. Many of them contain at least an occasional article of scientific chemical interest. Furthermore, there are numerous agricultural experiment stations which issue bulletins, circulars and the like. Only the journals of special scientific interest are listed below.]

United States

Journal of Agricultural Research. This journal is published by the United States Department of Agriculture in coöperation with the Association of American Agricultural Colleges and Experiment Stations. It was established in 1913. The pages of this journal are limited to reports of essential data and conclusions of original research conducted by scientists of the De-

partment of Agriculture or the state agricultural experiment stations. Papers which are purely of systematic and taxonomic interest or which furnish descriptions of local variety tests or routine analyses which merely contribute to the mass of similar data are not considered suitable for publication.

Journal of the Association of Official Agricultural Chemists. The Association was organized in 1884. The proceedings of its meetings were for a long time published in bulletin form by the Department of Agriculture. The *Journal* was started in May, 1915. Publication was suspended from May 15, 1917 to November 15, 1919. Besides original papers this journal contains committee reports on changes in and additions to the official and tentative methods of analysis. The journal is "of interest to the fertilizer, soil, cattle, food, dairy, drug, plant and other chemists connected with the agricultural industry."

Soil Science. Soil Science was established by Jacob G. Lipman in 1916. It is devoted to the publication of papers dealing with the physics, chemistry and microbiology of soil, with a few papers on plant physiology.

British Empire

Journal of Agricultural Science, The. Dr. E. J. Russell, director of the Rothamsted Experiment Station, has written: "Practically all the important papers on agricultural chemistry, physics and soil microbiology published in" England "have appeared in this journal; but as a rule those on biology and plant pathology have been published in the *Annals of Applied Biology;* physiological and botanical papers in the *Annals of Botany;* and ecological papers in the *Journal of Ecology.*" *The Journal of Agricultural Science* was started in 1905.

Germany

Zeitschrift fur Pflanzenernahrung und Dungung.

France

Comptes-rendus des séances de l'académie d'agriculture de France.

Holland

Verslagen van Landbouwkundige Onderzoekingen der Rijkslandbouwproefstations.

16. THE FERMENTATION INDUSTRIES

[There are no journals of outstanding chemical value in this field. Since the passing of the prohibition amendment in the United States the trade journals for the brewing and like industries have been discontinued. In England the *Journal of the Institute of Brewing* and in Germany the *Wochenschrift fur Brauerei,* the *Zeitschrift fur das gesamte Brauwesen* and the *Zeitschrift fur Spiritusindustrie* are of particular interest.]

17. PHARMACEUTICAL CHEMISTRY

United States

American Journal of Pharmacy. This long-established journal (started in 1830) has greatly decreased in value as a source of papers reporting new research work since the establishment of the *Journal of the American Pharmaceutical Association* in 1912. It publishes abstracts, only a few now, however.

American Perfumer and Essential Oil Review, The.

Journal of the American Pharmaceutical Association. From its organization in 1852 up to 1906 the American Pharmaceutical Association published *Annual Proceedings* in which papers were included. From 1906 to 1912 a *Bulletin* was issued; then in 1912 the *Journal* was founded. The *Proceedings* for many years contained a "Report on the Progress of Pharmacy;" after the establishment of the *Journal* this was continued in the *Year Book.* There is a collective index to the *Proceedings* published in 1902 and covering the work of the Association from the beginning. The *Journal* is devoted mainly to the scientific side of pharmacy; it publishes many good papers.

British Empire

Perfumery and Essential Oil Record.

Pharmaceutical Journal and Pharmacist, The. This is the official organ of the Pharmaceutical Society of Great Britain. It was established in 1841. It is more or less of the trade journal type.

Germany

Archiv der Pharmazie. This journal was founded in 1822 by the Apotheker-Verein im nördlichen Teutschland as *Archiv des Apotheker- Vereins im nördlichen Teutschland.* Vols. 40–50(1832–1834) were called Vols. 1–12 of *Annalen der Pharmacie.* The name *Archiv der Pharmacie* was adopted in 1835. To form the above-mentioned *Annalen der Pharmacie* the *Magazin fur Pharmacie und Experimentalkritik* and the *Neues Journal der Pharmacie fur Aerzte, Apotheker und Chemiker* were combined with the *Archiv des Apotheker-Vereins im nördlichen Teutschland.* Good papers are published. The present field of the journal (since 1890) is pharmaceutical chemistry and pharmacognosy. There are collective indexes for the periods (1) 1822–1857 and (2) 1858–1873. In 1923 *Vierteljahresschrift fur praktische Pharmazie* and in 1924 *Berichte der deutschen pharmazeutischen Gesellschaft* were combined with *Archiv der Pharmazie.*

Pharmazeutische Zentralhalle für Deutschland.

Pharmazeutische Zeitung, Die deutsche.

France

Journal de pharmacie et de chimie. Bulletin de pharmacie, the original name of this journal, was founded in 1809. In 1814 the name became *Bulletin de pharmacie et des sciences accessoires.* In this name "Bulletin" was changed to "Journal" in 1815. The present name was adopted in 1842. This journal is of more chemical interest than the average pharmaceutical journal.

Répertoire de pharmacie. The *Répertoire* is devoted mostly to abstracts.

Italy

Bollettino chimico-farmaceutico.
Giornale di farmacia, di chimica e di scienze affini

Switzerland

Schweizerische Apotheker Zeitung. The French name, *Journal suisse de pharmacie,* and the Italian name, *Giornale svizzero di farmacia,* are sometimes used.

Austria

Pharmazeutische Monatshefte.
Pharmazeutische Post.

Belgium

Journal de pharmacie de Belgique. A comparatively new journal (established in 1919) which has made a good start.

Denmark

Archiv for Pharmaci og Chemi.

Holland

Pharmaceutisch Weekblad. This journal publishes some chemical papers (particularly on analytical chemistry) which are outside the field of pharmaceutical chemistry and is of special interest to chemists on that account.

Japan

Journal of the Pharmaceutical Society of Japan (Yakugakuzasshi). Good papers in the field of organic chemistry in addition to papers in pharmaceutical chemistry are published.

Sweden

Svensk Farmaceutisk Tidskrift.

18. ACIDS, ALKALIES, SALTS AND SUNDRIES

[There are no important journals devoted exclusively to these subjects. The journals under "13. General Industrial Chemistry" above are most apt to carry such papers]

19. GLASS, CLAY PRODUCTS, REFRACTORIES AND ENAMELED METALS

United States

Journal of the American Ceramic Society. The American Ceramic Society, which was founded in 1899, published only an annual book (called *Transactions*) for

many years. In 1918 the monthly *Journal* was established. It is a valuable source of original papers and has in two separately paged sections, respectively, a set of abstracts and a "*Bulletin*" section devoted to "proceedings of the Society, discussions of plant problems, discussions of technical, scientific and art questions and promotion of coöperative research." There is a collective index to the nineteen volumes of *Transactions* (1899–1917).

Glass Industry, The. A good trade journal.

British Empire

Journal of the Society of Glass Technology. From its beginning in 1917 this journal has been the most important one published which is devoted to glass. There is an extensive abstract section in addition to the section devoted to original papers.

Transactions of the Ceramic Society (including Refractory Materials Section). This Society was founded in 1900 as "the North Staffordshire Ceramic Society" and continued from 1903 to 1916 as "The English Ceramic Society." The *Transactions*, which now appear in two or more parts per year, contain abstracts in considerable number as well as original papers.

Germany

Keramische Rundschau.

Sprechsaal, Zeitschrift fur die keramischen, Glas- und verwandten Industrien.

Tonindustrie-Zeitung.

France

Céramique, La.

Japan

Journal of the Japanese Ceramic Society

20. CEMENT AND OTHER BUILDING MATERIALS

[A big part of the research in this field is published in the general chemical journals like *Industrial and Engineering Chemistry* or in the engineering journals. The following specialized journals, however, are worthy of note.]

United States

Concrete.

Proceedings of the American Concrete Institute.

Proceedings of the American Wood-Preservers' Association.

Germany

Zement.

France

Revue des matériaux de construction et de travaux publics, La.

21. FUELS, GAS, TAR AND COKE

United States

Gas Age-Record. In 1921 *Gas Age* and *Gas Record* combined to form this journal.

British Empire

Colliery Guardian and Journal of the Coal and Iron Trades.
Fuel in Science and Practice.
Gas Journal.
Gas World, The.

Germany

Braunkohle.
Brennstoff-Chemie. To the chemist this is perhaps the most valuable of the fuel journals. It was started in 1920.
Feuerungstechnik.
Gas und Wasserfach, Das.

France

Chaleur et industrie.
Journal de usines à gaz.

22. PETROLEUM, LUBRICANTS, ASPHALT AND WOOD PRODUCTS

[The number of trade journals devoted to this field is very large The scientific papers on petroleum usually appear, first at least, in the industrial chemical journals or the engineering journals. The most valuable petroleum journal is the British *Journal of the Institute of Petroleum Technologists* (it publishes abstracts; established in 1915). Next comes the German *Petroleum (Zeitschrift fur die gesamten Interessen der Mineralol-Industrie und des Mineralol-Handels)*]

23. CELLULOSE AND PAPER

[This industry, like the petroleum industry, has many trade journals. There are more journals in this case, however, which carry papers of scientific interest.]

United States

Paper Industry
Paper Trade Journal. This journal publishes abstracts prepared by a committee of the Technical Association of the Pulp and Paper Industry. These were formerly published in *Paper* (discontinued in 1925).

British Empire

Paper Maker and British Paper Trade Journal.
Paper Makers' Monthly Journal, The.
Proceedings of the Technical Section of the Paper-Makers' Association of Great Britain and Ireland.
Pulp and Paper Magazine of Canada.
World's Paper Trade Review, The.

Germany

Cellulosechemie. (Supplement to *Der Papier-Fabrikant.*)
Papier-Fabrikant, Der.
Wochenblatt fur Papierfabrikation.
Zellstoff und Papier.

24. EXPLOSIVES AND EXPLOSIONS

United States

Army Ordnance.

Germany

Zeitschrift fur das gesamte Schiess- und Sprengstoffwesen. This journal, established in 1906, is perhaps the most valuable of the journals devoted to explosives and related subjects.

France

Mémorial des poudres.

25. DYES AND TEXTILE CHEMISTRY

United States

American Dyestuff Reporter. The *Proceedings of the American Association of Textile Chemists and Colorists* appears as a part of this journal and in this part as well as in the rest of the journal there are published many original papers on textiles, dyes and dyeing.
Textile World (formerly *Textile World Journal*).

British Empire

Journal of the Society of Dyers and Colourists. Many good original papers and an extensive set of abstracts of both papers and patents are published in this periodical. It was established in 1884 There is no better dye journal.
Journal of the Textile Institute, The. This is the official journal for communications of the British Cotton Industry Research Association, British Research Association for the Woolen and Worsted Industries, Linen Industry Research Association, and British Silk Research Association. An abstract section is included. The journal was started in 1910.

Germany

Melliands Textilberichte. This is a continuation of *Textilberichte uber Wissenschaft, Industrie und Handel.* It is an excellent journal.
Kunstseide. Formerly called *Faserstoffe und Spinnpflanzen* and before that *Deutsche Faserstoffe und Spinnpflanzen.*

France

Revue génerale des matières colorantes de la teinture, de l'impression, du blanchiment et des apprêts.

26. PAINTS, VARNISHES AND RESINS

United States

Oil, Paint and Drug Reporter. Good for trade statistics. It has been appearing since 1871.

British Empire

Journal of the Oil and Colour Chemists' Association. The Paint and Varnish Society has been incorporated with the Oil and Colour Chemists' Association. The *Journal* is small but valuable. It has an abstract section.

Germany

Farben-Zeitung. A good trade journal.

27. FATS, FATTY OILS, WAXES AND SOAPS

United States

Oil and Fat Industries. This comparatively new journal (established in 1924) is really an outgrowth of the former *Cotton Oil Press.* It publishes abstracts as well as full papers.

Germany

Chemische Umschau auf dem Gebiete der Fette, Oele, Wachse und Harze. Formerly called *Chemische Revue über die Fett- und Harz-Industrie.*
Seifensieder-Zeitung.
Zeitschrift der deutschen Öl- und Fett-Industrie (formerly *Seifenfabrikant*).

France

Matières grasses.

28. SUGAR, STARCH AND GUMS

United States

Facts About Sugar.
Planter and Sugar Manufacturer. This was formerly called *The Louisiana Planter and Sugar Manufacturer.*
Sugar. This journal was formerly known as *American Sugar Industry.*
Sugar News. Published at Manila, P. I.

British Empire

International Sugar Journal, The. This little journal, which should be in every sugar chemist's library, publishes abstracts as well as original papers. In 1899 it succeeded *Sugar Cane,* which was started in 1869.

Germany

Centralblatt fur die Zuckerindustrie.
Deutsche Zuckerindustrie, Die.
Zeitschrift des Vereins der deutschen Zucker-Industrie.

France

Bulletin de l'association des chimistes de sucrerie et de distillerie de France et des colonies.

Belgium

Sucrerie belge, La.

Czechoslovakia

Listy Cukrovarnické.
Zeitschrift für Zuckerindustrie der cechoslovakischen Republik.

Holland

Archief voor de Suikerindustrie in Nederlandsch-Indië. A good many valuable papers appear here.

29. LEATHER AND GLUE

United States

Journal of the American Leather Chemists' Association, The. This valuable leather journal (started in 1906) publishes original papers, reprints the more important papers of its field from other sources and abstracts the rest, its abstract section being truly comprehensive. Ten-year collective indexes are published.

British Empire

Journal of the International Society of Leather Trades' Chemists. This is a good journal which closely resembles the *Journal of the American Leather Chemists' Association.* It was started in 1917. "International" was made a part of the title in 1925. Some of the papers and abstracts are in French.

Germany

Collegium. This journal also resembles the *Journal of the American Leather Chemists' Association* in quality and scope. Abstracts are included. There is a collective index to the first 20 volumes (1902–1921).

30. RUBBER AND ALLIED SUBSTANCES

United States

India Rubber World. A good trade journal.
Rubber Age (N. Y.).

British Empire

India Rubber Journal. A good trade journal.
Transactions of the Institution of the Rubber Industry. This journal (established in 1925) promises to be one of the best of the rubber journals.

Germany

Gummi-Zeitung.
Kautschuk.

France

Caoutchouc & la gutta-percha.
Revue générale du caoutchouc.

Holland

Archief voor de Rubbercultuur in Nederlandsch-Indië.

ABSTRACT JOURNALS

The **importance** of published abstracts, indeed their absolute necessity, needs no emphasis to the chemist. Without the abstract journals a literature search would be a hopeless task. The value of an abstract service was early recognized in chemistry and the chemist has had abstracts available for many years. Other sciences have followed suit, some only within the past few years, so that now most of the natural sciences have one or more sources of abstracts.

In the **production of the modern chemical abstract journal** an organized group, trained to the work and backed by a large number of the chemists of the country in which it appears (the national chemical society), systematically examines the current literature, prepares more or less brief digests (the abstracts) of the papers and patents of chemical interest which appear throughout the world (thoroughness in this varies), classifies them for convenient use, publishes them and furnishes indexes to make the published record available. As a result the individual, who could not hope to do so otherwise, can without too great effort keep abreast with chemical advances in his field of special interest or can search out with a minimum of effort the published chemical information on any subject which may engage his interest. *Chemical Abstracts*, for example, is the product of the work of an editor, two associate editors and seven assistants in the editor's office (two of them chemists), aided by the part-time work of 45 assistant editors and approximately 250 abstractors, with the backing of the 14,000 members of the American Chemical Society. The editors and abstractors examine regularly over 1200 journals printed in many different languages and the number of abstracts published annually passed the 29,000 mark in 1926.

Abstracts are essentially **unorganized.** Even though carefully classified in abstract journals, correlated with other related abstracts by references and well indexed, they do not serve as well

as do critical reviews (see p. 134) the purpose of the scientist interested in a subject in a more or less general way but not enough to go into the evidence carefully.

As previously suggested no distinct line can be drawn between journals publishing full papers and those publishing abstracts. Many journals publish a limited number of abstracts along with full papers; only a few are devoted exclusively to abstracts. The tendency has been in the direction of the complete segregation of abstracts into special journals; many journals which formerly published abstracts, as *Journal of the American Chemical Society* and *Berichte*, have given up that practice with the development of the modern abstract journal. In searching the earlier literature one has to examine all of the journals of the period involved and can hardly expect even then to get results as satisfactory as those gained by use of a single, modern, comprehensive and well indexed abstract journal. There was no attempt at comprehensiveness, no uniformity, no system in the early abstract services.

The development which has led, only in comparatively recent years, to the **centralization of the abstract service** with convenience, thoroughness and economy as objectives may properly be said to be still in progress. The year 1926 marks the unification of the two British chemical abstract journals, as described below, and the beginning of *Biological Abstracts*, a product of the combined efforts of a considerable number of American biological organizations some of which previously had separate abstract journals, as *Abstracts of Bacteriology* and *Botanical Abstracts*. Some have suggested that there should be but a single world chemical abstract journal or at least only one in the English language but investigation on several occasions by different people[9] has invariably led to the conclusion that the nation is apparently the best unit for such an undertaking. Little or no economy would be effected on account of extra distribution cost. Economy of effort in the making of abstracts is possible and is being effected by a coöperative arrangement between *British Chemical Abstracts* and *Chemical Abstracts*. Beside the language difficulty, there are differences in national viewpoints which do not matter so much as far as the making of *abstracts* is concerned, except where an article happens to be of more or less local interest (this does not often occur), as in

[9] See John J. Miller, *J. Ind. Eng. Chem.* **6**, 411–5(1914).

the making of an abstract *journal.* It is an advantage to have more than one chemical abstract journal as no existing journal is faultless and a combined one would not be.

A **comprehensive chemical abstract service** is now provided by journals published by chemical societies in the United States, England, France and Germany. While the ground covered is pretty much the same, there are still considerable differences in scope. Each society has its own aims and methods so that the resulting abstracts and still more the abstract journals (including the idea of scope and the indexes) differ considerably. Each excels the others in some respects.

The first chemical society to take up this work of publishing comprehensive abstracts was the French society, which started this practice in the *Bulletin de la société chimique de France* in 1858. The Deutsche Chemische Gesellschaft published abstracts in its *Berichte* during the period 1868–1896 and then took over the *Chemisches Zentralblatt* in 1897. The British society first published abstracts in 1871. The American Chemical Society's *Chemical Abstracts* was not started until 1907 but abstracts of United States chemical papers were published as *Review of American Chemical Research* in *Technology Quarterly* during the years 1895 to 1901 and in the *Journal of the American Chemical Society* during the years 1897 to 1906.

Before attempting to describe the various sets of abstracts of interest to the chemist the general characteristics of an efficient abstract service will be discussed with the hope that such information as can be supplied will be helpful not only in evaluating the various journals but also to some extent in the use of abstracts.

The ideal abstract journal (1) covers its field completely, (2) publishes good annual and collective indexes, (3) maintains a high quality in its abstracts and (4) keeps its service prompt. All are important but it is believed that completeness and the publication of good indexes are of the most consequence. Completeness depends to some extent on the quality of abstracts for an abstract journal is not complete, even though it reports every paper appearing in its field, if the abstracts are inadequate and an index to serve as a thorough guide to the literature must be based on abstracts which are complete from the indexing point of view. If completeness is attempted and safeguarded by an abstract journal it can be used with a feeling of reasonable assurance that the search

has been thorough. Proper indexing is a factor in completeness and it is well to remember that the user of an abstract journal must contribute his part in a thorough search by effective index using (see p. 152).

The **quality of abstracts** depends largely on the ability of the abstractor to understand the significance of the paper being covered and his skill as a maker of abstracts. The making of good brief abstracts is an art which must be learned by experience. Some abstract journals employ a few professional abstractors; others have their work done by a considerably larger number of abstractors who do abstracting only as an extra-time task, more to help a good cause and as an effective method of doing desirable reading than for a fee, which is liable to be small if existent at all. By the latter method it is possible for most of the abstracts to be made by men who are specialists in the subjects involved and who are therefore particularly well equipped to discover the significant points in a paper; by the former method abstracting skill is likely to be greater and abstracts can be obtained more promptly. The authors of this book consider the best method of obtaining abstracts to be one which involves the assigning of papers to be abstracted to specialists (active in other chemical work) who are interested in reading the papers anyhow, who have acquired abstracting skill and who are willing to devote a share of their spare time to this type of activity.

The **ideal chemical abstract** begins with a statement of the author's purpose in the work reported if this is not entirely apparent from the title. It indicates fully the scope of the paper and reports or makes specific reference to all the new material of chemical interest contained therein. Since a complete and permanent record is the object it is very important that the abstract should contain or make specific reference to all of the information in the paper that is suitable to be indexed. This would include every measurement, observation, method, apparatus, suggestion and theory which is presented as new and of value in itself. All new compounds and all elements, compounds and other substances for which new data are given should be entered in the abstract. Adequate precision is important when data are given. *E. g.*, it is usually not sufficient to refer merely to "steel" if "3% chromium steel" is specified and it is not satisfactory to omit temperature, pressure, etc., variations if these are significant. The author's conclusions from his work

make up a part of the ideal abstract. Such an abstract is informational rather than merely descriptive when this can be accomplished within reasonable space limits; that is to say, the more important actual results are reproduced in the abstract instead of merely a statement being made as to what one can expect to find by turning to the original paper. A good abstract is kept reasonably brief. The length of an abstract should be affected by the degree of availability of the paper being covered. If it appears in a rare journal or the language involved is one read by few in the country in question the abstract should be longer than if published in a journal accessible to many and in a language read by many. Judgment of the importance of a paper is best left to present and future users of the abstract, although some consideration should be given to this in obvious cases. If the abstract is a part of a series of abstracts, as in an abstract journal, its value is likely to be enhanced if it is accompanied by references to previous abstracts covering related work by the same author or others or to the previous papers themselves.

Because of the frequent inadequacy of titles to papers abstracts are made more convenient to use (and the index, too) if the words designating subjects covered which are not brought out in the title proper are printed in special type to make them stand out prominently. Separate paragraphs with definite subtitles are used in a few instances.

Occasionally abstracts are met which read like notes jotted down. These are unsatisfactory. The use of full sentences in abstracts makes for clearness and easy reading.

Abstract journals frequently use **word abbreviations** and similar devices to save space. A long list of abbreviations of various kinds is to be found in Appendix 2.

A full discussion of **indexes,** so important in an abstract journal, is to be found in the chapter on "Indexes" (see p. 150). In addition to annual and collective author and subject indexes (formula and patent number indexes too in some instances) many of the abstract journals have author indexes (names and page references only) to their individual numbers.

It is perhaps best to point out that in the **use of abstract journals** it is not wise for the research chemist to depend too much on the information given in them. If a paper located by means of an abstract journal has an important bearing on a problem, it is usually

advisable to get the full paper, not so much to verify the accuracy of the abstract (partly for this purpose, however) as to get the atmosphere of the paper and the point of view of the author. Important details are thus to be obtained. In many circumstances an abstract is enough but on the whole abstract journals are to be regarded as guides to the literature more than as sources of information.

The **individual abstract journals** available for use by the chemist will now be briefly described, consideration being given first to the strictly chemical ones and then to those devoted primarily to other sciences but still of considerable interest to the chemist, and to those journals devoted to specific branches of chemistry. In the chapter on Procedure (pp. 236–8) will be found a chronological table of abstracts and reports of chemical interest.

CHEMISCHES ZENTRALBLATT
(1830–Date)

This important German chemical abstract journal is taken up first because of its early appearance and its continuous usefulness. The journal now known as *Chemisches Zentralblatt* was started in 1830 under the name *Pharmaceutisches Centralblatt* and has been published continuously ever since. In 1850 the name was changed to *Chemisch-Pharmaceutisches Centralblatt;* in 1856 the present name was adopted except that "Zentralblatt" was spelled "Centralblatt" up to 1897. The Deutsche Chemische Gesellschaft acquired possession of this journal in 1897 and has sponsored it since.

Chemisches Zentralblatt appears weekly and the abstracts are reasonably prompt. Only one volume per year was issued up to 1892 but from that year until 1919 and again since the beginning of 1924 there have been two volumes per year, I covering the period January-June and II the period July-December. During the years 1919 to 1923 inclusive four volumes per year were published, I and III being devoted to abstracts of papers classified as "scientific" and II and IV to abstracts of papers classified as "technical." The usual form of reference is *Chem. Zentr.* **1924,** I, 340 or **1926,** II, 1234. Often merely "*C.*" (from *Centralblatt*) is used instead of *Chem. Zentr.* as the journal name abbreviation.

"The abstracts in *Chemisches Zentralblatt* represent a wide range of quality," to quote a gentleman who has had occasion to make much use of them. "Some are inadequate, some poor in composi-

tion. They tend to be descriptive instead of informational. The abstracts to be condemned are in the minority but are far more frequent than in *Chemical Abstracts*." Our own impression is that most of the abstracts are good; the organic abstracts, because fuller, are certainly better than those of *Chemical Abstracts*. Most of the abstracts are reasonably full, particularly those in the so-called "scientific" part, these averaging about twice as long as the "technical" abstracts.

For many years *Chemisches Zentralblatt* limited its abstracts to contributions dealing more or less directly with pure chemistry. It was not until the beginning of 1919, when the abstract section of *Zeitschrift fur angewandte Chemie* was made a part of *Chemisches Zentralblatt*, that applied chemistry was given any considerable space. Up to that time *Chemisches Zentralblatt* could not be spoken of as a complete chemical abstract journal mainly because applied chemistry was left out, partly because chemical papers appearing outside of Germany were covered with not quite the same thoroughness as that which characterized the treatment of German papers. Now completeness is much more nearly approached. The cover of the journal carries the statement "Chemisches Zentralblatt. *Vollstandiges* Repertorium für alle Zweige der reinen und angewandten Chemie." This claim seems a little extravagant but it is a good purpose at which to aim and the editors deserve credit for real advances in that direction in recent years. At the present time more abstracts are published in the section devoted to applied chemistry than in that devoted to pure chemistry.

Previous to 1918 only German patents were abstracted and then only a limited number of them, the leaning being towards the selection for abstracting of patents on organic chemical subjects. This limitation might reasonably be expected since the covering of applied chemistry was not attempted. Now German, United States, British, French, Canadian, Danish, Dutch, Norwegian, Austrian and Swiss patents are covered with more thoroughness, the whole list being considered, than by any other abstract journal.

During the period 1922–1926 there was published, as a supplement to *Chemisches Zentralblatt*, a classified list of new books of chemical interest called *Bibliographia chimica* (cf. p. 28); since 1926 new books have been announced by titles published along with the abstracts.

The author indexes to *Chemisches Zentralblatt* are published

semiannually. The subject indexes were semiannual, too, up to 1925, when they were made annual and in recent years these indexes have been issued with remarkable promptness, thus making the literature for each period accessible very soon after the period is completed. Five-year collective indexes are published. Author, subject, patent-number and formula indexes are published, the last-named having been started in 1925. The individual numbers have author indexes. For a fuller description of the subject indexes see the chapter on Indexes (pp. 196–7).

JOURNAL OF THE CHEMICAL SOCIETY
(Abstracts 1871–1925)

The Chemical Society of London in its *Journal* has been publishing abstracts since 1871. For a few years the abstracts were paged with the transactions (full papers) but from 1898 down through 1923 the abstracts have been paged separately and have been given a separate volume number so that they could be bound separately. During 1924 and 1925 these abstracts were published separately under the heading "Abstracts of Chemical Papers Issued by the Bureau of Chemical Abstracts. A. Pure Chemistry." This change marks the beginning of a plan of coöperation with the British Society of Chemical Industry, which during these years published "Abstracts Issued by the Bureau of Chemical Abstracts. B. Applied Chemistry." The *Journal of the Society of Chemical Industry* and the *Journal of the Chemical Society* had been overlapping a good deal, both abstracting the same papers in many instances, and the Bureau of Chemical Abstracts was formed by the two societies as a step towards greater economy and efficiency. Duplication was thus reduced. Beginning with 1926 the abstracts formerly published in the *Journal of the Chemical Society* are published as Part "A. Pure Chemistry" of *British Chemical Abstracts* (monthly), Part B of which appears fortnightly as a supplement to the *Journal of the Society of Chemical Industry*. Both parts are published in the same double-column quarto format and in uniform type. The overlapping which had hitherto existed between the two sets of abstracts has been entirely eliminated and the policy of publishing a single annual index covering both has been adopted. This is a distinct improvement.

The *Journal of the Chemical Society* was started in 1841 as "*Memoirs*" and "*Proceedings*." After the first volume these were

no longer issued separately, volumes ii (1843–1845) and iii (1845–1847) bearing the double title *Memoirs and Proceedings of the Chemical Society.* The Journal proper was begun in 1847 and was entitled *Quarterly Journal of the Chemical Society.* It was continued in this form through 1861; beginning with 1862 and continuing up to the present time a monthly journal with its present name has been published.

The field of the *Journal of the Chemical Society,* both of the part in which full papers have been published (the *Transactions*) and of the abstract part, has consistently been the whole of chemistry *in its scientific aspects.* Organic papers predominate in the *Transactions* part; biochemical and analytical papers are few in number, apparently because of the existence in England of journals devoted specifically to these fields.

In the past completeness has not been emphasized as strongly in the policy of the abstract section of this journal as would seem desirable. The list of journals regularly covered has been considerably increased recently. The abstracts are good, are comparatively long and have been issued promptly.

With the exception of a very limited number of patents dealing with some phase of organic chemistry the *Journal of the Chemical Society* has not covered the patent literature in its abstract section.

Book titles are not included.

Throughout the journal special care has been taken to use good chemical nomenclature, so that the indexes to this journal can be used with a considerable degree of safety as a guide in settling nomenclature problems.

Very few word abbreviations are used in the British abstracts.

The *Journal of the Chemical Society* has published annual and ten-year author and subject indexes (see p. 195). The *Transactions* part and the *Abstracts* part have been indexed separately. Individual numbers have author-name indexes.

The *Journal of the Chemical Society* is properly to be ranked as one of the most valuable chemical journals published.

JOURNAL OF THE SOCIETY OF CHEMICAL INDUSTRY

(Abstracts 1882–1925)

The Society of Chemical Industry (British) published the *Proceedings of the First General Meeting* in 1881 and then started in 1882 the publication of the *Journal of the Society of Chemical In-*

dustry, which has appeared continuously since. From the beginning abstracts of papers and patents have been published as well as original papers. This set of abstracts, as one would expect, has been devoted to the technical side of chemistry. The interest of the industrial chemist has very properly been interpreted to include a considerable amount of the information reported in papers published as so-called pure chemistry so that until 1926, as pointed out above, a good many papers abstracted in the *Journal of the Chemical Society* have been covered also by the *Journal of the Society of Chemical Industry*. The coöperative arrangement with the Chemical Society, which has eliminated this overlapping, is described above (p. 83). The industrial side of chemistry has been very well covered. The abstracts are comparatively full and are well prepared. This is in many respects the best abstract journal to use in looking up technical subjects. Completeness has not been approached quite as closely as some would consider desirable and the subject indexing has perhaps not been quite on the same level of excellence as characterizes the abstracting. It is the aim of the Bureau of Chemical Abstracts, which publishes its "B. Applied Chemistry" section fortnightly, beginning with 1926, as a supplement to the *Journal of the Society of Chemical Industry*, "to issue as promptly as possible trustworthy abstracts of *all* papers of chemical interest." There can be no doubt from the past record of the two journals involved that the abstracts will be prompt and trustworthy and there is good evidence to suggest that completeness will be more nearly approached in the future.

Up to 1918 the abstracts have been paged and indexed along with the original papers but beginning with Vol. 37 the material presented has been segregated into three independently paged parts, "Review," "Transactions" and "Abstracts," the letters "R," "T" and "A" accompanying the page numbers. Starting with 1923 (Vol. 42) the "Review" part has appeared weekly under the name *Chemistry & Industry*. In it are published editorials, addresses and other similar discussions, correspondence, market reports, lists of British patent applications and of completed specifications and other information of a news character.

The abstracts of patents in this journal are very good. The name of the assignee is given as well as that of the inventor. English, United States, French and German patents are covered with some variation as to thoroughness. The abstracts of English

patents have been indexed by numbers as well as by names and subjects starting with 1901, and beginning with 1916 numerical patent indexes for the patents of the other countries have been furnished.

There are annual and ten-year author and subject (see p. 196) indexes but no indexes to the individual numbers.

The *Journal of the Society of Chemical Industry* deserves to be considered one of the two most valuable journals to the industrial chemist, particularly in view of its good abstract service. *Industrial & Engineering Chemistry* is the other.

BRITISH CHEMICAL ABSTRACTS
(1926–Date)

This is a combination of the abstract sections of the *Journal of the Chemical Society* (London) and the *Journal of the Society of Chemical Industry* (see above), which it replaces. The combination was made in 1926. It combines the good qualities of both and it is a distinct advantage to have the two together, and especially to have a single index.

CHEMICAL ABSTRACTS
(1907–Date)

Chemical Abstracts is, as one would expect, the journal most used in chemical literature searching in the United States and its use throughout the chemical world has increased greatly in recent years. It has much the largest circulation of any scientific abstract journal in the world. Because of these facts it seems appropriate to describe this journal fully.

It is published by the American Chemical Society and was started in 1907. The first editor was Dr. William A. Noyes, to whom much credit is due for the big part which he has played in the development of chemical publication in the United States (he was for many years the editor of the *Journal of the American Chemical Society;* he was also the first editor of *Chemical Reviews* and of the Scientific Monographs published under the auspices of the American Chemical Society). *Chemical Abstracts* was really the outgrowth of a previous more restricted set of abstracts published under the heading "Review of American Chemical Research" as a part of the *Technology Quarterly* during the period 1895 to 1901 and from 1897 to 1906 as a part of the *Journal of the American Chemical Society.* This "Review" had as its purpose the presentation "in

a concise form" of "a review as complete as possible of all original work having a chemical bearing published in the United States after the beginning of the year 1895."

Chemical Abstracts rapidly developed into what Dr. E. Emmet Reid[10] describes as "the most extensive and inclusive abstract journal ever published." It has been the policy of the editors to place special emphasis on completeness. In the first place it was the first abstract journal to attempt to cover both pure and applied chemistry and was the only journal doing this up to 1919, when *Chemisches Zentralblatt* took over the abstract section of *Zeitschrift fur angewandte Chemie*, and the only abstract journal published in English with such a policy until the combination in 1926 of the abstracts published by the British chemical societies to form the new *British Chemical Abstracts*. In *Chemical Abstracts* an effort is made to supply the needs of the industrial chemist as faithfully as those of the chemist interested primarily in the so-called theoretical side of chemistry.

The list of journals regularly examined for papers suitable to be abstracted totaled 1246 in 1926. This included, besides the strictly chemical journals, many of the journals of the bordering sciences and the trade journals of the many industries which are dependent, at least in part, on chemistry. In addition to the combing process which is applied to the many journals on the official list of *Chemical Abstracts* which publish original material, the editors systematically check some fifteen other sets of abstracts, including all of the other strictly chemical abstract journals, against the *Chemical Abstracts* indexes and when it is found that the other abstract journal has covered a paper of chemical interest which has so far been missed by *Chemical Abstracts*, steps are taken at once to obtain such an abstract for their journal. Such abstracts are usually obtained from the original papers if these can be located; if the other abstract is used, due credit is of course given.

Another factor in the completeness of *Chemical Abstracts* is the broad interpretation of the scope of the interest of chemists. Much information which is not strictly chemical but which is of definite value to the chemist in his work is included and papers which are only in small part of chemical interest are reported briefly to disclose that part. In its section on Subatomic Phenomena and

[10] Introduction to Organic Research, Van Nostrand, New York (1924), p. 94.

Radiochemistry *Chemical Abstracts* has kept pace with the work of physicists (as well as of physical chemists) which has been of so much interest and value to chemists in recent years. A great many of the abstracts in this section are obtained from physical journals and it is said that many physicists use *Chemical Abstracts* regularly. The section is built for chemists and very few abstracts could be eliminated from it without distinct loss to the journal as a full chemical record. Similarly *Chemical Abstracts* has gone further than the other chemical abstract journals in such fields as mineralogical and geological chemistry, metallurgy and metallography, biochemistry, water, sewage and sanitation, and agricultural chemistry and in the fields represented by some of the industries.

The policy of completeness is reflected in the requirement that abstracts be written so as to be complete from the indexing point of view and in the special emphasis which is placed on thorough indexing.

United States and some foreign patents are abstracted. These abstracts are discussed under "Patents," on page 116. It is to be noted that owing to insufficiency of funds abstracts of certain foreign patents are lacking in recent volumes, a real weakness.

Except in a few special cases each abstract is made by a chemist who is a specialist in the particular field involved. Quality of abstracts is further safeguarded by the editorial supervision of men of high standing in their branches of chemistry who serve as Assistant Editors, one or more being in charge of each of the thirty sections into which the abstracts are classified. While the loss has not been great the abstracts have had to suffer somewhat in usefulness in recent years owing to the necessity of making them a little briefer each year in order to keep pace with the growing literature of chemistry within the space limitations set by available funds. (The annual budget runs a little over one hundred thousand dollars.) The foreign chemical abstracts are a little longer. The use of a considerable number of word abbreviations and of other space-saving devices, the adoption of a compact printing form, and the use in many instances of a special style of expression, have made it possible to get a maximum of information into the available space.

The method of having abstracts made by specialists and then examined by other specialists (the 45 Assistant Editors) is a bit

time-consuming so that the abstracts in *Chemical Abstracts*, while more prompt than those of a great many abstract journals, do not in many instances appear as soon as those in *British Chemical Abstracts*.

Titles of new and revised books of chemical interest are reported, with references to published reviews whenever these are located. There are about a thousand titles each year. They are indexed along with the abstracts. Books are a part of the literature; this is another factor in completeness.

Because of the belief that a record such as an abstract journal constitutes is of greatly lessened value if the information is not made readily and certainly available by thorough indexing, more attention has been given to the indexing, particularly the subject indexing, of *Chemical Abstracts* than to any other feature (see p. 194). *Chemical Abstracts* started publishing formula indexes in 1920 and was the only abstract journal to publish such indexes until *Chemisches Zentralblatt* started such a policy in 1925. *Chemical Abstracts* publishes ten-year collective indexes. There are author-name indexes for the individual numbers.

For searches which do not need to go back further than 1907 *Chemical Abstracts* is regarded as the best starting point. For many purposes it is the only abstract journal which one needs to use.

BULLETIN DE LA SOCIÉTÉ CHIMIQUE DE FRANCE
(1858–Date)

This official journal of the French chemical society has been appearing since 1858. It has played very much the same rôle in the development of chemistry in France as the *Journal of the Chemical Society* has in England. It resembles its British contemporary in that alternate volumes have been devoted to original papers and to abstracts. The field of both has been, and is, pure chemistry. The abstracts are fairly comprehensive and reasonably full. The original papers and the abstracts are indexed together.

The abstract section of this journal is apparently not used a great deal in the United States. This is not due, it is believed, to a lack of merit but rather to the fact that the abstract journals in the English language, supplemented at times by the long-established *Chemisches Zentralblatt*, in most instances serve the purpose of the American chemist more conveniently.

CHIMIE & INDUSTRIE
(1918–Date)

This journal, started in June, 1918, is the industrial chemical abstract journal of France. It is the organ of the Société de chimie industrielle. Just as the *Bulletin de la société chimique de France* can properly be compared with the *Journal of the Chemical Society*, so it may be said that *Chimie & industrie* is serving a purpose in France like that of the *Journal of the Society of Chemical Industry* in England. *Chimie & industrie*, like the British industrial chemical journal, publishes full papers, has a newsy review section and abstracts the literature of applied chemistry with considerable thoroughness. The abstracts are often quite long with frequent reproduction of figures. On the whole they are well prepared and are for the most part informational. The abstracts are rather slow in appearing. The classification is sometimes puzzling. The subject indexing seems inadequate.

It is a good journal to turn to for abstracts of French patents, perhaps the best.

Chimie & industrie is a valuable journal. It is by far the best industrial chemical journal published in France. It is a safe prediction that appreciation of its value in the United States will grow. French chemical journals appear to be a little slow to "take hold" in American libraries. *Chimie & industrie* well deserves a place among the really important chemical journals.

CHEMIKER-ZEITUNG
(Abstracts 1882-Date)

This journal was started in 1877 as a weekly, became a semi-weekly in July, 1882 and since January 1, 1909 has been appearing three times a week. The field covered is the whole of chemistry with a leaning towards applied chemistry. The original papers vary in value. Good reviews are published. "*Naturwissenschaftliche Umschau*" appears monthly as a supplement.

There is an extensive abstract section called the *Chemisch-technische Übersicht* (called *Chemisches Repertorium* up to 1916). Patents (see p. 118) as well as papers are abstracted. The abstracts are little used in the United States.

The annual author indexes give author names and page references only (no subjects) and the annual subject indexes are divided into separate alphabetical arrangements of entries for each

of the 33 sections of the *Repertorium*, which makes for inconvenience in use. There are no collective indexes.

OTHER SOURCES OF ABSTRACTS OF GENERAL CHEMICAL INTEREST

1778–1781. *Crell's Chemisches Journal.*
1781–1786. *Crell's Entdeckungen.*
1784–1803. *Crell's Chemische Annalen.*
1789–1870. *Annales de chimie et de physique.*
1790–1796. *Elwert's Repertorium fur Chemie.*
1820–date. *Dingler's Polytechnisches Journal.*
1822–1847. *Berzelius' Jahresbericht der Chemie.*
1832–1860. *Annalen der Chemie* (number of abstracts limited).
1834–1873. *Journal fur praktische Chemie.*
1835–1875. *Polytechnisches Centralblatt.*
1840–1858. *The Chemist.*
1846–1875(?). *Chemisch-Technische Mittheilungen.*
1857–1926. *Moniteur scientifique.*
1868–1896. *Berichte der deutschen chemischen Gesellschaft.*
1877–date. *Zeitschrift fur Krystallographie.*
1881–1886. *Appendice alla gazzetta chimica italiana.*
1892–date. *Zeitschrift fur anorganische Chemie* (early volumes only).
1898–date. *La revue des produits chimiques.*
1901–1918. *Répertoire général de chimie pure et appliquée.* Supplement to *Revue générale de chimie pure et appliquée.*
1914–date. *L'industrie chimique.*
1919–date. *Giornale di chimica industriale ed applicata.*
1912–date. *Anales de la sociedad española de fisica y quimica.*
1922–date. *Australian Science Abstracts.*
1922–date. *Japanese Journal of Chemistry.*
1925–date. *Journal of Chemical Education.*

ABSTRACTS FOR SPECIFIC BRANCHES OF CHEMISTRY AND FOR RELATED SCIENCES

The above descriptions and list cover all of the important journals publishing comprehensive abstracts devoted to the whole of chemistry or to pure or applied chemistry respectively. The following

journals are devoted, in whole or in considerable part, to abstracts relating to specific branches of chemistry or to sister sciences. Many of the abstracts in the journals devoted to other sciences, as physics and biology, are of chemical interest. The current journals which are wholly abstract journals will be marked "Abstracts only" and briefly described here; the others are merely listed, the descriptions having been given where they are mentioned along with other journals carrying original papers. The journals are classified in accordance with the classification system of *Chemical Abstracts*.

It should be emphasized that for the various branches of chemistry the general chemical abstract journals, as *British Chemical Abstracts*, *Chemisches Zentralblatt* and *Chemical Abstracts*, in almost every instance provide a more satisfactory abstract service, at least as far as the chemical side of things is concerned, than do the sets of abstracts devoted exclusively to definite branches. The more specific abstract journals or abstract sections in some instances publish longer abstracts and in many cases the nonchemical side of the subjects involved is covered.

PHYSICAL CHEMISTRY, SUBATOMIC PHENOMENA AND RADIOCHEMISTRY

1872–1920. *Journal de physique théorique et appliquée.* This monthly journal of the Société française de physique was combined in 1920 with *Le radium* and then assumed the title *Journal de physique et le radium* (see below).

1877–1919. *Beiblatter zu den Annalen der Physik.* Abstracts only. It was superseded in 1921 by *Physikalische Berichte.*

1889–1904. *Zeitschrift fur physikalische Chemie.*

1896–1906. *Journal of Physical Chemistry.*

1898–date. *Science Abstracts.* Abstracts only. This journal was split into two Sections (A and B) in 1903, when it was taken over by the Institution of Electrical Engineers. It is now compiled and edited by this Institution "in association with the Physical Society of London and the American Physical Society, with the coöperation of the American Institute of Electrical Engineers and the Associazione Elettrotecnica Italiana." Section A, Physics, is devoted to the whole range of physical science (from the experimental side mainly); chemical papers are dealt with only when the articles are of interest to physicists. Section A is really a continuation of the "Abstracts of Physical Papers" (or "Abstracts") started by the Physical Society of London in 1895. Section B, Electrical Engineering, is in a sense a continuation of the abstracts which for the period 1872–1896 appeared in the *Journal of the Institution of Electrical Engineers.*

The abstracts in this monthly journal are for the most part good. They are comparatively full. About five thousand abstracts are published in

a year. This journal has a weakness, serious for an abstract journal, in that its indexes are far from adequate. No collective indexes.

1903–1912. *Journal de chimie physique.*

1904–1909. *Physikalisch-chemisches Centralblatt* (now a review serial called *Fortschritte der Chemie, Physik und physikalischen Chemie*).

1904–1919. *Le radium.* This journal is of particular value for the subjects radioactivity, radiations and gaseous ionization. It was combined in 1920 with *Journal de physique théorique et appliquée* to form *Journal de physique et le radium.*

1906–date. *Kolloid-Zeitschrift.* Papers on pure and applied colloid chemistry are covered in the abstract section. The abstracts are well prepared.

1920–date. *Physikalische Berichte.* Abstracts only. It is a continuation of *Beiblatter zu den Annalen der Physik* (above), *Fortschritte der Physik* (a review journal) and *Halbmonatliche Literatur-verzeichnisse.* It is published by the Deutsche physikalische Gesellschaft and the Deutsche Gesellschaft für technische Physik.

1922–date. *Journal de physique et le radium.*

1922–date. *Japanese Journal of Physics.* Abstracts of Japanese literature. (In English and German.)

1923–date. *Revue générale des colloides et de leurs applications industrielles.*

ELECTROCHEMISTRY

[There is no comprehensive abstract journal for this field outside of the general chemical abstract journals. *Science Abstracts* since 1898 (see above) has covered "electrical engineering," including electrochemistry, rather well. *Mining & Metallurgy* publishes very brief "abstracts" (little more than enlarged titles) on electrochemical and electrometallurgical papers and there are a few abstracts (very good ones) each week in *Electrical World.* There are also to be found a limited number of abstracts in *Revue d'électrochimie et d'électrométallurgie. Zeitschrift für Elektrochemie,* 1894–date, published abstracts up to 1907.]

PHOTOGRAPHY

1865–date. *British Journal of Photography.* Patent abstracts. Indexed both by authors and by subjects.

1893–date. *Bulletin de la société française de photographie.* The number of abstracts is limited.

1915–date. *Eastman Kodak Company, Monthly Abstract Bulletin.* Completeness is emphasized. The abstracts are arranged according to a numerical classification. There is an author index. A good journal.

1921–date. *Photographic Abstracts.* This quarterly journal of the Royal Photographic Society of Great Britain covers all of the photographic articles appearing in about 75 journals. There is an author index only.

1921–date. *Science, technique & industries photographiques* was at first a supplement to *Revue française de photographie.* It became a separate publication in 1923 and in 1924 "technique" was dropped from the title. The field of photography is covered thoroughly and the abstracts are good. The abstracts are not indexed but are arranged according to the Dewey decimal

bibliographic system.

? –date. *Photographische Industrie.* Abstracts of German patents.

ANALYTICAL CHEMISTRY

1862–date. *Zeitschrift fur analytische Chemie.* The abstract section of this journal is written up somewhat like a review.

1877–date. *Analyst.* This organ of the Society of Public Analysts covers analytical chemistry with considerable thoroughness Decennial as well as annual indexes are published.

1880–1915. *School of Mines Quarterly, The.*

1896–date. *Annales de chimie analytique et de chimie appliquée.*

1908–date. *Annales des falsifications et des fraudes.*

MINERALOGICAL AND GEOLOGICAL CHEMISTRY

1807–date. *Neues Jahrbuch fur Mineralogie, Geologie und Palaontologie.* Good abstracts are published. German and English papers are thoroughly covered, others apparently less so. The indexes are excellent.

1916–date. *American Mineralogist*

1920–date. *Mineralogical Abstracts.* Abstracts only. This appears quarterly as a separately paged appendix to *Mineralogical Magazine.* It is published by the Mineralogical Society (London). In this journal "an effort is being made to summarize the world's mineralogical literature (including books) for the period 1915 onwards. Crystallography, crystal structure, petrology, economics, etc., are taken into account when these have any bearing on scientific mineralogy "

1920–date. *Revue de géologie et des sciences connexes.* Belgian, French, British and Spanish literature is covered much more fully than American. German papers are seldom noted. There are a good many mistakes in the abstracts and the indexes are inadequate.

1922–date. *Japanese Journal of Geology and Geography.* Abstracts of Japanese literature (in English and German).

METALLURGY AND METALLOGRAPHY

1855–1920. *Bulletin de la société de l'industrie minérale.*

1857–date. *Revue universelle des mines.*

1865–date. *Gluckauf, Berg- und Huttenmannische Zeitschrift.*

1869–date. *Journal of the Iron and Steel Institute.* This journal appears in two bound volumes annually. In Section 2 of each volume are to be found "abstracts of all articles on the foreign iron, steel and allied industries."

1898–date. *Journal of the Chemical, Metallurgical and Mining Society of South Africa.*

1904–1911. *Metallurgie.*

1904–date. *Revue de métallurgie.* This journal covers its field very well with good full abstracts.

1909–date. *Journal of the Institute of Metals.* The field covered "embraces the whole of nonferrous metallurgy after the metal has assumed the ingot form."

1911–1918. *Internationale Zeitschrift für Metallographie.*

1919–date. *Zeitschrift fur Metallkunde.* Formerly called *Internationale Zeitschrift fur Metallographie* (see above).

1921–date. *Bulletin of the Cleveland Scientific and Technical Institution.* During its first two years this was called the *Bulletin of the Cleveland Technical Institute.*

1921–date. *Transactions of the American Society for Steel Treating.*

1921–date. *Revue de l'industrie minérale.* Formerly called *Revue de la société de l'industrie minérale.*

1923–date *Bulletin of the British Cast Iron Research Association.*

BIOCHEMISTRY

1902–1909. *Biochemisches Centralblatt.*
1909–1918. *Zentralblatt fur Biochemie und Biophysik.*
1918–date. *Berichte uber die gesamte Physiologie und experimentelle Pharmakologie.* These are really just three names for the same journal. They contain abstracts only. This is the most extensive set of biochemical abstracts for the earlier years.

1915–date. *Endocrinology.* This journal is devoted principally to abstracts and since there is considerable chemical interest in the study of the glands of internal secretion the abstracts are often of chemical bearing.

1916–1926. *Abstracts of Bacteriology.* Abstracts only. This journal comprises "reviews and abstracts of work in bacteriology, mycology and protozoölogy in their relation to the arts and sciences." There is much of chemical interest in this field and many of the abstracts are almost wholly chemical while a big percentage of the others contain at least a little of chemistry. In 1925 there were published 2296 abstracts. Merged in *Biological Abstracts* in 1926.

1916–date. *Physiological Abstracts.* Abstracts only. This monthly journal, issued by the Physiological Society (Great Britain and Ireland), is a well edited and very valuable publication which contains abstracts of many papers of chemical interest. Plant as well as animal physiology and biochemistry are covered. Though occasionally papers in pathology which have physiological interest are covered, it is the policy of this journal to exclude pure pathology, medicine, immunology and bacteriology in its medical aspects. Over 4000 abstracts were published in 1925. A few book reviews are included. For papers from foreign journals the titles are given in the original language only in the earlier volumes; starting in 1925 translations are given along with the original language titles.

1919–1926. *Botanical Abstracts.* Abstracts only. *Botanical Abstracts* furnishes "abstracts and citations in the international field of botany in its broadest sense." Plant chemistry is of course included. A dozen or more American and Canadian societies have sponsored it. Approximately 10,000 abstracts were published in 1925. Dr. J. R. Schramm who developed this journal has, in our opinion, very good ideas about indexing and the preparation of abstracts with a thorough index in mind. There is a collective index to the first ten volumes. Merged in *Biological Abstracts* in 1926.

1922–date. *Japanese Journal of Botany.* Abstracts of Japanese literature (in English and German).

1922–date. *Japanese Journal of Medical Sciences.* Abstracts of Japanese literature (in English and German).

1926–date. *Biological Abstracts.* Abstracts only. This is issued under the auspices of the Union of American Biological Societies, which has 19 member societies. Theoretical and applied biology, exclusive of clinical medicine, is covered. This is a very pretentious undertaking which is in good hands; Dr. J. R. Schramm, mentioned in a preceding paragraph, as its first editor has organized the work. In addition to the customary annual author and subject indexes arranged alphabetically there is planned a subject index arranged by systematic groups.

Other sources of abstracts of biochemical interest. Many of the numerous biological and medical journals publish a more or less limited number of abstracts. Some of these are:

American Journal of the Medical Sciences.
Archiv fur Dermatologie und Syphilis.
Botanical Gazette.
Botanisches Centralblatt.
Bulletin de l'institut Pasteur.
Bulletin de la société scientifique d'hygiène alimentaire.
Bulletin des sciences pharmacologiques.
Centralblatt fur Bakteriologie, Parasitenkunde und Infektionskrankheiten. I Abteilung (a) Referate.
Centralblatt fur Physiologie.
Hygienische Rundschau. (Discontinued in 1922)
Japanese Medical Literature. (Discontinued in 1921.)
Journal of the American Medical Association.
Kongresszentralblatt fur die gesamte innere Medizin.
Zeitschrift fur Tuberkulose.
Zentralblatt fur allgemeine Pathologie und pathologische Anatomie.
Zentralblatt fur Chirurgie.
Zentralblatt fur die gesamte Chirurgie.
Zentralblatt fur die gesamte Gynakologie.
Zentralblatt fur die gesamte Hygiene und ihre Grenzgebiete.
Zentralblatt für die gesamte Kinderheilkunde.
Zentralblatt fur die gesamte Therapie.
Zentralblatt fur Gynäkologie.
Zentralblatt fur innere Medizin.
Zentralblatt fur Kinderheilkunde.

FOODS

1882–1890. *Vierteljahresschrift der Chemie der Nahrungs- und Genussmittel.*
1891–1925. *Zeitschrift fur Untersuchung der Nahrungs- und Genussmittel sowie der Gebrauchsgegenstande.* (Continuation of the "*Vierteljahresschrift*" immediately above.)
1926–date. *Zeitschrift für Untersuchung der Lebensmittel.* (Continuation of the preceding journal.)

1889–date. *Experiment Station Record.* (For description see below under "Agricultural Chemistry.")
1891–1922. *Hygienische Rundschau.*
1891–date. *Zeitschrift fur Fleisch- und Milchhygiene.*
1908–date. *Annales des falsifications et des fraudes.*

WATER, SEWAGE AND SANITATION

1909–date. *Wasser und Abwasser.* Abstracts only. Very little used in America.
1919–date. *Journal of the American Water Works Association.* The engineering and other non-chemical sides of the water supply problem are covered more fully here than in *Chemical Abstracts.*
1919–date. *Journal of Industrial Hygiene.* This official organ of the American Association of Industrial Physicians and Surgeons contains a good many abstracts. It appears monthly.
1921–date. *Public Health Engineering Abstracts.* Issued in mimeographed form by the United States Bureau of the Public Health Service (Treasury Department).

AGRICULTURAL CHEMISTRY

1803–1818. *Archiv der Agrikulturchemie* (Hermbstaedt's).
1872–date. *Zentralblatt fur Agrikulturchemie* (Biedermann) (often called *Biedermann's Zentralblatt*). Abstracts only. There are collective indexes for Vols. 1–25 and Vols. 26–35.
1889–date. *Experiment Station Record.* Abstracts only except for editorials and a few pages of notes. This journal is published by the United States Department of Agriculture. It attempts to supply the kind of information needed in the investigation work of the American agricultural experiment stations. Originally the *Experiment Station Record* reviewed only the bulletins and circulars of the U. S. experiment stations and of the Federal Department of Agriculture. Beginning with the second volume the publications of the Canadian experiment stations were included, also a few of those of the French and German stations Soon the reviewing of journal articles and books was started and this journal has for many years covered its field with a considerable degree of completeness.

The abstracts are prepared for the most part by full-time abstractors. The abstracts vary considerably in promptness, length and quality.

Originally one volume of twelve numbers was issued annually. With 1909 (Volume 21) a change was made to two volumes of nine numbers each, which, with the two indexes, makes a total of twenty issues a year. Each issue runs about 100 pages.

The indexes are conveniently arranged in entry-a-line form and are easy to use. There are collective indexes for Vols. 1–12, 13–25, and 26–40, inclusive.

Two volumes of a so-called *Digest of Experiment Station Work* were published. These covered the experiment station annual reports. This plan was abandoned and these reports are now covered by the *Experiment Station Record.*

Experiment Station Record is the most valuable of the abstract journals devoted exclusively to agriculture.

1910–date. *International Review of the Science and Practice of Agrultureic* (formerly called *Monthly Bulletin of Agricultural Intelligence and Plant Diseases*). Mostly abstracts. This journal is published by the International Institute of Agriculture, Rome, Italy, in separate English, French, German, Italian and Spanish editions. The abstracts are often very long. A good many mistakes occur in them. The field is not covered completely.

1912–date. *Review of Applied Entomology.* Some abstracts on insecticides and fungicides.

THE FERMENTATION INDUSTRIES

[There are no systematic abstract journals devoted exclusively to this field but some abstracts are to be found in *Brewing Trade Journal, Journal of the Institute of Brewing* and *Wochenschrift für Brauerei.*]

PHARMACEUTICAL CHEMISTRY

1785–1787. *Elwert's Magazin fuer Apotheker.*

1809–1814. *Bulletin de pharmacie et de chimie.*

1815–1876. *Gehlen's Repertorium der Pharmacie.*

1815–date. *Journal de pharmacie et de chimie* (formerly called "*Bulletin;*" see second entry above).

1830–date. *American Journal of Pharmacy.* Very few abstracts now.

1841–date. *Pharmaceutical Journal.*

1842–1859. *Chemical Gazette.*

1844–date. *Répertoire de pharmacie.* The number of abstracts is quite limited.

1852–1911. *Proceedings of the American Pharmaceutical Association.*

1859–date. *Pharmazeutische Zentralhalle fur Deutschland.*

1912–date. *Yearbook of the American Pharmaceutical Association.*

1920–date. *Pharmazeutische Monatshefte.*

? –date. *Pharmazeutische Zeitung, Die deutsche.*

CERAMICS

1908–date. *Transactions of the Ceramic Society* (London).

1913– ? *Silikat-Zeitschrift.*

1917–date. *Journal of the Society of Glass Technology.*

1919–date. *Journal of the American Ceramic Society.*

1920–date. *Berichte der deutschen keramischen Gesellschaft.*

1926–date. *Keramos.*

? –date. *La céramique.*

FUELS

1890–date. *American Gas Association, Bulletin of Abstracts.* Issued in loose-leaf form, one abstract to the 8 × 5-inch sheet.

1908–date. *Journal of the American Peat Society.*

1920–date. *Brennstoff-Chemie.* Chemical research in fuels is covered with considerable thoroughness by abstracts which are reliable and complete.

1923–date. *Fuel in Science and Practice.*

1923–date. *Automotive Abstracts.* The section on "Materials" in this little journal is of chemical interest; a subdivision "Fuels" is included.

PETROLEUM

1905–date. *Petroleum, Zeitschrift für die gesamte Interessen der Mineralöl-Industrie und des Mineralol-Handels.*

1914–date. *Journal of the Institution of Petroleum Technologists.* Decennial Index 1914–24.

CELLULOSE AND PAPER

[The Technical Association of the Pulp & Paper Industry has had a Committee on Abstracts since 1920 which has prepared abstracts of practically all articles and patents relating to the mechanical and chemical sides of the paper industry. These were at first published in *Paper*, later in *Paper Trade Journal.* By an arrangement with the Canadian Association these abstracts appear also in *Pulp & Paper Magazine of Canada.* Some of them have appeared in the *Paper Mill.* An index is issued every six months, corresponding to the volumes of the *Paper Trade Journal.*

There are incomplete abstract sections in *Cellulosechemie* and *Papier-Fabrikant.* In the latter there is published quarterly a bibliography on paper making, with brief annotations. There is a similar compilation in each number of *Paper Makers' Monthly Journal. Zellstoff und Papier* publishes a quarterly bibliography on paper making.

The above-mentioned T. A. P. P. I. committee publishes an Annual Bibliography in the *Paper Trade Journal* and in the *Technical Association Papers.*]

EXPLOSIVES

1882–1897. *Proceedings of the United States Naval Institute.* "Notes on the Literature of Explosives" by Chas. E. Munroe appeared in this publication.

1924–date. *Explosives Engineer.*

DYES AND TEXTILES

1879–date. *Textile Colorist.* Abstracts of U. S. patents.

1884–date. *Journal of the Society of Dyers and Colourists.* Extensive abstracts.

1910–date. *Journal of the Textile Institute.* Extensive abstracts.

1917–date. *American Dyestuff Reporter.* The "Technical Notes from Foreign Sources" section is made up almost entirely of abstracts.

PAINTS AND VARNISHES

1918–date. *Journal of the Oil and Colour Chemists' Association.* A few abstracts. Now coöperating with the British Bureau of Chemical Abstracts.

FATS, FATTY OILS, WAXES AND SOAPS

[There are a few abstracts in *Chemische Umschau auf dem Gebiete der Fette, Oele, Wachse und Harze, Oil and Fat Industries, Matières grasses* and *Zeitschrift der deutschen Oel- und Fett-Industrie.* The first two of these are of the most value.]

SUGAR

1908–date. *International Sugar Journal.* Full abstracts of the papers considered to be the most important with titles only for the others.
1923–date. *Facts About Sugar.*

[A more or less limited number of abstracts also appear in *Bulletin de l'association des chimistes de sucrerie et de distillerie de France et des colonies,* in *Centralblatt für die Zuckerindustrie,* in *Deutsche Zuckerindustrie,* in *Planter and Sugar Manufacturer,* in *Sugar,* in *Zeitschrift des Vereins der deutschen Zucker-Industrie,* in *Zeitschrift fur Zuckerindustrie der cechoslovakischen Republik* and in *Nauchnuie Zapiski.*]

LEATHER

1906–date. *Journal of the American Leather Chemists' Association.* This journal attempts to reprint or abstract the current literature of the world relating to the leather industry.
1912–date. *Collegium.*
1917–date. *Journal of the International Society of Leather Trades' Chemists.*

RUBBER

[For this field there is no complete set of abstracts outside the general chemical abstract journals, as *Chemical Abstracts.* But a limited number of abstracts, often long ones, are to be found in *Caoutchouc & la gutta-percha, Gummi-Zeitung, India Rubber World, Kautschuk, Revue générale de caoutchouc,* and *Rubber Age* (N. Y.).]

OBTAINING PAPERS AND PERIODICALS

If one wants to obtain a paper, after finding it to be of interest through the reading of an abstract for example, and does not find it in the libraries near enough to be visited, it is usually better to send to an appropriate library for a **photoprint** than to try to borrow or buy a copy of the journal in which the paper appears, unless the paper is very long. Then borrowing may be better. A borrowed journal has to be returned, usually with promptness; a photoprint can be kept and easily filed. To buy a single number of a journal to get a paper is to buy also other papers not wanted, and, in a sense, to break a volume. Also the attempt is apt to fail and loss of time result. Publishers are often soon out of a given edition of their journal. Most of the larger libraries maintain a photoprint service now. In the long run the photoprint method of individual paper distribution is economically the soundest method. The modern development of photoprint services by libraries is one of great importance. See page 208.

Every few years *Chemical Abstracts* publishes a **"List of Periodicals Abstracted,** with Key to Library Files" which is a great help in locating journals of chemical interest. For each of the 1246 periodicals listed in the 1926 edition of this 89-page compilation numbers are given which tell which of 225 libraries of the United States and Canada currently receive that periodical. For each periodical there are also given the authorized abbreviation, the name and address of the publisher, the 1926 volume number, the first number of that volume if other than 1, the number of volumes per year and prices for single numbers and for a year's subscription. Reprints can be obtained from the editor, Ohio State University, Columbus, Ohio, for thirty-five cents each. This is a very nearly complete list of current periodicals of chemical interest.

As Appendix 4 of this book there is given a **Bibliography of Lists of Periodicals.** Most of these lists give library location data, some for limited places, as a single library, a city or a city "and vicinity." Such lists covering more than one library are called *union lists.* This bibliography will, no doubt, help the individual to orient himself as regards his journal facilities and resources. Of special interest among the union lists given is that by Henry C. Bolton, which covers the period 1665 to 1895 and lists the scientific and technical periodicals of the world. The H. W. Wilson Co. (New York) has in progress a Union List of Periodicals in the Libraries of the United States and Canada, which will cover all of the periodicals in nearly 200 libraries. Part has been published.

Papers can be obtained sometimes by asking authors for reprints.

In **selecting journals for** which to enter **personal subscriptions** it is hoped that the descriptions of Current Journals of Greatest Chemical Interest given on pages 46 to 76 will help. Publishers' addresses and subscription prices will be found in the "List of Periodicals" which makes up Appendix 6. It is usually cheaper to obtain foreign journals by dealing directly with the publishers; the journals are received more promptly that way in most cases, too. It is more convenient, however, and not so very much more expensive to order through dealers (see Appendix 7). Usually the best and least expensive way to obtain a journal published by a scientific or technical society is to join the society in question if eligible.

The office of *Chemical Abstracts* will lend rare chemical period-

icals not available elsewhere, a charge of twenty-five cents for use during forty-eight hours being made. It should be noted that this service is not available for journals that can be obtained, in photoprint form or otherwise, through the usual channels.

For further information regarding the obtaining of papers or journals with the help of libraries, as by interlibrary loan, one should turn to the chapter on Libraries and to the List of American Libraries of Interest to Chemists (Appendix 3).

CHAPTER IV

PATENTS

Patents make up an important part of the literature of applied chemistry and few searches with an industrial aspect are complete without the examination of this immense field. Patents are also frequently the object of search by chemists for information of a legal nature. Effort and money spent in working out processes already covered by patents are obviously wasted and infringement difficulties are to be avoided. Much of the chemical work done in industrial laboratories and a great many of the products of chemists of inventive ability are reported and described in patent form only. Even the investigator in pure science cannot afford to neglect the patent literature entirely. There is a tendency on the part of some to underestimate the value of patents as a source of chemical information but chemists in the industries as a rule understand their importance and do not neglect them.

In this chapter an attempt will be made to answer the questions: Just what kind of information and how much can one expect to get from patents? Where should one look for it? What is the best way to obtain it?

NATURE AND SCOPE OF THE PATENT LITERATURE

The word "patent" is frequently used in a general, descriptive sense without regard to the scope or extent of protected rights. It is usually so used here. In its legal sense the word refers to the grant by some government to the patentee of certain exclusive rights in the invention covered. It is really a contract between the public and the inventor. The terms of the contract are that *for a full disclosure of the invention* to the public the government gives the inventor a monopoly for a limited period, which varies in the different countries (17 years in the United States). The

basis for the United States patent system was laid in the Constitution as originally adopted in 1787, which provided that: "The Congress shall have the power * * * * *to promote the progress of science and useful arts,* by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries." The early disclosure of inventions in patents and the stimulation of invention by patent protection are the salient points in the promotion of "the progress of science and useful arts" by the patent system. The italics in this paragraph have been used with the purpose of emphasizing the fact that patents are granted primarily for the benefit of the public.

Patent disclosures are supposed to be full, clear and exact. Unfortunately they do not measure up to this standard at times. Even though it may properly be considered that a patent is addressed to those skilled in the particular part of the art to which it pertains and is not intended to be a complete statement for the benefit of the general public, which might require a long treatise on the whole science surrounding an invention to understand it, it is still possible to say that disclosures are sometimes inadequate and sometimes misleading. This is the great weakness of patents as a part of the literature. Often experimental details are not given sufficiently to enable even the skilled chemist to duplicate patented processes when the patent has expired, at least not without excessive investigation. A patent application sometimes intentionally has the real essence of the invention hidden away in a single inconspicuous paragraph. When a citizen of one country takes out a patent in another, not with the intention of working it in the foreign country but with the object of preventing citizens of that country from manufacturing the patented product, there is a strong temptation to conceal the real invention if possible.

Not infrequently unexpired patents contain disclosures which are not claimed and are therefore public property.

Patents are supposed to be **practical.** They may be based merely on empirical observations without the underlying principles being understood. The underlying principles are not as such patentable. Patents are continually being issued on subject matter the real nature of which is not understood. Scientific theory or understanding may have little or nothing to do with a case; patent validity is not dependent on them. This constitutes a significant difference

between patents in general and the average journal article as sources of chemical information.

On the other hand patents are taken out at times on mere speculation by individuals who wish to preëmpt without the delay or expense of test something which they think will be practical and useful. Such patents are valid only if what they propose actually turns out to be capable of actual use or operation as they allege. Statements in the technical journal literature can more safely be presumed to be based on experiment or experience.

Patents are the source of **new and useful information** because novelty and utility (seeming utility at least) are essential in the obtaining of a patent on any process or product. The statutes provide that "any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor." A great many chemical patents are of the "composition of matter" type and accordingly it is pointed out that this phrase, as used in the statutes, covers all compositions of two or more elements or substances, including "all composite articles, whether they be results of chemical union, or of mechanical mixture, or whether they be gases, fluids (liquids), powders or solids." The legal interpretation, as far as patents are concerned, of "invention," "novelty," "utility," "manufacture," etc., requires pages to be stated clearly;[1] it is hardly within the scope of this book to attempt that here. A sufficiently definite notion of just what kind of information one can expect to get from patents is conveyed, it is hoped, without that.

Like the journal literature the patent literature is **voluminous** and is growing at an accelerated rate. Many countries issue patents and some of them have been issuing them for many years. Chemical patents are increasing in the percentage of the whole number taken out. It is said[2] "that the tendency of the courts is to regard chemical inventions with special sympathy, for the 'inventive idea' is, as a rule, easier to formulate and envisage in these than in mechanical combinations." The United States passed the million and a half mark in May, 1924, in the number of patents issued and about 100,000

[1] A good reference is "Walker on Patents," 5th edition, by John H. Hilliard and Eugene Eblé, pages 1–103.

[2] Ballantyne, *Chem. Age* (London) **6**, 384(1922).

patent applications are now filed each year in the U. S. Patent Office. The British Government has been granting patents since 1617. The **countries which issue patents,** according to *Patent and Trade-Mark Review*, November, 1922[3] are:

Argentina
Australia
Austria

Bahamas
Barbados
Basutoland
Belgian Congo
Belgium
Bermuda
Bolivia
Brazil
British Guiana
British Honduras
British North Borneo
Bulgaria

Canada
Ceylon
Channel Islands
Chile
China
Cochin
Colombia
Costa Rica
Cuba
Czechoslovakia

Danzig
Deccan
Denmark
Dominican Republic

East Africa Protectorate
Ecuador
Egypt
Esthonia

Falkland Islands
Federated Malay States
Fiji Islands
Finland
France

Gambia
Germany
Gibraltar
Gilbert and Ellice Islands
Gold Coast Colony
Great Britain
Greece
Grenada
Guatemala

Haiti
Holland
Honduras
Hong Kong
Hungary

Iceland
India
Italy

Jamaica
Japan
Jodhpur
Johore
Jugoslavia

Kedah
Kelantan
Korea

Latvia
Leeward Islands
Liberia
Libya
Lithuania
Luxemburg

Malta
Mauritius
Mexico
Morocco
Mysore

Newfoundland
New Guiana
New Zealand
Nicaragua
Nigeria
Norway
Nyasaland

Panama
Paraguay
Peru
Philippines
Poland
Porto Rico
Portugal and Colonies

Rhodesia
Rumania

St. Helena
St. Lucia
St. Vincent
Salvador
Sarawak
Seychelles Islands
Shan States
Siam
Sierra Leone
Solomon Islands
Spain
Straits Settlements
Swaziland
Sweden
Switzerland

Travancore
Trinidad and Tobago
Tunis
Turkey

Uganda Protectorate
Union of South Africa
United States
Uruguay

Venezuela
Virgin Islands

Zanzibar

[3] Cf. also Julian F. Smith, *Ind. Eng. Chem.* **16**, 527(1924).

Patents of the same invention are frequently taken out in more than one country. It is pretty safe to assume that a citizen of any patent-issuing country will apply for a patent in his own country first. Most inventions of practical value patented in the lesser countries industrially are later patented also in one or more of the five major countries as far as industrial progress is concerned, namely: The United States, Great Britain, Germany, France and Austria. The current patent literature of the last-named country had relatively greater importance before the World War than at present. A good many more inventions are made in the United States, Great Britain, Germany and France than in all of the other countries put together.

Internationalization of patents has been proposed on several occasions but the only accomplishment which has even approached that in nature is the agreement known as the International Convention for the Protection of Industrial Property, which has been entered into by most of the industrially important countries. According to it, if more than one application for the same invention is made in a given country, preference is given to the one with earliest filing date in any of the subscribing countries in case there have been applications elsewhere and provided the first application was not more than a year old at the time of the later application.

THE SOURCES OF PATENT INFORMATION

These may be classified as follows:

(1) The original specifications.
(2) Official patent publications.
(3) Scientific and technical journals containing patent abstracts.
(4) Patent digests and lists.
(5) Publications on patent law and practice.

Original specifications. The standard form of patent specifications, both domestic and foreign, is: (1) the heading, which includes the name and address of the patentee or patentees, the assignee and the address thereof, the patent number, the date of application, the serial number, and the title of the invention, (2) a brief statement of the general nature or objects of the invention, (3) an explanation of the drawings reproduced, if any, (4) a specific, detailed description of one or more ways of embodying and carrying out the invention and (5) one or more claims, which define concisely and comprehensively the invention covered by the patent. It is

to be noted that **patent titles** often fail to indicate the content of the patents in a precise manner. They are often too general, as "Electrolysis" when the patent is on a means of electroplating with nickel, and sometimes they are misleading.

The countries listed below issue **printed** copies of complete **specifications:**

Australia	Germany	Norway
Austria	Great Britain	Sweden
Denmark	Holland	Switzerland
France	India	United States
	Japan	

Many of the other countries which issue patents will supply photoprint or manuscript copies of patents, the charges for which vary considerably.

In addition to the full specifications it is possible at the United States Patent Office in Washington, D. C., to examine, in the case of U. S. patents, files of the various **Patent Office proceedings** leading up to patent grants, including the original application papers and amendments thereto, and the official communications of the examiners, in which reference is made to prior patents and published statements considered relevant by the examiners. Records of interference proceedings in which U. S. patents may have been involved are likewise available at the Patent Office. In these proceedings one may find lists of prior patents and published statements relating to the same subject matter as the patent under investigation, and at times testimony of interest. If desired, copies of foreign patent applications can usually be obtained from the patent offices of the principal countries.

Information of value may also be obtained at times from **court records** of patent cases. Extensive searches are usually made when such litigation is being conducted and the pertinent findings made a part of the case record.

In certain foreign countries, of which Germany is a noteworthy example, **patent applications** are thrown open to inspection by the public for a certain period before a patent is actually granted upon them for the purpose of offering an opportunity for any interested parties to file an "opposition" proceeding, in which the opponent is privileged to call to the attention of the Patent Office any reasons which he may regard as constituting a proper and legal bar to the issuance of a patent as sought on the application. This is in con-

trast to the practice in the United States, where patent applications are, as a general rule, maintained in secrecy by the Patent Office up to the time the patent is actually issued.

Many of the **libraries** in the United States have substantially complete sets of U. S. patents. Some of the larger libraries have sets of the patents of certain of the more important foreign countries. In most cases these are bound in order of patent numbers. The Patent Office in Washington is the place in the United States where patent searching facilities are best. There, in addition to U. S. patents, files of complete patent specifications are maintained for the following countries:

Australia	Great Britain	Norway
Austria	Holland	Russia (up to and including the first half of 1917)
Czechoslovakia	Hungary	
Denmark	Italy (up to and including 1892)	Sweden
France		Switzerland
Germany	Japan	

The patents in these sets are arranged numerically and duplicate sets with the patents classified in accordance with the official system of the respective countries are available for Austrian, British, Danish, French, German, Norwegian, Swedish and Swiss patents. Abstracts of patents are received at the Patent Office from Belgium, Canada, Finland and New Zealand.

To facilitate searches it is the practice to classify patents. The **classification systems** of the various countries differ in most cases. The United States, British, French, German and Swiss classifications differ greatly from one another. Swedish, Norwegian and Danish patents are classified according to the German system, which is regarded as excellent. The Austrian classification is only slightly different from the German. All classification systems naturally have limitations. The field covered is broad and different kinds of patent searches involve different points of view. The French classification is considered the least satisfactory.

The classification system for U. S. patents is outlined in the "Manual of Classification of Patents," the 1923 edition of which is in loose-leaf form and can be brought up to date by the use of substitute pages as the revision of the classification, which has been under way since the Classification Division of the Patent Office was created in 1898, proceeds. These substitute pages are furnished as ready without extra charge for a period of two years to purchasers

of the Manual (price, $1) and subscriptions can be extended. The Manual contains at suitable points references to "Definitions of Revised Classes," published in 1912, and to "Classification Bulletins" (semiannual, 10 cents per copy, from Superintendent of Documents, Government Printing Office). A subject index is provided.

For U. S. Patents there are 55 examining divisions, 298 classes and thousands of subclasses. The divisions into which the greater portion of the chemical work of the Patent Office falls are numbers 3, 6, 25, 31 and 50. The classes in these five divisions, given as an example of the Patent Office organization, are:

Division 3

Electrochemistry
Electric heating
Heating
Metal founding
Metal treatment
Metallurgical apparatus
Metallurgy
Plastic metal working

Division 6

Chemistry
Chemistry, carbon compounds
Substance preparation

Division 25

Agitating
Bleaching and dyeing
Centrifugal bowl separators
Explosive, pyrotechnic and match compositions
Fertilizers
Mills
Sugar, starch and carbohydrates
Classifying, separating and assorting solids

Division 31

Alcohol
Ammonia, water and wood distillation
Charcoal and coke
Gas, heating and illuminating
Hydraulic cement and lime
Mineral oils
Oils, fats and glue

Division 50

Coating
Laminated fabric and analogous manufactures
Liquid coating compositions
Plastic compositions

As an example of the varied extent of subdivision it is pointed out that there are 292 subclasses under the class "Chemistry," and 175 under the class "Chemistry, carbon compounds." There is considerable of chemical interest scattered through other divisions, as "Photography" in Division 7, "Hides, skins and leather" in 11, "Glass," "Paper-making and fiber liberation," "Plastic block and earthenware apparatus" and "Plastics" in 15, "Batteries" in 16, "Furnaces" in 19, "Textiles" in 21, "Gas separation," "Gas and liquid contact apparatus" and "Heat exchange" in 32, "Medicines" in 43, "Fire extinguishers" and "Concentrating evaporators" in 46, "Liquid separation or purification" and "Fuel and igniting devices" in 49. From the point of view of the chemist the U. S. patent classification is far from satisfactory. The tendency has been in clas-

sifying patents of chemical interest to disregard the usual classification used in other chemical literature, to use unusual terms and to make unusual lines of distinction. Patented corkscrews would hardly be put under "Rotary extractors," but odd things occur.

The U. S. Patent Office has translated the outline and index of the German patent classification. It also has a copy of the "Official Classification of the British Patent Office" and a book (published in English by the British Patent Office) which gives the classification of Austrian, Danish, French, Norwegian, Swedish and Swiss patents.

U. S. patent specifications are available at the Patent Office (1) in the Search Room, arranged according to the official classification (with cross references), (2) in the adjacent hall, arranged numerically and (3) in the examining divisions (by permission), arranged in general according to the official classification but with departures in the form of unofficial reclassifications made in some instances by the examiners for classes of patents never officially reclassified and the official system for which is unsatisfactory; and in the form of further subdivision of official classes. The examiners also have introduced cross references and have made digests of patents and other literature along the lines of their work. The examining divisions also have sets of various foreign patents relating to their subjects classified in the same way as their U. S. patents.

Official patent publications. The patent offices of most of the countries publish official journals in which are reported in brief form the patents and trade-marks issued. Sometimes the patents and trade-marks are reported in separate publications. The following list, compiled by Julian F. Smith,[4] gives the official publications of the various patent offices together with information as to which of fifteen important libraries maintain files (only partially complete in some cases) of these publications. The libraries are designated by numbers (see library list following patent publication list).

1—Argentina: *Patentes de Invencion*, 1,2,3; *Marcas de Fabrica*, 1,2,3.

2—Australia: *Australian Official Journal of Patents* (1904 to date), 1,2,3,4, 5,6,7; *Australian Official Journal of Trade Marks*, 1,2.

3—Austria: *Oesterreichisches Patentblatt* (1899 to date),1,2,5; *Zentral Marken-Anzeiger*, 1.

4—Belgium: *Recueil de Brevets d'Invention* (1854 to date), 1,2,4,8; *Moniteur Belge*, 1; *Recueil Officiel de Marques de Fabrique*, 1.

[4] See *Ind. Eng. Chem.* **16**, 527(1924).

5—Brazil: *Diario Official*, 1.

6—Canada: "Abridgments" (from 1824), 2; *Canadian Patent Office Record* (1873 to date), 1,2,3,4,5,6,7,9,15, *Canadian Trade Marks*, 1.

7—Chile: *Boletin de la Sociedad de Fomento Fabril*, 1.

8—Cuba: *Boletin Official de Marcas y Patentes*, 1.

9—Czechoslovakia: *Patentri Vestnik*, 1.

10—Denmark: *Dansk Patenttidende*, 1,2.

11—Finland: *Registertidning*, 1.

12—France: *Bulletin Officiel de la Propriété Industrielle et Commerciale*, 1,2,5.

13—Germany: *Patentblatte* (1880 to date), 1,2,3,8,11,12, *Auszüge aus den Patentschriften* (1877 to date), 1,2,3,4,5,10,11; *Waarenzeichenblatt*, 1,2; *Blatt fur Patent-, Muster-, und Zeichenwesen.*

14—Great Britain: "Abridgments of Specifications" (1617 to date), 1,2,3,4, 5,7,10,11,13,14,15; "Subject Matter Indexes," 1,2,11; *Illustrated Official Journal*, 1,2,3,4,7,11; *Reports of Patent, Design and Trade Mark Cases, Trade Mark Journal*, 1,2.

15—Hungary: *Patentblatt*, 2.

16—India: *Patent Office Journal*, 1,2.

17—Italy: *Bolletino della Proprietà Intellettuale*, 1,2; *Bollettino dei Marchi di Fabbrica*, 1

18—Japan: *Official Gazette* (patents) 1,2, *Models and Designs*, 1; *Trade Marks*, 1,2.

19—Mexico: *Gazeta Official de Patentes y Marcas*, 1,3.

20—Netherlands: *Octrooiraad Nederland, De Industrielle Eigendom*, 1,2

21—New South Wales: *Letters of Registration of Inventions* (not now being published) 1866–79, 2,4.

22—New Zealand: *Patent Office Journal*, 1,2,3,4,7,8.

23—Norway: *Norske Tidende f. det Industriell Rittsvern*, 1.

24—Peru: *Registro Official de Fomento*, 1.

25—Poland: *Monitor Polski*, 1.

26—Portugal: *Apendice ao Diario do Governo*, 1,2.

27—Russia: *Swob. Privileg*, 1,2,5.

28—South Africa: *Union of South Africa Government Gazette*, 1.

29—Spain: *Boletin Official de la Propriedad Industrial*, 1,2.

30—Sweden: *Beskrivning* (complete specifications), 1,2.

31—Switzerland: *Patentliste*, 1,2,4,5; *Propriété Industrielle*, 1; *Marques Industrielles*, 1; "Register" (annual index), 1,2,4.

32—United States: *Official Gazette* (1872 to date), 1,2,3,4,5,6,7,9,10,11,12,14, 15, "Commissioner's Decisions," 1,2,3,5,11,15; "Annual Report of the Commissioner," 1,2,3,4,5,6,7,8,9,10,11,12,14,15.

33—Victoria: *Abstracts of Specifications* (not now being published) 1854–66, 2,4.

LIBRARY LIST

1—Scientific Library, U. S. Patent Office (Washington).

2—New York Public Library (New York City).

3—Public Library of the City of Boston.

4—Carnegie Library of Pittsburgh.

5—Library of the Franklin Institute (Philadelphia).

6—New York State Library (Albany).
7—Library of the State Historical Society of Wisconsin (Madison).
8—Columbia University Library (New York City).
9—Yale University Library (New Haven).
10—John Crerar Library (Chicago).
11—Chicago Public Library.
12—St. Louis Public Library.
13—Mercantile Library (St. Louis).
14—Rose Polytechnic Institute Library (Terre Haute).
15—Grosvenor Library (Buffalo)

The *Official Gazette of the United States Patent Office*, which has been issued weekly since the beginning of 1872 and now averages about 250 pages per number, is devoted mostly to brief reports on patents issued, the patent heading being followed by one or more typical claims and a selected figure if the patent is accompanied by drawings. The heading includes, besides the information outlined above (see p. 107), the class and subclass number. The *Official Gazette* also contains reports on trade-marks, designs, labels and prints and selected decisions rendered in patent, trade-mark, etc., cases by the Commissioner of Patents, the Court of Appeals of the District of Columbia, the United States Supreme and other courts, and occasional opinions of the Attorney-General concerning such cases. In each number there is an alphabetical list of patentees and a like "list of inventions arranged in accordance with the first significant character or word of the name" (title); also a numerical list of patents arranged by classes and subclasses is given. The subscription price of the *Official Gazette* is $5 per year (10 cents per single copy) and the Superintendent of Documents, Government Printing Office, Washington, D. C., handles the subscriptions. The *Gazette* is widely distributed. There is a large free list, including, by act of Congress in 1895, "one copy to eight such public libraries having over 1000 volumes, exclusive of Government publications, as shall be designated by each Senator, Representative, and Delegate in Congress."

There is an annual index of U. S. patents, formerly published as by far the larger part of the "Annual Report of the Commissioner of Patents," but starting with 1920 issued separately under the title "Index of Patents," which contains entries, arranged separately, for patentees (assignees are included) and for "subjects," similar to those mentioned in the preceding paragraph as occurring in the individual numbers of the *Gazette*. The so-called "alphabetical

list of inventions," being based entirely on patent titles, which are not systematically made, and being compiled merely by the selection of the word considered most prominent, does not serve as a satisfactory subject index. The "Index" is supplied without extra charge to those who receive the *Gazette*. The separate purchase price is $1 per volume in paper and $2 per volume in buckram binding. A digest and title page of each monthly volume of the *Official Gazette* is sold for 10 cents per copy. The weekly index is also separately published and is sold at 10 cents per copy.

The U. S. Patent Office issues for free distribution copies of patent and trade-mark laws, Patent Office Rules of Practice, and pamphlets containing general information concerning patents and trade-marks. The U. S. Patent Office spends over $900,000 annually for printing.

The *Illustrated Official Journal* (Patents), published weekly by the British Patent Office, contains good abstracts, often with illustrations, of all British patents together with lists of applications filed and of patents granted. The patent abridgments are arranged numerically. It is obtainable for £3 per year sent to the Patent Office, London. There is an annual "Index to Names of Applicants," a "Quarterly Subject-Matter Index of Accepted Complete Specifications" and an annual subject index (both annual indexes have appeared since 1853).

The searching of British patents is very greatly facilitated by reason of the fact that the British Patent Office has published carefully classified abridgments of all patents granted since the British patent system was started in 1617. In separate volumes one will find all of the patents for a considerable period of years on the subjects of each of the many classes. For example, the abridgments of all British patents issued between 1622 and 1866 relating to "acids, alkalis, oxides and salts" are in a single volume. The system of classified abridgments was changed in 1855 and for the period 1855 to 1908 there are 146 volumes (because that many classes) for each of 9 consecutive periods. Starting with 1909 the abridgments have been classified in 271 volumes for the periods 1909–1915 and 1916–1920. Completed volumes are to be had for some of these, and any that are not complete, as well as future volumes, can be obtained sheet by sheet as ready for distribution. These classes are not subdivided but each class is provided with periodic sets of "index headings," under which there are entries for kindred patents from a wide variety of bases of similarity.

There have been published an index of names for the period 1617–1852, a subject index for the same period, a numerical index for each of the years from 1901 to 1916[5] and a list of patents in force annually from 1917 to date.

A fifty-year subject index for the period 1861 to 1910 is in course of publication in 271 volumes corresponding to the latest series of Illustrated Abridgment Classes.

The German *Patentblatt*, a weekly, has a supplement, *Auszuge aus den Patentschriften*, which contains illustrated abstracts of German patents similar to those in the U. S. and British publications except that they are arranged according to the German classification instead of by numbers. The only index in the *Auszuge* is the chronological list of classes and subclasses, the patents in each in the number involved being noted. The annual index (*Verzeichnis erteilten Patente*) is divided into five sections, as follows: (1) a chronological list of patent numbers which shows the class in which each patent has been placed; (2) a chronological list of classes and subclasses, which shows the distribution of the patents; (3) an alphabetical index of patentees; (4) an alphabetical subject index; and (5) an index of patents in effect at the time, arranged (*a*) according to classes and (*b*) according to numbers. For a more detailed description of the German patent publications and a discussion of their use see Earl N. Jessup, *J. Ind. Eng. Chem.* **8,** 1053–4(1916).

German patents are frequently referred to in the literature as D. R. P., which is an abbreviation for Deutsches Reichs-Patent.

A description of the other official patent office journals, which are of lesser importance, would be close to a repetition of the preceding paragraphs with names changed.

Scientific and technical journals containing patent abstracts. Most of the abstract journals in the chemical field publish abstracts of chemical patents. Some of them endeavor to cover the patent literature as fully as the journal literature. *Chemisches Zentralblatt*, for example, published about 7500 abstracts of patents in 1926, which was approximately one-fourth of the total number of abstracts from all sources published. Other journals, such as the *Journal of the Society of Dyers and Colourists*, which are not strictly abstract journals but which contain abstract sections, cover patents in their special, more restricted fields with varying degrees of thorough-

[5] The numbering of British patents started anew each year until 1916, when the continuous system, customary in other countries, was adopted.

ness. Still another place where patent abstracts are to be found is in the trade journal which carries a section devoted in each number to abstracts, usually full ones, of a small number of selected patents of interest to those interested in the industry served. *Gas Journal*, which has a section entitled "*Register of Patents*," is a typical example.

Instead of abstracts, or in addition to abstracts, some journals give **lists of patent applications.** *Chimie & industrie*, in addition to abstracts, contains a rather extensive section in each number devoted to such lists. These are classified first according to country (France, England, Norway, Sweden, Czechoslovakia, Austria and Germany) and then by subject. The *Journal of the Society of Chemical Industry* (now in the part called *Chemistry & Industry* —see page 85) contains a "Patent List" in which applications and complete specifications accepted at the British Patent Office, when of chemical interest, are announced. These are arranged in subdivisions which correspond to the various parts of the abstract section of this journal.

Of the journals publishing abstracts of chemical patents the following deserve special comment.

The *Journal of the Society of Chemical Industry*,[6] 1882 to date, is a particularly good source of chemical patent information. The abstracts are good and comparatively full. The field is covered with considerable thoroughness. The countries whose patents are covered are: England, United States, France and Germany. Names of assignees as well as those of patentees are given and also application dates as well as dates of issue. Annual patent number indexes of British patents have been published since 1901 and of the abstracted patents of the other countries since 1916. In this and the other journals the patent abstracts are of course covered by the author and subject indexes, the letter "P" being used in some journals following entries to denote "Patent."

Chemical Abstracts, 1907 to date, covered the chemical patent literature pretty thoroughly up to the time of the World War. It is weak on German, French and Swiss patents during the World War period and since then, curtailment having been made necessary by financial limitations. Within its pages abstracts will be

[6] It is to be noted that the abstract section of this journal has appeared under the name "*British Chemical Abstracts. B. Applied Chemistry*" since the beginning of 1926 (see page 86).

found of British, Canadian, Danish, Dutch, French, German, Japanese (starting 1917), Norwegian, Swedish, Swiss and United States chemical patents. A few Austrian, Italian and Russian patents have been abstracted but these have never been systematically covered. *Chemical Abstracts* is apparently the only abstract journal covering Japanese patents. The abstracts average somewhat briefer than those of the *Journal of the Society of Chemical Industry*. Titles of U. S. and British patents taken out previously in other countries are given together with references to the abstracts of the patents of earlier issuance. For other countries, with the exception of Canada, the present policy is to abstract only patents taken out by natives, unless the foreign patentee be from a country not issuing patents or whose patents are not covered by *Chemical Abstracts*, it being considered a safe assumption, based on numerous agreeing opinions, that patents taken out by foreigners have been taken out, or will be, in their home countries and abstracted from that source. Numerical indexes for 1912–14 only have been published. The subject indexing has received special attention.

Chimie & industrie, 1919 to date, publishes good abstracts of patents. The countries whose chemical patents are covered, with considerable thoroughness, are France, United States, Great Britain, Germany, Norway and Sweden. This journal is recommended for abstracts of French patents in particular. There are no numerical patent indexes and the subject indexes are not very full.

Chemisches Zentralblatt, 1830 to date, has published abstracts of German patents for a long time but did not cover these nearly completely up to 1919. The tendency has been to pay most attention to patents on organic chemical subjects, as dyes and medicinal chemicals. Since its expansion starting with 1919 to cover industrial chemistry the patents of the principal countries have been abstracted and the patent literature is now covered more thoroughly by *Chemisches Zentralblatt* than by any other abstract journal. Annual and five-year (since 1897) numerical patent indexes are published.

Zeitschrift fur angewandte Chemie, 1887 to date, published abstracts of patents and patent applications, mainly German, until its abstract section was discontinued at the end of 1918, this applied chemistry abstract service being taken over by *Chemisches Zentralblatt* at that time. The abstracts were unusually

long in the earlier volumes. Starting with 1890 the German patents have been indexed by numbers and the patent applications listed in accordance with the official German patent classification system.

Chemisch-technische Übersicht (formerly called *Chemisches Repertorium*), which is the abstract section of *Chemiker-Zeitung*, publishes abstracts of the patents of the principal countries but only German chemical patents are covered with an approach to completeness. All of the patent abstracts have been indexed numerically since 1908.

The *Journal of the Chemical Society* published for many years a limited number of abstracts of patents, mainly in the field of organic chemistry. The abstracts are very good. Numerical indexes were first published in 1913.

Moniteur scientifique de Docteur Quesneville has an abstract section devoted to patents. The patents of various countries have been covered. This journal is not recommended for patent searching except that it may be used as a source of information regarding French patents as a last resort. It was combined with *Revue de chimie industrielle* in 1927.

L'industrie chimique, 1914 to date, covers French patents chiefly.

Revue des produits chimiques, 1898 to date, publishes a limited number of patent abstracts.

In Wagner's *Jahresbericht uber die Leistungen der chemischen Technologie* (see page 136) there has been published, starting with 1889, an annual numerical index of German patents covered.

The principal journals devoted to specific branches of chemistry or to specific chemical industries which make it a practice to cover patents in their abstract sections are:

British Journal of Photography.
Eastman Kodak Co. Monthly Abstract Journal
International Sugar Journal.
Journal of the American Ceramic Society.
Journal of the American Leather Chemists' Association.
Journal of the Institution of Petroleum Technologists.
Journal of the International Society of Leather Trades' Chemists.
Journal of the Society of Dyers and Colourists.
Journal of the Society of Glass Technologists.
Journal of the Textile Institute.
Photographische Industrie.

Revue générale des colloides et de leurs applications industrielles.
Transactions of the Ceramic Society (England).
Zeitschrift für Metallkunde.

Patent digests and lists. The number of digests of patents on specific subjects and of other patent compilations calculated to be helpful in patent searches is small. For the most part they are German publications and are based on German patents to the neglect, though not complete passing over, of others. Perhaps the most extensive of these is **Friedlaender's** Fortschritte der Teerfarbenfabrikation. The fourteen large volumes of this work, which covers the period from 1877 to Jan. 31, 1925, thoroughly cover German patents in the field of synthetic coal tar chemistry, including intermediates, dyes, medicinal compounds and perfumes. The patents are classified and following a general discussion of each class there are reproduced the full text of accepted patents and the claims of patent applications. References to foreign patents are numerous. Each volume includes numerical, patentee and subject indexes. The patent applications have a separate number list. Beginning with Vol. IV (1894–97) the numerical index to the accepted patents is cumulative in each volume. Beginning with Vol. V (1897–1900) the cumulative numerical index is followed by number lists of French, British and United States patents referred to. (Springer, Berlin.)

A valuable similar work is **Winther's** Patente der Organischen Chemie (in three vols.). The first volume contains digests, classified by subjects, of the German patents and patent applications of the period 1877 to 1905 which relate to organic compounds other than dyes. The second volume covers German patents on dyes for the same period, the abstracts being classified according to dye classes. The third volume is the index volume. It contains (1) a numerical list of German patents relating to organic chemistry, with the corresponding U. S., British, French, Austrian and Russian patent numbers, if any; (2) separate lists of U. S., British, French, Austrian and Russian patents relating to organic chemistry for the period 1895 to 1908 in which are given the number, date, name of patentee and subject of the corresponding German patents, if any; (3) an index of patentees; (4) a subject index; and (5) a useful list of trade names with information as to the chemical composition of the products and the manufacturer, as well as patent or other literature citations.

Census Bulletin No. 210, published in 1902, contains a digest of the older U. S. patents of chemical interest. This same list of chemical patents granted prior to 1902 was also published as an appendix to Census Reports, Vol. 10, Twelfth Census of the United States, Manufacturers, Part 4, Special Reports on Selected Industries. Another partial list of U. S. patents is the list of U. S. patents granted to Germans and Austrians which was compiled by the Federal Trade Commission during the World War as *prima facie* enemy-owned patents. The part of more particular interest to chemists was published in the *Oil, Paint and Drug Reporter* 1918 yearbook. A similar list is the "Temporary List" issued by the Chemical Foundation consisting of patents taken over by the Alien Property Custodian and transferred to the Chemical Foundation. None of these lists is very helpful in patent searching.

Lange's Die Zwischenprodukte der Teerfarbenfabrikation (1920) contains a brief summary of the patented methods (German patents only) for making aromatic intermediates. The arrangement is systematic. (Leipzig, 1920.)

Doyle's Digest of Patents Relating to Coal Tar Dyes and Allied Compounds covers all patents on dyestuffs and intermediates issued up to 1924. The patents are classified in 24 groups. Useful indexes are included. (Chemical Pub. Co., 1926, $20.)

The lists of patents made by the examiners in the U. S. Patent Office (see above) are helpful in searches. These are called **"Unofficial Examiners' Lists."**

At the U. S. Patent Office there is a card index of patent and other literature compiled for use in patent application examination, which contains over a million cards. See chapter on Indexes, page 191. This index is not being kept up to date.

The *Repertorium der technischen Journal-Literatur* (1823–1909) (see p. 201) was an official publication of the German Patent Office from 1877 to 1909, when it was taken over by a private organization and published for a few years under the name *Fortschritte der Technik.*

The *Patentregister der Jahresberichte uber die Leistungen der chemischen Technologie,* by A. Loesche, is a collective index to the patents recorded in the *Jahresberichte* for the period 1877 (year in which the German Patent Office was founded) to 1924. Leipzig: Johann Ambrosius Barth.

Kunststoffe often contains patent bibliographies on chemical subjects.

Other publications of interest to the patent searcher are:

Metz, "Yearbook for Dyers and Colorists" (annual from about 1900).

Heumann, "Anilinfarben und ihre Fabrikation" (digests of German dye patents up to 1904).

Bedford and Winkelmann, "Systematic Survey of Rubber Chemistry," in which patents receive special attention.

Worden, "Technology of Cellulose Esters" (the number of patents relating to this subject is unusually large).

Publications on patent law and practice. The following selected list, prepared in part by Julian F. Smith,[7] is given because in some circumstances these books rather than the more strictly chemical patent literature may supply the information needed by chemists. (Cf. List 13F, Appendix 8.)

1. Barrows, Patent Law of Interest to Chemists. See *Ind. Eng. Chem.* **15,** 80 (1923).
2. Edelman, Inventions and Patents (1915).
3. Ephraim, Deutsches Patentrecht für Chemiker (1907).
4. Fairweather, Foreign and Colonial Patent Laws (1910).
5. Glascock, Manual of Office Procedure (1922).
6. Guérin, Les brevets d'invention dans l'industrie chimique (1922).
7. Hoar, Patents; What a Business Executive Should Know about Patents (1926).
8. Guides to the Patent Office Library (London). These include AA–BE, Reference works; BF–BL, Patent and Copyright Laws; ZC–ZQ, Chemistry.
9. Kraetzger, Ausfuhrungszwang in Patentrecht.
10. Linley, Practical Advice to Inventors and Patentees (1925).
11. Lynch, Canadian Patent Office Practice (1909).
12. Macomber, Engineer's Handbook of Patents.
13. Potts, Patents and Chemical Research (1921).
14. Potts, Patents; Invention and Method (1924).
15. Robb, Patent Essentials (1922).
16. Samter, Physikalische Chemie und das Patentrecht (in Vol 21, 1917, of Ahrens' Sammlung chemischer und chemisch-technischer Vortragen).
17. Thomas, Chemical Patents and Allied Problems (1917).
18. Thomas, Chemical Patents (1916).
19. Thomas, The Law of Chemical Patents (1927).
20. Walker, Patent Laws of the United States.
21. Walker and Foster, Patents for Inventions (1922).
22. Weber, The Patent Office, Institute for Government Research, Service Monographs of the U. S. Government, No. 31 (1924).
23. White and White, Patents Throughout the World.
24. Witt, Chemische Homologie und Isomerie (discussion on patents).

[7] *Ind. Eng. Chem.* **16,** 528(1924).

There are two **journals** published in the United States which are devoted to this field. They are:

Journal of the Patent Office Society (Washington, D. C.)

Patent and Trade-Mark Review (New York)

The *Journal of the Patent Office Society* is a monthly and was started in September, 1918. It is controlled and published by employees of the technical examining force of the Patent Office. It consists mainly of articles of legal, scientific and historical interest with reference to patents and trade-marks, and contains current information concerning Patent Office and court procedure. Price, 25 cents per copy.

Patent and Trade-Mark Review is also a "monthly authority on *foreign* patent and trade-mark law." It has been appearing since 1902.

There is a comparatively new (1926) German patent journal called *Die Erfindung, Internationale Zeitschrift fur Patentwesen* (Berlin).

SCIENTIFIC LIBRARY OF THE UNITED STATES PATENT OFFICE

In addition to the facilities as to patent specifications and publications mentioned above, the Patent Office library contains approximately 25,000 volumes of scientific and technical books and about 17,000 bound volumes of periodicals devoted to science and technology. The number of foreign patents available totals approximately 3,000,000 copies. Assistants are provided to help those interested in locating publications. A translator and an assistant translator are connected with the library. Four editions of catalogs of the Patent Office library have been published as follows: Catalog of Library of Patent Office, 1878; catalog of additions, May 1, 1878–May 1, 1883; catalog of books in law library of Patent Office, 1883; catalog of additions, 1883–1888. The catalog is now being carried on cards but has not since been printed.

PROCEDURE

The procedure best to follow in making patent searches **varies** considerably with the object and needs of the searcher. If the purpose is merely to seek chemical ideas and information, as in the case of the investigator in pure science who is not concerned with legal considerations, a much more restricted search conducted

in a different way would be suitable than if the purpose is to settle some legal point. And of course the nature of legal questions to be settled alters procedure; different problems are presented by such matters as the patentability of inventions, the filing and prosecution of applications for patents, the validity and scope of issued patents, the infringement of unexpired patents, property rights in patents and the rights and obligations of patentees.

The **main use of patent abstracts** as published and indexed in abstract journals is in searches made of patents as a part of the chemical literature as compared with patents merely as patents. The convenient segregation and classification of patent abstracts and the better indexing in abstract journals makes patent searching by means of these journals a much simpler task than it is when the other facilities are utilized.

In any patent search of the thorough, painstaking nature such as is required in most of those with a legal aspect it is necessary to turn to the **full patents.** Abstracts cannot be relied on always to report everything in patents (frequently they are only intended to report the general purpose or give the principal claim or claims) and a fortune may hang on the wording of a single phrase or sentence. From the very nature of patents abstracts obviously cannot serve as satisfactory substitutes for the original specifications in many circumstances. When such a thorough search is to be made it is advisable to seek the aid of a trained patent searcher. Patent searching is the job of a specialist in about the same sense as is eyeglass fitting. The average chemist cannot afford to attempt this work himself. Furthermore Washington, D. C. (the Patent Office) is the only place in the United States where such searches can satisfactorily be made.

Since patent searching at the Patent Office is considered definitely to be a task to be referred in almost all circumstances to an assuredly competent patent attorney trained to this work, no effort will be made here to describe in detail the procedure considered best in such searches. The treatment in this chapter has been planned with this situation in mind. It has seemed best to give a pretty full description of the patent literature and of the facilities for the various kinds of searches even though it is not recommended that an effort be made to learn patent searching as the competent patent lawyers do. One likes to know about things in a more or less general way anyhow. For this reason

some of the more important points to be kept in mind in **Patent Office searches** are stated in the form of notes.

(1) The same **general considerations** relative to procedure should be kept in mind as are outlined in the chapter on Procedure (pages 212–18). For example it is well to realize that "completeness" is really a relative term as applied to literature searching even when patents are involved; it is necessary to learn to recognize the point beyond which it is not reasonable to go because of the improbability of finding something of sufficient value to compensate for the time, effort and expense of proceeding further. And it is important, as in other searches, to map out a preliminary program of procedure after a study of the subject under consideration, which study may involve some reading and (or) consultation with someone of practical experience along the line involved.

(2) The rules for **index using** (see pages 152–88) naturally apply also. It is especially advisable to learn the shortcomings of the patent indexes and be governed accordingly.

(3) In some industries patents have been resorted to frequently, as in the manufacture of sulfuric acid; in others very little if anything has gotten into the patent literature. The trained searcher learns to recognize these **variations according to industries.**

(4) A **background** of general and historical knowledge of a subject under investigation, or of the industry into which it fits, is useful not only in determining how far back to go in a search but also in selecting the countries whose patents it is most important to examine. Some countries have developed certain industries more extensively than others, as the dye industry in Germany.

(5) Unless there is some special reason for departing from usual practice, it is advisable to begin a search with the U. S. patents and it is rare that it need be extended beyond the patents of England, Germany, France, Austria, Switzerland and the Scandinavian countries. Following the U. S. patents, in **order of preference** in a search, come the British and then the German and Austrian patents. The order for the rest matters less except that French patents are usually turned to last because of the unsatisfactory classification. Many inventions made elsewhere are patented in England.

(6) The patent **classification systems** are helpful but it is necessary to recognize their shortcomings and limitations. There is a good deal of scattering of like patents owing to different points of view. Knowledge of the existence of one or more patents on a subject closely related to the one in hand is likely to be very helpful in determining the classes and subclasses in which to make a search.

(7) When a patent of interest has been located the **use of the indexes of patentees** of the same and other countries is often an easier way to find further patents of interest by the same individual than any other method. It is to be noted in this connection that in most of the European countries patents can be taken out by corporations but that in the United States they are only issued to individuals. A U. S. patent issued to A. B. Smith, for example, may correspond, therefore, to one taken out in some other country by the company for which he works.

(8) Facility in the use of the various classification systems depends on experi-

ence not only as regards general familiarity with them but also as regards the learning of numerous little "tricks of the trade" in finding one's way about in the **search for subclasses** to be examined.

(9) It is usually possible to **consult the examiners** at the U. S. Patent Office when advice is needed and they, as well as the other Patent Office employees, are courteous and obliging.

(10) In the **actual examination of patents** to determine which ones in the selected subclasses are of interest it is seldom necessary to read the whole patent. It is a rule of the U. S. Patent Office to require that everything which can be illustrated by drawings be so illustrated.[8] Many chemical patents do not fall in this class, but when they do it is pretty safe to base one's examination largely on the drawings. If the text needs to be examined beyond the title it is often sufficient merely to read the first and last claims.

(11) For each subclass revised by the Classification Division there has been provided a **"search card"** on which is to be found a definition of the subclass and references to such other classes and subclasses as may contain relevant material.

(12) **Foreign patents** can best be examined in the Scientific Library at the Patent Office and next best in the examiner's foreign files. If special care is desirable it is well to examine them in both places as material is likely thus to be revealed which might be missed with either one-way method on account of the fact that different classifications are likely to take cognizance of patent features disregarded in the others.

(13) The examination of application files of issued patents and of the records of interferences, if any, in the case of U. S. patents of particular interest, and the search by means of abstract journal author indexes for technical articles by the patentees on subjects the same as, or related to, those of their patents are **final steps** in a patent search.

There is an occasional chemist who finds it expedient to keep in touch with the patent literature in which he is interested by **use of the patent office journals.** He goes through from cover to cover each weekly number of the *Patent Office Gazette*, sometimes also the British *Illustrated Official Journal* and in rare instances other like journals. With abstract journals available which cover chemical patents fully this practice can only be considered suitable for the chemist who is interested in some subject on the borderline of chemical interest or whose interest includes nonchemical subjects likely to be dealt with in patents. For example, the authors are acquainted with a chemist interested in evaporator design and manufacture who finds it advisable to keep in touch with patents on heaters, vacuum pumps, condensers, liquor level regulators and other devices which are ordinarily considered as of a purely mechanical as compared with a chem-

[8] The U. S. Patent Office "Rules of Practice" (gratis) furnishes symbols for use in making drawings for patents.

ical engineering nature and are not likely to be covered by chemical abstract journals. In from one-half to three-quarters of an hour this chemist goes through a copy of the *Gazette* and makes his selections of patents to be bought.

HOW TO OBTAIN PATENTS

Copies of U. S. patents can be obtained for 10 cents apiece by application to the Patent Office, Washington, D. C. For convenience in ordering patents and in paying for them, coupons are sold by the Patent Office in pads of 20 for $2 and books of 100 for $10. These coupons are printed so that one merely has to fill in the necessary patent data and his name and address and send them off to the Patent Office when U. S. patents are wanted.

If the supply of printed U. S. patents is temporarily exhausted it is possible to obtain photoprint copies at a rate of 15 cents a page for single pages (8 by $12\frac{1}{2}$ inches) and 25 cents for double pages (10 by 15 inches). Such copies can also be obtained from libraries with photoprint facilities (see p. 208).

If there is no hurry the least expensive method of obtaining copies of most foreign patents is to send to the various countries for them. The following table gives rates and addresses to be used for the more important industrial countries.

Country	Price	Address
Austria	M.5, 10 or 15 according to length	Lehmann & Wentzel, 1, Karnthnerstrasse 30, Vienna
Belgium	$2.00	Office des Inventions L. Duvinage, Brussels
Canada	Varies. Copies from manuscript only available	Commissioner of Patents, Ottawa
Denmark	Kr 3 for each 5 pages	Patentkommissionen, B. Niels Brocksgade 14, Copenhagen
England	1s. (plus postage, usually $\frac{1}{2}$ d, outside the Kingdom)	Comptroller-General, Patent Office, 25 Southampton Bldgs., London, W. C. 2.
France	5 francs	L'Imprimerie Nationale, 87 rue de la Convention, Paris, XV^e.
Germany	Varies	Reichspatentamt, Berlin
Holland	Fl.0.60, plus postage (Fl.0 05)	Bureau voor den Industrieelen Eigendom, The Hague
Italy	Varies. Copies from manuscript only available	Ministerio per l'Industria, il Commercio ed il Lavoro, Rome
Japan	4 sen plus postage	Hatsumei Kyokwai (Invention Association), 1, Yuraku Cho Itchome, Kojimachi Ku, Tokyo

Country	Price	Address
Norway	Kr 1.50 plus postage	Library, Styret for det industrielle Retsvern, Tomtebryggen 14, Oslo.
Sweden	Kr.1.00	Kungl. Patent och Registreringsverket, Stockholm
Switzerland	Fr.1.20 for each ten pages of copy, or in lots of ten or more, Fr. 0 80	Bureau Fédéral de la Propriété Intellectuelle, Berne
United States	10 cents	Patent Office, Washington, D. C.

While it costs a little more as a rule, it is convenient and time-saving to obtain copies of foreign patents by taking advantage of the fact that the U. S. Patent Office will supply, at the rate above mentioned for copies of U. S. patents temporarily out of print, photoprints of all patents available. The countries whose patents are regularly received at the Patent Office are listed on page 109. Certain libraries have a like service but are more or less limited in the number of foreign patents on file. An estimate of the cost of any particular patent (depending on its length) or series of patents can be obtained in advance of ordering from the Patent Office. A convenient plan, when copies of foreign patents are frequently ordered, is to make a deposit of $25 and have copies as needed charged against the deposit account.

It should be mentioned incidentally that photoprints of any other literature available in the Scientific Library at the Patent Office can also be obtained at the same rate.

In ordering a copy of a patent, the number of the patent, the date, the name of the patentee, and the subject of the invention should all be stated if possible.

CHAPTER V

OTHER SOURCES

BULLETINS

The term "bulletin" is rather indefinite; often it is used in titles of the periodicals described in Chapter III as journals, and in that sense does not concern us here. Nevertheless, as a common noun it conveys a fairly clear idea to literature users. It usually denotes a pamphlet publication issued by a government or state department or bureau, a university, an association or other organization, forming a member of a series but having its own serial number. The bulletins of a series may or may not appear at regular intervals. When a single bulletin treats of different subjects and forms part of a regular volume, the publication is to all intents and purposes a journal, yet even then it may be thought of as a series of bulletins. The bimonthly bulletin of the Ohio Agricultural Experiment Station, in its 12th volume in 1927 and with a regular mailing list, is an example. The typical bulletin treats of a single topic and is regarded as a quasi independent piece of literature. It has the advantages of a "separate" or reprint, rather than of a journal number. Under the above heading will be treated all "bulletins," "circulars," "reports," "papers," etc., that belong to this general class. Many of them contain important information for chemists.

United States Government Bulletins. The United States Government is said to be the greatest publisher in the world, at least judging by the amount of its productions. Their very quantity and multiplicity sometimes make it difficult for the chemist to discover what is of interest to him. The Superintendent of Documents, Washington, D. C., is the authorized distributing agent for Government publications, but he charges for everything, cash in advance (at low prices, to be sure), and all

things do not go through his hands. If one knows the particular document wanted, he will do well to apply first to the department or bureau issuing it, where he may obtain it free; if he cannot get it in this way he may secure a copy free through his congressman or senator; if this is not possible he should be able to purchase it of the Superintendent of Documents if the supply is not exhausted. The Superintendent's office will answer information (it maintains a card catalog) and will also send without charge any of a series of classified price lists, which are revised every year or so. Each price list contains a complete catalog of the price lists available. The lists of most interest to chemists are:

No. 11. Foods and Cooking. Dietary studies, nutrition, home economics, household recipes, canning, cold storage.
No. 15. Geological Survey. Covers geology, mineral resources and water supply.
No. 16. Farmers' Bulletins. Agricultural Reports, Yearbooks. Numerical lists; all are found by subject in other lists.
No. 19. Army and Militia. Manuals, aviation, ordnance pamphlets, pensions.
No. 36. Government Periodicals, for which subscriptions are taken.
No. 38. Animal Industry. Domestic animals, poultry and dairy industries.
No. 40. Chemistry. Technical investigations of food adulterations, preservatives and alcohol.
No. 43. Forestry. Tree planting, management of national forests, lumber industry.
No. 44. Plants. Culture of fruits, vegetables, cereals, grasses, herbs
No. 45. Roads. Construction, improvement and maintenance.
No. 46. Soils and Fertilizers. Soil surveys, fertilizers, nitrates, potash, phosphates.
No. 51. Health. Disease, drugs, sanitation, water pollution, care of infants.
No. 55. National Museum, National Academy of Sciences, Smithsonian Institution (covers only the annual reports of the last named).
No. 58. Mines. Mineral resources, fuel testing, coal, gas, gasoline, explosives.
No. 62. Commerce and Manufactures. Foreign trade, patents, trusts and dyestuffs.
No. 63. Navy. Marine Corps, Coast Guard, armor plate, battleships, drill books.
No 64. Standards of Weight and Measure. Electricity, radiotelegraphy, cement, etc.
No. 70. Census. Statistics, population, manufactures, agriculture, mining, etc.

The Superintendent's office also takes subscriptions for the Monthly Catalog of United States Public Documents at 50 cents a year (foreign 75 cents). Stamps are not accepted by the Superintendent but coupons are sold at the rate of twenty for

$1 as a convenience to those wishing to make a number of small remittances.

Government organizations often issue their own catalogs and also send out cards telling of new publications. It is therefore well to get in touch with the particular department the documents of which may be of special interest, and ask to be put on the mailing list to receive announcements. The following are examples of department catalogs:

A list of the publications of the United States Geological Survey. July, 1925. 215 pp.
Publications of the Bureau of Mines. July, 1925. 42 pp.
Index of Bureau of Mines publications. July, 1925. 43 pp.
Subject index of Bureau of Mines Reports of Investigations published during the calendar years 1919–1924. January, 1925 (mimeographed). 35 pp.
Publications of the Bureau of Standards, 1901–1925 (Circular of the Bureau of Standards, No. 24, 7th edition). 1925. 271 pp.
Supplementary list of publications of the Bureau of Standards, July 1, 1925–June 30, 1926. 71 pp.
Announcement cards of the Bureau of Standards, mailed about once a month. (The only material issued by the Bureau and not listed by the Superintendent of Documents is the irregular series of mimeographed letter circulars to answer specific inquiries—no complete list, and no back numbers supplied.)
List of publications of the Department of Commerce available for distribution. Yearly, with monthly supplements.
Monthly list of the publications of the Department of Agriculture. Annotated. (The Official Record of the Department, weekly, 50 cents a year, contains reviews of new bulletins.)

Some Government sources which are of interest to chemists and have not been already mentioned are:

Custom House (Treasury Decisions)
Forest Products Laboratory (Madison, Wis.)
House and Senate Documents, Congressional Hearings, etc.
Interstate Commerce Commission (Decisions)
Public Health Service (including the Hygienic Laboratory)
Tariff Commission (Tariff Information Series)

The list might be much extended. Even with a great deal of watchfulness, it is easily possible to miss Government documents of interest. *Industrial and Engineering Chemistry* performs a useful function here by carrying titles of new Government publications. These should be checked as they appear. Abstracts of many documents can be found in *Chemical Abstracts*, and the originals can be consulted at libraries. Many libraries over the country are known as "Government depository libraries" and

receive some or all of the documents handled by the Superintendent. They must be resorted to for the many bulletins that are out of print. The Bureau of Standards "Supplementary list" (mentioned above) gives a full directory of the libraries where any or all of the Bureau's series may be found.

Swanson's Guide,[1] though it is now several years old, will be found of assistance in explaining the organization of the various departments and bureaus, what they publish and how the publications are distributed. It also contains a list of depository libraries classified by States, and a list of the Government libraries in Washington. It is well indexed.

The **National Research Council** ("of the National Academy of Sciences," as its full title reads) was organized in 1916 by the Academy through an executive order of the President. During the World War it was partially supported by the Government, with which it coöperated. Today, however, it is entirely supported by private funds, the greater portion of which is derived from the Carnegie Foundation. The Council maintains its own publication office (21st and B Sts., N. W., Washington, D. C.). Its bulletins, reprints and circulars may be bought separately. The bulletins have been sold in volumes of approximately 500 pages at $5 a volume but beginning with what would be Volume 12 they will be designated by number only. A number of the bulletins are on scientific research in general; the most important contributions from a single science are on physics. A complete list of the publications of the Research Council covering the period 1916–25 is available for distribution. For the *Survey of American Chemistry*, see page 135.

The **Smithsonian Institution,** an establishment created by Congress in 1846 under the terms of the will of James Smithson, distributes its annual reports free and sells its Miscellaneous Collections, Contributions to Knowledge and a few other publications at various prices (free to organizations and specialists). The Institution takes all science for its field. Annual and quarterly lists of the publications are obtainable. The annual reports are also sold by the Superintendent of Documents.

State and municipal bulletins. These bulletins are in most cases supplied free to residents and to others specially interested.

[1] Swanson, Walter I.: Guide to United States Government Publications. Bureau of Education, *Bull.* **1918,** No. 2. 206 pp. 20¢.

Direct application to the issuing authority is the best plan. The Monthly Check-List of State Publications covers the official publications of the States, Territories and insular possessions (Superintendent of Documents, Washington, $1 a year domestic, $1.25 foreign). Back numbers can be had from 1910 on. Bulletins of State agricultural experiment stations, universities, geological surveys, schools of mines, boards of health, etc., are all listed here.

Foreign bulletins. British Government bulletins may be obtained from His Majesty's Stationery Office, Adastral House, Kingsway, London, W. C. 2. They include such documents as the National Physical Laboratory Collected Researches and Reports, Reports of His Majesty's Inspectors of Explosives, and the Scientific and Industrial Research Reports. The Canada Department of Mines (Ottawa, Canada) issues a number of documents; so also do government departments in Australia, India, New Zealand, etc. Some of these series are given in the List of Periodicals (Appendix 6). Apparently, the tendency to publish information in the form of independent bulletins rather than periodicals is stronger in English-speaking countries than in the rest of the world, or else our knowledge of foreign-language bulletins is more imperfect.

Other bulletins. The **Carnegie Institution of Washington** furnishes free price lists and classified lists of its publications. At the end of December, 1926, it had issued for sale (in addition to the Index Medicus and the Year Book) 377 publications, about 50 of which are on chemistry and physics. Some of these are large monographs. Much of the Institution's research work is published in scientific periodicals; reprints of these articles can often be obtained by persons interested.

Other organizations publishing valuable bulletins include the British Non-Ferrous Metals Research Association (Birmingham; No. 17 in 1926), the British Portland Cement Research Association (London, E. C. 3), the Eastman Kodak Co. (Rochester, N. Y.; Abridged Scientific Publications, etc.), the Institute of Margarine Manufacturers (Washington; No. 10 in 1927), the National Canners' Association (Washington), the Paint Manufacturers' Association of the United States (Washington; Technical Circular No. 257 at the beginning of 1926), and the Structural Materials Research Laboratory (Lewis Institute, Chicago). The National

Research Council will publish soon a bulletin giving complete information about United States organizations of this type, and their publications. Those publishing in *periodical* form are listed in Appendix 5.

THESES

Universities ordinarily require theses (also called *dissertations*) of their candidates for higher degrees and often require them to be printed. In the majority of cases the valuable results of the work covered by the scientific theses find their way into the regular channels by publication in journals, but in some the thesis remains the only source. The abstract journals report some theses but cannot attempt to cover them systematically. Moreover, the thesis usually contains greater detail than journals can give the space for. Hence it is of some importance to be able to learn the titles of theses and how they can be obtained. Universities which do not require printed theses preserve written copies which may be consulted. Those which require printed ones usually appropriate a considerable number of copies which are used for exchange with other institutions; hence, some university libraries have valuable collections of domestic and foreign theses.

The following catalogs are of assistance:

American. Library of Congress lists of American doctoral dissertations. Annual lists of publications actually acquired by the Library, beginning with those published in 1912. The 1925 list appeared in 1927.

The National Research Council compiles the titles of doctoral dissertations from time to time and publishes them in its Reprint and Circular Series, *Science,* and elsewhere (for chemical theses 1922–26 see *J. Chem. Education* **3,** 77–99 (1926); **4,** 99–109(1927)).

French. Catalogue des thèses et écrits académiques. Issued annually under the auspices of the Ministère de l'instruction publique. Paris: Leroux. Classified by main subjects, then by institutions. 40th part in 1923.

German. Jahres-Verzeichnis der an den deutschen Universitäten erschienenen Schriften. Annual. Berlin: Behrend und Ges. Classified by universities, with subject and author indexes. Volume 39 in 1925 (covering 1923).

Verzeichnis der Dr.—Ing.—Dissertationen der deutschen technischen Hochschulen in sachlicher Anordnung, nebst Namen- und Schlagwort-Verzeichnis. 1913–1922. Willy B. Niemann, ed. Charlottenburg: R. Kiepert, 1924. 102 pp. M6.

The third volume of Bolton's Bibliography[2] is a valuable catalog of the older

[2] Bolton, Henry C., "A Select Bibliography of Chemistry," Section 8, Academic Dissertations, Smithsonian Miscellaneous Collections Publication No. **1253.** 1901. 534 pp.

theses. It is based on the card catalogs of the collections in Strassburg University library, the United States Geological Survey Library and the Library of Congress

REVIEWS

The need of critical reviews of the progress made in the various branches of chemistry has been felt from the time the modern era began. The competent specialist may not need them in his own particular territory, but the field that he can know thoroughly grows ever narrower and there are always learners who find peculiar value in such guidance from the more experienced. A review of the present state of knowledge of a topic may easily pass into a monograph, but by "review" is usually meant a rather condensed account or survey, especially one dealing with the latest developments.

Annual reports and yearbooks. Historically famous are the *Jahresberichte* of **Berzelius,** a series of very complete yearly reports on chemistry and related fields which the great master edited from 1821 to 1847. He combined an almost omniscient grasp of the science with great critical ability. But he could not equal his achievement today. With the steady accumulation of knowledge the Jahresberichte type, even though continued by Liebig and other able editors, waned and gave place on the one hand to the abstract journal (which furnishes prompt digests of the facts) and on the other to monographs and more summary reviews. The Jahresberichte and yearbooks of today do not occupy the same place or exert an influence at all comparable with that of Berzelius' production.

Nevertheless, there is still room for reports of progress and the year is still a convenient period of time for the summing up. The reviewer can select the more important pieces of work, compare their relations to one another and criticize them as the abstract journal editor cannot do. The *Annual Reports on the Progress of Chemistry* issued by the Chemical Society of London and the *Reports on the Progress of Applied Chemistry* of the (British) Society of Chemical Industry are especially to be commended to all who would keep in general touch with the advancement of the science.

The **Chemical Society Reports** cover the period from 1904 on. They are attractive volumes made up of well written reports by competent specialists, with references to the original articles.

Volume 22 (for the work of the year 1925) contains 373 pages of reports on general and physical chemistry, inorganic chemistry, organic chemistry, analytical chemistry, biochemistry, crystallography, mineralogical chemistry, colloid chemistry and photochemistry. Volume 11 of the **industrial Reports** covers the work of 1926 in 724 pages, which treat of most of the applications of chemistry. Special rates on both sets of reports are made to members of the American Chemical Society and the British Societies.

The first volume of the **Survey of American Chemistry** appeared in 1927, giving a review of the progress made in pure and applied chemistry in America during the year July 1, 1925 to July 1, 1926. It is prepared by the Division of Chemistry and Chemical Technology of the National Research Council and published by the Chemical Catalog Co.

The Mineral Industry is an annual review of mineral production, technology and markets and includes metals, cement, coal and coke, petroleum and natural gas, asphalt, phosphate rock, potash, etc., with mineral statistics of the world.

A **list of** some of **the principal annual reports and yearbooks** follows. It does not include the reports of the proceedings of certain annual gatherings such as the International Union of Pure and Applied Chemistry (these are considered periodical literature) nor of certain handy books of data called "annuals" and "yearbooks" (for the latter class see Chapter II, and Select List 2G (Appendix 8)). For the full names and addresses of publishers see Appendix 7.

Annual Reports of the Chemical Laboratory of the American Medical Association. The Assocn., Chicago. v. 17–18 for 1924–25. 199 pp. $1.25 (paper).

Annual Reports on the Progress of Chemistry. Chemical Society (London). Van Nost. v. 22 for 1925 See above.

Annual Statistical Report of the American Iron and Steel Institute. The Institute, 61 Broadway, New York.

The Chemical Age Yearbook, Diary, and Directory. Benn.

Chemie-Büchlein. Ein Jahrbuch der Chemie. K. H. Bauer, ed. v. 6 in 1927. 79 pp. M 1.50

Deutscher Färbenkalender. Jahrgang 36 for 1927. 308 p. M5. Deutsche Färber-Zeitung.

Glasindustrie-Kalender. Jahrbuch fur die Glasindustrie v. 24 in 1926–27.

Jahrbuch der Chemie. Vieweg. R. Meyer, editor.

Jahrbuch der deutschen Braunkohlen-, Steinkohlen-, Kali- und Erz-Industrie. Jahrgang 18 in 1927. Knapp. 563 pp. M16.

Jahrbuch des deutschen Drogisten-Verbandes, zugleich Deutscher Drogisten-Kalender. 1927. 382 pp. M5.50.

Jahrbuch der Elektrochemie und angewandten physikalischen Chemie.

Jahrbuch der Erfindungen und Fortschritte auf den Gebieten der Physik und Chemie, der Technologie und Mechanik, der Astronomie und Meteorologie. Leipzig. 1865–92.

Jahrbuch der Milchwirtschaft. v. 2 in 1925. Hannover: Schaper, 1925.

Jahrbuch der Moorkunde. v. 12 for 1923. Hannover: Schaper.

Jahrbuch für ökonomische Chemie und verwandte Fächer. Leipzig. 1847–49.

Jahrbuch der organischen Chemie. v. 12 for 1925. Stuttgart: Wissenschaftliche Verlagsgesellschaft.

Jahrbuch der Spinnerei, Weberei und Textilchemie. v. 15 in 1926. Altenburg: F. O. Müller.

Jahresbericht für Agrikultur-Chemie v 66 for 1923 (issued 1926). Berlin: P. Parey. 563 pp. M46.

Jahresbericht der Chemisch-Technischen Reichsanstalt v. 4 for 1924–25 (issued in 1926). Verlag Chemie.

Jahresbericht über die Ergebnisse der Immunitätsforschung.

Jahresbericht über die Fortschritte der Agriculturchemie. Berlin 1860–92

Jahresbericht über die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften. Founded by Liebig and Kopp.

Jahresbericht über die Fortschritte der chemischen Technologie 1855–60

Jahresbericht über die Fortschritte auf dem Gebiete der reinen Chemie. Tubingen. 1874–83.

Jahresbericht uber die Fortschritte in der Untersuchung der Nahrungs- und Genussmittel.

Jahresbericht über die gesamte Physiologie und experimentelle Pharmakologie. A continuation of Jahresbericht uber die Fortschritte der Thierchemie.

Jahresbericht über die Leistungen der chemischen Technologie. v. 72 for 1926, in 2 parts (1927). v. 1. Inorganic. 598 pp. M37. Leipzig: Barth. Founded by R. von Wagner.

Jahresbericht über Neuerungen auf den Gebieten der Pharmakotherapie und Pharmazie. v. 37 in 1923. Darmstadt: Merck.

Jahresbericht der Pharmazie. v. 58 in 1925. Göttingen

The Mineral Industry. v. 34 for 1925. $12. McGraw. See above.

Mineral Resources of the United States. U. S. Geol. Survey through 1923, Bur. of Mines 1924 on.

Neues Jahrbuch für Mineralogie, Geologie und Paläontologie In two Abteilungen (mineralogy–petrography and geology–paleontology). Stuttgart: Schweizerbart.

Reports of the Progress of Applied Chemistry. Society of Chemical Industry (London). v. 11 for 1926. 12s. 6d. See above.

Standards Yearbook. v. 1 in 1927. 398 pp. $1. U. S. Bureau of Standards.

A Survey of American Chemistry. v. 1 for 1925–26. See above.

Technisch-chemisches Jahrbuch. 28 v., for the period 1878–1905, ed. Biedermann. v. 1–3 were issued as supplements to the Chemiker-Kalender.

Year Book of the American Iron and Steel Institute. New York.

Year Book of the Institution of the Rubber Industry. v. 2 for 1923. London: The Institution.

Yearbook of Pharmacy. London: Pharmaceutical Press.

Reviews in periodicals. Of course it is not necessary to wait on the revolution of the earth for the preparation of reviews. They are appropriate at any time and frequently appear in periodicals issued at shorter intervals. They may constitute the entire contents, as is the case with *Chemical Reviews*, published by the American Chemical Society, and with *Ergebnisse der Physiologie, Fortschritte der Chemie, Physik und physikalische Chemie, Fortschritte der Mineralogie Kristallographie und Petrographie, Physiological Reviews*, and *Science Progress*.

Other journals publishing frequent reviews are:

Annales de chimie
Annales de physique } (Comprehensive papers reviewing the author's own work published elsewhere previously in various other places).

Bulletin of the National Research Council (Committee reports of a review nature).

Chemical and Metallurgical Engineering.

Chemiker-Zeitung.

General Electric Review.

Industrial and Engineering Chemistry (The September number usually consists chiefly of reviews).

Journal of the Franklin Institute (Addresses).

Journal of the Royal Society of Arts (Lectures).

Medicine.

Revue générale des sciences pures et appliquées.

Scientia (Comprehensive general write-ups).

Scientific Monthly (Popular papers, often of the nature of reviews).

Zeitschrift für angewandte Chemie.

Zeitschrift für Elektrochemie.

For information about the above serials see the chapter on Periodicals, and the List of Periodicals (Appendix 6).

Addresses and lectures. The **address** is a freer form than the stated review. In it the speaker may take such turns as his fancy dictates and omit detail altogether, unless for the purpose of illustration. He can sum up in a half hour a point of view developed through years of experience. When delivered by one who knows his subject well and at the same time has a gift for expression, the result is a delight and often a great stimulus. The addresses of the presidents and vice presidents of the British and the American Associations for the Advancement of Science, of the presidents of chemical and technical societies, of medal recipients and of

speakers on other special occasions are frequently most profitable. *Science* and *Nature* reproduce addresses on various scientific topics, and chemical addresses appear in many of the chemical periodicals.

The term **"lecture"** implies a somewhat more didactic production. Singly it may amount merely to a review; but often it forms one of a series on the same topic, given on invitation by a person of some note. The series may be published later as a book; important treatises have sometimes appeared in this way. The "lecture" style is, however, more familiar than that of the ordinary book. In this connection should be mentioned the excellent series of memorial lectures delivered before the (London) Chemical Society in commemoration of the life and work of eminent deceased chemists. Two volumes of these have appeared (see Select Book List 2H3, Appendix 8). Similar lectures or biographical articles on German chemists occur from time to time in the *Berichte*.

There is a German collection of chemical addresses and lectures, appearing in volumes and numbers, which may be bought singly (Sammlung chemischer und chemisch-technischer Vorträge. Stuttgart: Enke. Band 28, Heft 1 in 1924).

BIBLIOGRAPHIES

Strictly speaking, a bibliography is a list of books; but in science, since most new information is published in the journals, it is usually a list of articles. It may be either, or both combined.

References to the previous literature are so important that technical scientific articles and books commonly give them and often collect them into bibliographies, more or less thorough, of the subject treated. Indeed, certain classes of chemical books are likely to be criticized in the reviews if they do not contain such compilations and the practice of including them is on the increase.

The **index** to a journal, especially to an abstract journal, may be considered a bibliography of the literature that it covers; such compilations as the International Catalog of Scientific Literature and the Repertorium der technischen Journal-Literatur are also both indexes and bibliographies. Works of this character embracing a large field are described in the chapter on Indexes (pp. 198–202) and entered in Select List 2N3 (Appendix 8).

The **typical bibliography** is a list of references to writings on a

particular subject or by a particular author. Some are arranged chronologically, others by authors, still others by subjects, and a large bibliography may be accompanied by one or more indexes. A bibliography may be found in an article, in a chapter of a book or at the end of the book, or it may be published separately. A bibliography of a scientist's work is often given in connection with a biographical article or obituary. Many valuable collections of titles exist only in manuscript form. Scientific bibliographies are now so numerous that bibliographies of bibliographies are appearing for geology, chemistry, etc., and the list 2N4 in Appendix 8 of this book, where some works of this kind are listed, is *a bibliography of bibliographies of bibliographies*.

For chemists the most important of the **compilations of bibliographies** is the "Bibliography of Bibliographies on Chemistry and Chemical Technology, 1900–1924" by Clarence J. West and D. D. Berolzheimer (National Research Council, Washington, *Bulletin* No. 50, March, 1925, 308 pp., $2.50). Part 1 is a list of 41 general bibliographies including books and articles on reference works, book lists and comprehensive lists of chemical titles. Part 2 lists 22 abstract journals and yearbooks. Part 3 gives 135 general or cumulative indexes to serials, such as the decennial index to *Chemical Abstracts*. Part 4 (the main section) is devoted to special bibliographies, approximately 9000 in number, and is arranged alphabetically by subjects (and, under each subject, by authors' names). Part 5 is a (confessedly incomplete) list of bibliographies of the writings of individual chemists. A supplement is in preparation.

Bolton's Select Bibliography of Chemistry and other catalogs of chemical books are treated in Chapter II (page 29); a list of such catalogs is also given in Appendix 8, list 2N3.

Probably the most complete and up-to-date bibliography of current periodicals of chemical interest is the "List of Periodicals" published from time to time by *Chemical Abstracts* (see p. 101). Appendix 6 of this book is a list of chemical journals that includes discontinued as well as current ones but gives less information about each than the *Chemical Abstracts* list does. For a bibliography of lists of periodicals, see Appendix 4. For the older serials Bolton's Catalogue of Scientific and Technical Periodicals, 1665–1895 (published 1897), is valuable.

Appendix 1 is a bibliography of writings about chemical literature.

The preparation of bibliographies is discussed in Chapter VIII (p. 220).

TRADE LITERATURE

By E. H. McClelland[3]

A modern chemical industry is chemistry, plus engineering, plus business, and the chemist is frequently called upon to supply the requisite knowledge of all three subjects. The function of the industrial chemist has been described as "the introduction of the dollar sign into the chemical equation" and in order that this suggested introduction may be properly performed the chemist may need more than the proper chemical procedure to guide him. Thus he cannot afford to overlook the commercial factors of his particular industry. Business methods, export and import practice, insurance risks, industrial accidents, and market conditions—all may have an important bearing on his work. Freight rates alone may determine the success or failure of an undertaking.

Neither the chemist nor the chemical engineer can afford to neglect the **trade catalogs** and allied publications of manufacturers. These publications frequently contain technical information which appears much more tardily, if at all, in books and professional journals. Anyone who does much work with technical literature will find that in the case of many new problems (and in the case of some special ones which are not so new) the best information available in print is in trade literature. Much of this trade literature is, of course, strongly flavored with salesmanship, but this is by no means universal and is to some extent decreasing. Today we have numerous publications which give little direct attention to the product of the publishers, but which carry much valuable general information in the way of instructions, tests, properties of materials and operation of equipment.

[3] Mr. McClelland, who very kindly volunteered to contribute this section to the book, is the technology librarian of the Carnegie Library of Pittsburgh and has taken an active part in making the library more serviceable to the chemist (see references to his articles in Appendix 1). For a list of consolidated catalogs and directories see Select List 13K, Appendix 8. Certain technical journals, for example *Industrial and Engineering Chemistry* (News Edition) and *Chemical and Metallurgical Engineering*, publish lists of individual pieces of trade literature as they appear.

Valuable as it is, this trade literature has not received the attention it deserves and it is too frequently inaccessible.

Limited information is available in concise and convenient form in the various "union" or **"consolidated" catalogs,** such as the "Chemical Engineering Catalog" and the "Keystone Coal Mining Catalog."[4] These and other catalogs of this type, in their respective fields, cover the products of many of the important manufacturers of equipment and materials. Treatment is brief —a maximum of a few pages usually being given to one manufacturer—but the "consolidated" catalog has many merits: Timeliness is secured by frequent revision (usually annual); compactness and ease of shelving are achieved through arrangement in a single volume; and (since the manufacturers pay for the space) the catalogs should be (and usually are) distributed free.

For more detailed information than is available in the "consolidated" catalogs, recourse must be had to the individual trade catalogs themselves. An approach to a limited number of these is possible through the **"Catalogue Studies"** arranged and distributed by George F. Whipple[5] of Boston. These "Catalogue Studies" consist of the actual catalogs of various manufacturers, concerned mainly with engineering materials and mechanical equipment. The catalogs are collected and bound together in volumes with uniform binding. The set as revised for 1927 comprises 115 volumes, many of which include several catalogs. An important feature of the project is an accompanying (annual) pamphlet which (though not a detailed index) constitutes a catalog or guide to the collection. This pamphlet lists the various catalogs both by subject and by name of manufacturer, and contains also a list of the valuable information in the form of tables, formulas, specifications, instructions and technical data in general, presented in many of the catalogs. The "Catalogue Studies" are distributed free to universities and engineering societies and, less frequently, to public libraries. The set is in the Technology Department of the Carnegie Library of Pittsburgh.

Both the "Catalogue Studies" and the various "consolidated" catalogs are necessarily restricted in scope. Neither serves the same purpose as a comprehensive collection of catalogs in which the files are not only kept up to date, but the old catalogs are

[4] Keystone Consolidated Publishing Co., Pittsburgh.

[5] Whipple's Technical Libraries, Allston Sq., Boston, Mass.

retained for their occasional great value in patent litigation, and in revealing the state of the art at any period. Unfortunately, the maintenance of an extensive file of catalogs is a considerable undertaking. It has been attempted in many libraries, but seldom followed up persistently. In 1923, a committee of the Special Libraries Association made a survey resulting in the following report:[6]

"The business branches of public libraries which started with a collection of trade catalogs have, after a few years, been obliged to abandon them. The reason given for so doing was that few firms kept the business branches of the public libraries on their mailing list and the task of keeping these collections 'up-to-date' was very difficult and very expensive. They also reported that to keep them available a pretty elaborate file and cataloging, etc., had to be evolved.

"'The characteristic answers from public libraries were to the effect that 'the staff is too small and our space too restricted for us to keep a collection of catalogs that is really a worth-while part of the library's resources,' and that a useful up-to-date file of trade catalogs requires the entire time and thought of one person and that such attention is generally impossible in a public library."

More than twenty years ago the Technology Department of the **Carnegie Library of Pittsburgh** began building up a **collection** of trade literature. The collection now contains more than 14,000 volumes (as many of these "volumes" are loose-leaf binders containing sets of pamphlets or circulars, there are actually 70,000 to 75,000 separate pieces of trade literature). To make this material accessible, two card catalogs are maintained. One of these lists the material by subject and the other lists it by the names of manufacturers. The old catalogs are kept and occasionally some of early date are added from private libraries received as gifts. The value of old trade literature is greater than is generally realized. Anyone can obtain a recent catalog, but the old ones are quite rare, and their use is likely to be greater since the advertising pages of magazines are usually discarded when binding. Many industrial corporations maintain files of trade catalogs but these are frequently the perquisite of the purchasing agent, and when a new catalog is received the old one goes into the waste-basket.

[6] *Special Libraries* **14,** 112(1923).

Certain manufacturers put their best advertising effort into the publication of magazines or serials which, for want of a better name, are called **"house organs."** Some of these publications contain valuable technical material—for example, the "Chemist-Analyst" of the J. T. Baker Chemical Company, which is occasionally abstracted in *Chemical Abstracts*. In the Carnegie Library of Pittsburgh the collection of catalogs is supplemented by a file of some 500 house organs. About 400 are currently received; many others are "dead," but in some cases the files extending back over twelve or fifteen years are still of interest. Card catalogs are maintained to make these house organs available by titles, subjects and names of companies.

REPRINTS AND PREPRINTS

It is the custom of scientific journals to furnish to the author of an article a limited number of *reprints* of the same, which reproduce the article in the form of a leaflet or pamphlet. The body of the article is printed from the same type but there may be minor changes, as in the style of type of the title and author's name; it may or may not be provided with a cover. Occasionally the article is printed in this manner *before* its appearance in the journal, when it is called a *preprint* or advance print. Reprints and preprints are also called *separates* and *offprints*.

Reprints should always indicate exactly the reference to the place where the original article will be found, and they should retain the original page numbers (whether or not they also have a pagination of their own, beginning with 1). An author can usually obtain any desired number of reprints by ordering them when he returns the proof of the article, and many do order extra ones.

To one specially interested in an article, the reprint is a more convenient form than the original appearance in the journal; hence, research workers and institutions frequently exchange reprints, and specialists collect reprints of articles on their specialties. Reasonable requests for reprints from those who have legitimate use for them are usually honored if not too long delayed after the appearance of the article.

Ostwald has gone so far as to anticipate that in the future scientific articles will be printed only as separates and that a chemist, instead of subscribing to certain journals, will subscribe to series

of separates on certain special subjects.[7] At present this seems rather impractical; nevertheless, there is no doubt as to the convenience of separates for some purposes.

PERSONAL CORRESPONDENCE

The possibility of obtaining or exchanging information by correspondence seems so obvious as scarcely to need mention. It is worth while to note that in the earlier days of science personal letters held a very important place in announcing discoveries and in criticism. Such correspondence has not been entirely displaced by scientific publications and meetings. Those interested in the same special topic will continue to exchange notes and sometimes material.

As a rule, scientists are very ready to respond to personal inquiries when the information wanted cannot be obtained through the regular channels. Many a young chemist has been encouraged and inspired, as well as informed, by a painstaking reply from an older worker.

Personal correspondence becomes more or less impersonal and public when it takes the shape of **"letters to the editor."** It can be, and often is, an entertaining and valuable feature of the less formal scientific journals. It should not be allowed to go too far in the direction of polemics.

INFORMATION SERVICE

The information bureau is a recognized institution—why not utilize it in science? However much this or other books or articles may seek to guide inquirers through the maze, definite questions arise that can only be answered by someone that knows; and this may raise the second problem—who and where is he? Engineers have been performing this function in industry, but it is only recently that information bureaus have come into existence for the general worker.

The most important of these is the Research Information Service of the **National Research Council** (21st and B Sts., N. W., Washington, D. C.). It is "a clearing-house for information about the natural sciences and their applications in industry, commerce and education." It has a scientific and technical staff and through

[7] Die chemische Literatur und die Organisation der Wissenschaft, Akad. Verlagsgesellschaft, Leipzig, 1919, pp. 11–14.

the Research Council has wide and important contacts with other scientists. The members of the staff consider its function to be three-fold: (1) To furnish information of various kinds to the Council; this was originally the reason for its existence. (2) To give similar service, within limits, to scientific workers, at home or abroad. (3) To prepare and publish compilations (issued as publications of the National Research Council). Its industrial service is restricted to referring the inquirer to appropriate sources of information, whether books, journals or men; it has no desire to compete with experts whose services are available to the industries. The service has a card index of over 30,000 bibliographies and a collection of catalogs of scientific instruments and apparatus. It makes a periodical survey of the scientific work of the Government, and engages in many other activities the object of which is to secure and disseminate information. An explanatory booklet is available.

The Chemical Catalog Co. of New York developed during the World War a free information service which grew so rapidly that it became necessary to place it on a charge basis. It is limited to chemical technology. There are no doubt other public information services of interest to chemists. The larger chemical companies also maintain their own services, some of which are very accommodating in answering reasonable questions from outsiders. Libraries, especially those specializing on technical subjects, should be included here since they are called upon to answer scientific questions of many kinds and take a pride in doing it well.[8] Certain libraries will undertake bibliographic work, translations, etc. (See the List of Libraries, Appendix 3.)

A somewhat different class of information service is that which came into existence for the purpose of popularizing science and at the same time giving authentic information. Much excellent popular scientific writing has been done in Great Britain but in the United States, before the World War, too often the scientist wrote without knowledge of the art and the magazine writer wrote without knowledge of science. Reporters passed important scientific meetings by or made headlines of some trivial incident.

To remedy this condition and to try to make the people familiar

[8] See the article by E. H. McClelland, *J. Ind. Eng. Chem.* 11, 578–82(1919), for the great variety of such service rendered by the Carnegie Library of Pittsburgh.

with the aims and achievements of science, **Science Service** was established at Washington in 1920 under the experienced leadership of Dr. E. E. Slosson. It is a non-profit-making corporation. It is reaching a wide circle of readers through the newspapers, *Science*, and other publications and circulates a news letter of its own.[9] A service of similar purpose has recently been established in France.

The **American Chemical Society** has also established its own news service, the purpose of which is "to give to the newspaper and magazine press accurate reports concerning chemical developments in the United States." It provides "statements and bulletins concerning discoveries in chemistry, which are expressed in as nontechnical diction as is consistent with precision." Since such services came into existence the improvement in scientific information furnished to the public has been marked.

The **International Institute of Bibliography** at Brussels was fortunately spared during the invasion and occupation of Belgium. It has published a comprehensive classification of science based on the Dewey system (see page 205) and has a huge card catalog (over 12,000,000 cards) in which chemistry is duly represented.

UNPUBLISHED MATERIAL

The constantly expanding volume of scientific literature is causing the editors to condense it more and more strictly, not only because funds for publishing have a limit but also in order that the reader may have the new information as promptly as possible and may not be compelled to wade through useless details. However, in the case of many an article there are a few workers to whom this detail is not useless but very valuable. They may find it advisable to apply to the author for the full unpublished notes on his work. This is especially true of quantitative and statistical records and minutiæ of methods. A plan has even been proposed[10] by which such records would be duplicated by mimeograph or otherwise and placed in a limited number of repositories at suitable points.

Aside from such details, it is safe to say that nearly all valuable scientific work is now published with more or less promptness unless withheld for commercial reasons. The amount of infor-

[9] *Science News-Letter*, weekly, 10¢ a copy, $5 a year. 21st and B Sts., Washington, D. C.

[10] *Science* **56**, 197–8(1922).

mation on research work held as confidential within private organizations is considerable; but the proportion released is growing and the prospect is promising for the time when purely scientific information (as distinguished from details of application) will be regarded as common property, by whomever obtained.

Most scientists have to overcome a kind of inertia before writing up their experimental results; writing papers is often a dreaded task. On this account publication of results by some workers lags behind, at times never occurs, a regrettable fact. A letter of inquiry to such a scientist, however, if one happens to know of his work, is not likely to be neglected.

MUSEUM COLLECTIONS

The collection of museum material and the use of it as a source of information have not attained the same importance in chemistry as in such sciences as botany, mineralogy or paleontology. A chemical museum is likely to be thought of as an exhibition of colors, of crystal forms and, if one is permitted to open the bottles, of smells. Chemists frequently do, however, make use of a substance already prepared by some other worker and even send long distances for it. Shelves of research laboratories serve as repositories to a certain extent, housing accumulated material that may prove useful in the future. But such material is scattered and only the local workers know much about it. It is a logical step to a central collection such as the Smithsonian Institution is now making under the name of the Loeb Collection of Chemical Types, the purpose of which is "to preserve for future reference and comparison the material results of chemical research." Such a collection or some system for making generally available the rare chemicals in existence seems desirable, for a great amount of time and work required for preparation may thereby be saved.

COMMITTEE WORK

The output of committees of scientific organizations constitutes a special source of information. There is certain work that can be done better by the conference of several specialists than by one, or that requires the authority of a large body back of it to make it effective; or, again, it may be something that is very much needed but is not done until some committee is specifically asked to attend to it. Activities of this nature include the setting up of standards

of all kinds, questions of nomenclature, the coördination of research and the direction of it along needed lines, the compilation of data, etc.

Committees charged with the solution of a certain problem are glad to receive help from outside and are in a special position to furnish information to others. It is therefore advisable to be familiar with the committee work in progress under the National Research Council and the chemical and other societies. For example, anyone in the United States intending to construct or equip a chemical laboratory at the present time would make a mistake not to avail himself of the aid of the National Research Council committee on that subject. The reports of committees appear from time to time in the regular publications; and some widely used books, such as the national pharmacopeias, are the outcome of committee work.

PERSONAL CONTACT

Because scientists are human, a person is ever of more interest than a name signed to an article. Any experienced chemist will testify to the value of frequent personal contact with other scientific workers. Such intercourse is constantly going on in the universities and colleges, the research laboratories and such headquarters as the Cosmos Club of Washington, the Chemists' Club of New York, or the Chemical Society rooms in London. But the occasions *par excellence* are the meetings of the scientific societies, especially the great annual or semiannual gatherings. Here one may hear the latest advances explained or discussed and may see or meet personally men with whose work he is already familiar. A single conversation at such a convention is often worth the whole trip. It may be considered the duty of every chemist to belong to one or more such organizations, first because of their indispensable publications (the cost of which is reduced as the membership increases), second because union is necessary if science is to have its due influence in the world of affairs, and third because of the benefit to be gained from scientific meetings. Those who decline to attend these do not in most cases realize how much they miss.

The development of scientific societies has been sketched by W. A. Noyes.[11] Information about the principal chemical socie-

[11] Presidential address, *J. Am. Chem. Soc.* **42**, 2099(1920).

ties of the world is given by E. E. Reid.[12] See also Appendix 5.

PORTRAITS

In lieu of personal contact we all make use of pictures, to make more vivid our memory of the features of persons we have seen, and to stimulate the imagination in the case of others in whom we are interested. Portraits of well known chemists help to impart a human interest in studying their work. It is an excellent idea to have a portfolio of them, and to frame those of special interest. Inquiries are made from time to time as to how such pictures may be obtained. A limited list of portraits of the most famous chemists may be found in the catalogs of apparatus firms. "Science Service" (Washington, D. C.) furnishes photographs of a considerable number of contemporary American scientists at a low rate. D. H. Killeffer's "Eminent American Chemists" (The author, 19 East 24th St., New York City, $6) is a collection of 33 portraits, with sketches, on separate sheets. Portraits are of frequent occurrence in some chemical periodicals, and very fine portraits sometimes appear in connection with biographies, obituaries, and memorial lectures. In listing such articles *Chemical Abstracts* usually mentions the portrait if one is given. Publishers' advertising matter frequently contains pictures of chemical authors, and even of chemical laboratories. If one were to save such miscellaneous illustrations on sheets and make a card index of important pictures in the journals, a valuable collection would result in the course of time.

[12] Introduction to Organic Research, Van Nostrand, 1924, pp. 73–77.

CHAPTER VI

INDEXES

A reference work can usually be little better than the index thereto. Dictionaries and encyclopedias are exceptions but even the latter can be indexed to advantage. The value of a record varies in proportion to the availability of the information recorded; buried data and opinions are lost to distribution and use. A work of reference should not only provide a sure means of locating every bit of information which it contains but also should be so arranged and equipped as to make this finding of things easy to accomplish. Classification and logical arrangement often help and are worth while but there are variations and limitations in their applicability. Except in special cases the main reliance must be placed on indexes. It is not only desirable that the chemist should become familiar with the general nature and plan of the principal reference works in his field, whether they be books or journals, but also that he should become acquainted with the characteristics and limitations of their indexes. It is only thus that he can use them effectively. Existing indexes vary rather widely in quality as well as in kind.

KINDS

Indexes may be independent of any specific publication, covering miscellaneous sources of information, as the Index Medicus for example, or, as is much more common, they may be to specific books, journals, or other publications. They usually cover definite periods in the case of serials, as a volume or year. Collective indexes covering a period of years are published in some cases; these are particularly helpful in literature searches for they save much time. The indexes in use in the literature of chemistry are of the following kinds:

1. Author indexes
2. Subject indexes
3. Empirical-formula indexes of compounds
4. Ring-formula indexes of compounds
5. Patent-number indexes

Each of these kinds will be treated separately in this chapter after a brief discussion of the general characteristics of all kinds and a few general hints for use.

GENERAL CHARACTERISTICS

What constitutes **a good index?** It is one that will serve as a reliable means for the location, with a minimum of effort, of every bit of information in the source covered which, according to the indexing basis, that source contains. This test is broad enough in its applicability to be used in connection with any kind of index. To meet this test an index must be accurate, complete, sufficiently precise in the information supplied and so planned and arranged as to be convenient to use. Existing indexes fall far short of this ideal in many cases and of course somewhat short of it in all cases.

It is not safe to assume that indexes are accurate although usually they are reasonably so. It is easy for **errors,** particularly in references, to creep in during the compilation and printing and only the most careful checking keeps them out. A common mistake of an indexer is to continue using a page number after he has turned to the next page; hence if the reference cannot be found on the page indicated it is well to look on the following page. The next most likely possibility is that two figures in the page number have been interchanged, as 2305 when 3205 is meant. It is sometimes possible to correct a wrong page number by referring to another kind of index to the same publication, as to the subject index if an author name and title have been located in an author index, or by referring to another subject obtained from the modifying phrase in case of a subject index entry with incorrect reference. In a reference work often in use it is advisable to make it a practice to write in corrections and additions as occasion demands.

Completeness is usually attained in author, formula and patent-number indexes but in subject indexes it can only be approximated and is frequently far from reached. More will be said about this in the section below on subject indexes. Considerations of precision and convenience in use will likewise be deferred till subject

indexes are discussed as their main importance is in connection with this kind of index.

The main purpose in indexing is sometimes partially lost sight of through an effort to bring some sort of **classification** into it. Classification in connection with indexing usually detracts from, rather than enhances, the efficiency and usefulness of an index and is beside the purpose. The Richter system of arrangement for entries in an empirical-formula index is an example of a mixture of classification and indexing to the detriment of the latter.

GENERAL HINTS FOR USE

Conscious effort to become a good index user will well repay any scientist. Many a day has been spent in the laboratory seeking information by experiment which might have been obtained in a few minutes or hours at the most in the library had the literature search been efficient. Skill in literature searching involves skill in index using and efficient index using is an art in itself, a thing to be acquired. This is particularly true with reference to subject indexes as will be pointed out later. The first step in learning this art is to become familiar with the characteristics and peculiarities of the various kinds of indexes. An effort will be made to set these forth in this chapter.

The first general hint for use is found in the above statement that **index using is an art** in itself. This is not always realized, though it may seem to some to be too obvious to mention. It deserves emphasis. Of course the ideal index would be one which anyone educated in the field covered can use effectively without special experience, but indexes vary much in quality and even the best ones make it clear that the approach to the ideal is a difficult one. The index user must meet the indexer part way for really good results.

An index should be as little dependent upon separate explanatory matter as possible. An author index and to a large extent a subject index can be independent of such matter; the alphabetical arrangement of index headings (authors or subjects) is expected and assumed by the user. The arrangement in a patent-number index is likewise so simple as to be assumed. The arrangement in either an empirical-formula or a ring-formula index is less simple so that some sort of key or introduction in explanation of the system is a necessity. Though not really dependent thereon,

important author and subject indexes sometimes are accompanied by **introductory matter** of an explanatory nature which is helpful. It is very much worth while to give careful attention to index introductions, no matter what the nature of the index, if one expects to make any considerable use of an index involved. One should be sure of the system.

It is important to avoid being too soon satisfied. Everyone has perhaps had the experience of looking for something, in an index or elsewhere, and after failing to find it has looked again, this time with success, and has wondered how he could have missed it before. It is worth while to look back and make absolutely sure in important cases. But much more important than this simple precaution, which is perhaps barely worth mentioning, is the advice to **be thorough.** There is no operation in which thoroughness is more important. It involves first a full knowledge of the system as advised in the preceding paragraph. Then one needs to be resourceful, exhausting all possibilities, if he is to avoid some futile searches or incomplete findings. This applies more particularly to subject indexes; these are the ones most used by far. One's fund of general knowledge can usually be brought into service to excellent advantage. This necessity for resourcefulness is less urgent in the use of the better prepared indexes but it is always present. For example, in the best subject indexes well supplied with cross references it is less necessary to think up a variety of possible headings under which a subject might be entered, for in such indexes scattering will be largely eliminated and the cross references will lead the way to related subjects; but it is always well to remember that even the expert indexer has human limitations and his range of knowledge of the subject in hand and of the subjects related to it may have been less than yours.

On account of the necessity of drawing on one's general knowledge in making a literature search in any field it is in many instances greatly preferable that **one should make his own searches.** It is not always safe to let a librarian or some one else less well informed than oneself in a certain field make an index search when a complete survey is desired, even though his familiarity with indexes and the literature in general may be better than one's own. Just as some tasks in the laboratory can be turned over to another to advantage but not the more important deter-

minations and experiments, so some tasks in the library can safely be delegated to an assistant but not all such tasks. Knowledge, skill and power of observation are factors fruitful of important results in the library as well as in the laboratory.

The **kind of index best to use** in a given situation will usually be obvious. Sometimes in the use of one kind one will receive suggestions for the use of another kind. For example, if in looking up references on a subject in a subject index one finds that such and such an author has done considerable work on that subject it may pay to turn to that author's name, if an author index is provided, to see if some of his studies not located from the subject index may nevertheless not be of interest, at least indirectly, to the subject. This is often worth while. If a compound is located in the formula index to *Chemical Abstracts* it is not improbable that reference to the subject index at the place where the compound is entered by the name which follows the formula in the formula index will disclose derivatives or other related compounds of possible interest. A patent-number index will often serve as a lead to the name of a patentee, which name in an author index will lead to information regarding other patents of interest. The ring-formula index to *Chemical Abstracts* is a kind of key to the ring compounds entered in the subject index.

One should be prepared, be persistent and be resourceful.

AUTHOR INDEXES

While the use of indexes of author names is in general very simple there are some special cases which at times lead to confusion and the missing of entries. Chief among these is the case of names from languages using different characters from our own. These must of course be transliterated before they can be entered in an index using Roman characters. The countries of importance as far as chemical literature is concerned whose languages are printed in letters distinct from our own are Russia and Japan. These languages present somewhat different cases but the type of confusion resulting is the same.

The transliteration of **Russian names** is done according to comparative alphabets which have been worked out. If only one system were in use the trouble would not be great but unfortunately such systems vary. This means that in the literature therefore the same name may be and probably will be found spelled two or

more ways if the author is a Russian. Sometimes such an author will be found entered in different places under different spellings in the same index. Some attempts have been made at standardization but no standard system has been universally recognized. The system agreed upon in England a number of years ago by a group of editors[1] has been adopted in this country to a considerable extent; it is the predominant system in the English-speaking countries. As a matter of interest and of possible utility this system is set forth in the accompanying table (page 156).

Some equivalents according to different spellings are noted below and should be kept in mind in looking up Russian names in the literature. Some of these, as "tsch," have come through German transliterations and are not necessarily desirable in English. Of course if a chemist settled in Germany whose name was originally Russian spells his name by German analogies his spelling should be respected. Of the equivalents listed below, the last in each instance is considered the preferable spelling.

"ce" is equivalent to "tze."
"tsch" is equivalent to "ch"
"j" is equivalent to "i" or "y."
"ks" is equivalent to "x."
"sch" is equivalent to "sh."
"ski," "sky" and "skago" (genitive form) are equivalent to "skii."
"w" and "ff" are equivalent to "v"
"i" is equivalent to "y."

Thus one will find in the literature both "Chugaev" (preferred) and "Tschugaeff" as spellings for the same name.

Japanese names can be written in our alphabet only on the basis of the pronunciation. Even though the exact pronunciation of a Japanese name is known there is usually more than one way in which that pronunciation can be expressed in English. For example, "chi" and "ti," "di" and "ji," "shi" and "si," "tu" and "tsu," and "zu" and "du" are used for the same respective pronunciations. Furthermore Japanese authors at times adopt spellings for their names in our alphabet which may vary a little from the exact pronunciation. An example is the spelling Yebihara where one would expect the spelling Ebihara. It is often difficult, even for a Japanese, to determine what the pronunciation of a given name is. Chinese letters are used for Japanese

[1] *Nature*, Feb. 27, 1890.

RUSSIAN - ENGLISH

Roman Capital	Roman Small	Written Capital	Written Small	English equivalents	Roman Capital	Roman Small	Written Capital	Written Small	English equivalents
А	а			a	Ф	ф			f
Б	б			b	Х	х			kh
В	в			v	Ц	ц			tz
Г	г			gh	Ч	ч			ch
Д	д			d	Ш	ш			sh
Е	е			e	Щ	щ			shch
Ж	ж			zh					
З	з			z	Ъ	ъ			(Not indicated at end of word)
И	и			ī					
І	і			i	Ы	ы			ui
К	к			k					
Л	л			l	Ь	ь			(Not indicated at end of word)
М	м			m					
Н	н			n	Ѣ	ѣ			ye
О	о			o	Э	э			e
П	п			p	Ю	ю			yu
Р	р			r	Я	я			ya
С	с			s	Ѳ	ѳ			th
Т	т			t	Ѵ	ѵ			œ
У	у			u	Й	й			ĭ

ENGLISH - RUSSIAN

a	А	ī	И	p	П	ui	Ы
b	Б	ĭ	Й	r	Р	v	В
ch	Ч	k	К	s	С	ya	Я
d	Д	kh	Х	sh	Ш	ye	Ѣ
e	Е	l	Л	shch	Щ	yu	Ю
é	Э	m	М	t	Т	z	З
f	Ф	n	Н	th	Ѳ	zh	Ж
gh	Г	o	О	tz	Ц	'	Ъ
i	І	œ	Ѵ	u	У	'	Ь

names. The pronunciation may be by proper Japanese derivation or according to old Chinese pronunciation. There is no way to tell which is the case. This means that two names spelled exactly alike in Japanese may properly be represented by very different spellings in our alphabet because of pronunciation differences. The confusion caused by this whole situation is not so bad, however, as one might expect. The more important Japanese chemical journals provide correct English spellings for the author names in connection with papers published. In addition Japan's scientists are not so numerous but that the correct pronunciation of their names is pretty generally known in Japanese scientific circles, which reduces the chance of error when English spellings are made by Japanese. When a Japanese has a name which is to be pronounced differently from what the ordinary educated Japanese might expect he usually puts Japanese letters under his name (first given in Chinese letters) to make the pronunciation clear.

It is usually not difficult to recognize Japanese names. The names Aoyama, Hayashi, Ishikawa, Komatsu, Ogawa, Sugiura, Tasaki, Tashiro, for example, sound Japanese. There are certain characteristic end syllables, as -chi, -da, -do, -ji, -ki, -ma, -no, -ra, -ri, -shi, -su, -ta, -to, -wa, -ya and -zu, which are very common in Japanese names. A Japanese name always ends in a vowel or "n" (a few Japanese in this country use "-oh" instead of "-o").

The umlaut is at times a source of confusion. It may be expressed by putting two dots over the vowel or an "e" after it. For example, one will see the name Röntgen also spelled Roentgen or Müller spelled Mueller. In some indexes a name involving an umlauted letter will be entered in the place where it comes alphabetically if the umlaut is disregarded (Plan A) while in others such a name will be alphabeted on a basis which considers the umlauted letter as being followed by "e" (Plan B). For example, in some indexes Müller will follow Mulhouse and in others it will precede it. If the confusion ended here it would not be bad but there is another kind of mix-up that is likely to be involved which is more serious. Since umlauted letters are not used in English words umlauts are rather frequently omitted when names involving such letters are reproduced in American and English publications. Typesetting keyboards and typewriters are not always so equipped as to make the reproduction of an umlauted letter as easy as the

reproduction of the letter without an umlaut and the umlaut is probably not considered of much importance by printers and typists. If this omission is not discovered the name is likely to get into an index minus its umlaut. The same name may also get in with its umlaut. Index entries for the same author in two different places because of an omitted umlaut are not common but they are to be found. In a large index such entries may be several pages apart if the name with the umlaut given is alphabeted by Plan B described above. Another common happening when names with umlauted letters are reproduced is the changing of an "ö," for example, to an "oe." If this is done part of the time but not always in the case of a given author name and an index in which this author name is entered is alphabeted according to Plan A above it is obvious that the name would appear in two more or less widely separated places. Of course an alert indexer will be on the lookout for such situations and eliminate them. This is not always done, however, and the indexer is not always to blame. The safe plan is to look both places.

It is possible for the same name to get into an index in three different ways as a result of the above-discussed situations, the spellings Müller, Mueller and Muller serving as an example.

The **Scandinavian letter "ø"** is sometimes treated like the umlauted letter "ö" as discussed in the preceding paragraphs. As a matter of fact, since printers outside of the Scandinavian countries do not as a rule have type for this letter, names involving it will be found with an "ö," an "o" or even an "oe" substituted for it. For example, Sørensen's name will be found in the literature spelled Sörensen, Sorensen and Soerensen as well as the right way.

Another source of confusion at times is the **name with two or more parts** (the first part being frequently a preposition), as De Groot, Van Slyke, van der Meulen, Vom Baur, van Voorhout, van't Hoff, von Seelhorst, de Wisniewski, Pina de Rubies, etc. Other such name "prefixes" are D', Da, Dal, Del, Della, Des, Du, La, Le, Les, Mac, O'. It is always a question as to whether or not the alphabetic place in the index has been chosen on the basis of the first or last part. Different practices are followed in different indexes. Perhaps the most common way is to make the first part the basis for the alphabeting if the beginning letter is a capital, and the second part if it is not; thus, De Groot, M.; and Seelhorst, T. S. von. Other indexes follow the practice of

entering English and French surnames beginning with a preposition (except the French de and d') under the preposition, but making the entries under the word following with all other languages, irrespective of the use of capital or "lower case" for the first letter of the preposition; a name which has been anglicized is usually entered under the preposition, as Van Rensselaer. In a few indexes "lower-case" beginning letters and a secondary place are accorded the preposition or prefix no matter what may be the practice of the author himself. In the use of indexes in which the "case" of the first letter of the first part of names decides their place, the question of course arises as to which case is correct in any name. The indexer himself is often puzzled as to this as changes are often made in copied names. These usually occur either through carelessness or through lack of clearness as to whether a lower-case or capital letter is correct, because names are at times printed in capitals from beginning to end, thus: H. VAN DER MEULEN. Even if one knows the system followed in a given index and is certain as to the situation with reference to the letters in a name being sought it is advisable, if the name is not found where expected, to try the other possible place for mistakes are not infrequent in this connection.

The custom in Spain of using the mother's as well as the father's name at times is a source of bother to indexers and index users. Such a name will have the form A. Rius y Miro and will be found in indexes both as Rius y Miro, A. and as Miro, A. R. y. The former is preferable.

Related to the name with more than one part is the **compound name,** thus: Prinsen-Geerligs. This name will be found, in connection with papers, printed both as just given and without the hyphen and it is not surprising therefore that indexes will have this and like names entered sometimes under the full compound name and sometimes under the last part.

In German-speaking Switzerland the wife's name is added with a hyphen to the husband's for social purposes. Thus Prof. Fr. Fichter's card reads Fichter-Bernoulli. Such compound names apparently rarely get into scientific literature.

Names starting with M' or Mc, as McMillan, are usually alphabeted as if spelled out Mac instead of in the strictly alphabetical place. This serves to bring together such names as MacLaurin and McLaurin. In an author index one may find such three

different forms as Macleod, MacLeod and McLeod. Occasionally an index will be found in which all the names starting with M' or Mc are segregated, separated entirely from the other M's as if the M' or Mc were a distinct part of the alphabet. **Names beginning with S., St., or Ste.** are usually alphabeted as though the prefix were written out (Sanctus, Saint, Sainte, respectively) but this rule is not applied to L' and O' since the prefixes for which these are contractions are not pronounced. In **Spanish CH** is a letter distinct from C and is given a separate place in certain foreign indexes. Again because of the easy possibility of mistake in spelling and because of the variation in practice it is desirable to be a little wary in looking up such names.

Changes in names, which occur now and then, are usually taken care of in indexes by cross references. Sometimes they are merely slight changes in spelling and at other times they are radical changes. Aside from the case of the woman scientist who is married there is the case of the British scientist who has been raised to the nobility and uses a different name on that account.

Although in the United States only individuals can take out patents, in most foreign countries companies can do so. This means that in looking up the patent literature one will frequently find **company names** entered in indexes as author names. Occasionally one may have trouble finding a company name for such reasons as the following. At times only a part of a company name will be used rather commonly but an index will usually give the name in full. Such a case is that of Farbenfabriken vorm. F. Bayer & Co., which is commonly spoken of as just Bayer & Co. Another source of confusion is the translation of a company name from one language to another. As an example, attention may be called to a company in Switzerland, where both the French and German languages are more or less commonly used, sometimes spoken of as Société anonyme pour l'industrie chimique à Bâle, at other times called Gesellschaft für chemische Industrie in Basel and occasionally Society of Chemical Industry in Basel. This kind of situation is sometimes taken care of by the use in indexes of appropriate cross references.

Cross references are almost universally used for second, third, etc., authors except that it is not uncommon for such an expression as Smith, A. B., *et al.* to be used with no mention of other authors if the number of authors of a paper goes beyond two or three.

Mention has been made a time or two in the preceding paragraphs of the easy **chance for errors** to creep into author indexes in special cases. As a matter of fact errors in spelling and in initials are comparatively common throughout author indexes. There are several reasons why this is so. The indexer is not to blame in many cases. Before a name gets printed in an index it usually has been copied several times. Errors are always likely when things are copied. Errors in copying ordinary words are almost always discovered and corrected because the correct spelling is generally known so that it is obvious that something is wrong; mistakes are frequently not obvious in the case of author names. And they seem easy to make, particularly if script is involved. The letters "n" and "u," not distinctly differentiated in the handwriting of so many, are often confused. The story of an author name entry in the index to an abstract journal would show the possibilities of mistake. Between the submission of the original manuscript of an article and the printing of the abstract journal index entry there are at least eight separate chances for such an error to be made in an author name. Of course in well edited journals a good deal of care is exercised to check up the accuracy of the operations which come directly under the editor's supervision but with many copyings by many different individuals, the author, the first editor possibly, the first printer, the abstractor, his typist, the abstract printer, the indexer and the index printer, it is not surprising that author indexes in general contain a comparatively large number of errors as indexes go. The compiling and publishing of an extensive author index free from errors in spelling or in initials is a very exacting undertaking and absolute accuracy is rarely attained. A realization of this situation may be of some little value to the index user under some circumstances. For example, one may feel sure that a given author has published a paper and yet failing to find it indexed, instead of giving up, may look around a little and find the name with a G instead of a C as an initial or with some other mistake made.

Instead of the spelling in an index being wrong, difficulty in finding an entry may be due to an incorrect spelling in the mind of the searcher. There are certain series of **names pronounced alike** or almost alike **but spelled differently** which rather frequently confuse the index user as well as the indexer. The series Hofman, Hofmann, Hoffman, Hoffmann and the series Myer, Myers,

Meyer, Meyers serve as examples. A few other cases are: Ayres, Ayers; Findlay, Findley; Fisher, Fischer; Johnson, Johnston; Kaufmann, Kauffman; Mathews, Matthews; Morrison, Morison; Neilson, Nielson; Newman, Neuman; Pierce, Pearse; Schmid, Schmidt; Schulz, Schultze; Seibert, Siebert; Stephenson, Stevenson; Thompson, Thomsen, Thomson; Zuntz, Zunz.

The custom more or less common among authors in France of signing their **last names only** to papers, omitting initials, is deplored by author indexers. The effect on indexing is obvious; either the initials have to be determined independently or omitted in the index involved. The latter procedure may throw several different authors together.

Mistaking of the **French abbreviation M.** (Monsieur) for an author's initial has also given rise to errors.

Cases of **different authors with the same** last **names** and the same initials are not uncommon. In some indexes these get together, for example under Smith, J. F.; in others they are separated with different given names spelled out, as Smith, John Frank, and Smith, John Frederick, or, in others, where the given names are alike the address may be given to differentiate authors, as Smith, John Frank (Chicago) and Smith, John Frank (New York)

One should be as sure as possible of his own spelling, not too sure of the correctness of the spelling in the index and ready to look around before being satisfied.

SUBJECT INDEXES

The subject index is the most important kind in chemistry as in most other fields. It is the index most used. The subject part of an important chemical index is always the first to show signs of wear in libraries.

The object of a search (see pp. 9, 122, 212) often has a good deal to do with its nature. If a single bit of information is being sought, for example the density of some definite substance, the search may be soon terminated, but if one wants to learn all that he can from the literature about some more or less general subject the search may be a long and difficult one, requiring the greatest resourcefulness for even an approach to completeness.

The indefiniteness of subjects in general as index headings, as compared with author names and formulas of compounds for

example, leads to many difficulties both in index making and in index using. This means that even the best subject indexes have limitations affecting their usefulness. Subject indexing is not a mechanical process; it involves the constant making of decisions of various sorts. It is perhaps not surprising, therefore, that existing subject indexes to books and periodicals of interest to chemists vary widely in quality.

Unfortunately the indexing has not been well done in a good many chemical publications. This constitutes the greatest weakness in the literature. The trouble seems to have been not so much a lack of appreciation on the part of authors and publishers of the importance of good subject indexes to scientific publications as a lack of realization that only a trained and experienced indexer can be expected to be able to make a good subject index. Subject indexing is all too often attempted by individuals unprepared for such special work, the belief seemingly being that the only requirement is a knowledge of the field to be covered. Subject indexing requires special skill and it is unreasonable to expect satisfactory results from untrained hands. Not even authors are qualified to index their own work unless they are equipped by training and experience with the qualifications of an indexer. Their intimate knowledge of the subject, a very desirable qualification though it is, will not make up for a lack of ability as an indexer. To measure up as a satisfactory indexer for a given publication one must have certain general qualifications for the work which can be acquired only by experience, these in addition to a considerable acquaintance with the whole branch of knowledge involved and the ability fully to comprehend the contents of the publication, and in addition to familiarity with the principles and practices of indexing. These general qualifications are good taste, good judgment and a habit of conciseness and of liberal and comprehensive thought. Furthermore, and above all, one needs what may be called the "indexing sense"—"that is, the ability to feel instinctively, at the first glance, what and how subjects should be indexed in all their ramifications; the sense that is in touch with searchers, and appreciates just how subjects will be looked for and how to arrange so that they can most readily be found."[2]

These qualifications of a good indexer are likewise good quali-

[2] J. B. Nichols, *Library J.* **17**, 406(1892).

fications for the subject index user. The use of subject indexes is more of an art than is usually realized. It is very much worth while cultivating. **Effective searches require** special knowledge, training, experience and the exercise of judgment on the part of the searcher. He must draw heavily on his general fund of knowledge, must know what to expect of subject indexes in general and of the more important particular ones, and he must go about the task with the same thoughtful and wide-awake attitude that is appropriate when one is making a search for information by conducting experiments in the laboratory. The difference between success and failure in finding a single bit of information or in making a reasonably complete general search may not lie so much in the indexes as in the index user.

An effort will be made here to set forth the general characteristics of subject indexes and to point out their faults. Then at the end of the chapter the more important individual indexes will be described. A part of the **plan** will be to indicate what it is considered that the ideal subject index should be like. This should be helpful not only in guiding chemists to the best reference sources but also in helping them to realize what to expect, and therefore what may have to be done, in using indexes that are not up to standard.

Many so-called subject indexes are really **indexes of words** instead of subjects. There is a vast difference. Words are of course necessary in the make-up of a subject index but it is important for an indexer to remember that the words used in the text of a publication are not necessarily the words suitable for index headings or even modifications.[3] Word indexing leads to omissions, scattering and unnecessary entries. After the most suitable word or group of words from the indexing point of view has been chosen for a heading it should of course be used consistently no matter what the wording of the text may be. And yet one will find indexes with entries scattered under such different headings as "Accumulators," "Storage batteries" and "Cells, secondary," when the meaning is essentially the same and all entries should be grouped. Or, as an example of a type of un-

[3] In indexing parlance "*modification*" is the term applied to the word or phrase which is usually supplied following an index heading to indicate the character of the information given in the source referred to, as "analysis of" under such a heading as "Aluminum alloys."

necessary entry, one may find such a title as "Scheme for the qualitative analysis of the common metals in the absence of phosphates" word-indexed under the heading "Phosphates."

To illustrate a kind of **scattering of entries** which may result **from word indexing** let us consider such a series of article titles as follows: "An apparatus for the determination of carbon dioxide," "A new absorption apparatus," "Apparatus for use in the analysis of baking powder," "An improved potash bulb" and "Flue-gas analysis." Word indexes would no doubt contain an entry under the heading "Carbon dioxide" for the first title, one under "Absorption apparatus" for the second, under "Baking powder" for the third, under "Potash bulb" for the fourth and one under "Flue gas" for the fifth, and probably no others. These entries seem reasonable enough if the titles are considered separately without thought of the others. And yet the articles may all be descriptive of the same sort of apparatus. As a matter of fact all of these titles might conceivably be used for the same article; if the author happened to be working on baking powder or on flue-gas analysis when he conceived the idea for his novel piece of apparatus or had it in mind particularly for one purpose or the other he might choose one of the more specific titles for his article rather than one of the more general ones. In an index entirely based on subjects rather than words it would be the task of the indexer to see that all of these articles get indexed under one heading, or all under each of more than one heading, best with cross references pointing from the other possible headings to the one or more headings used. Or if there seems to be some justification for scattering owing to differences in point of view (word indexing cannot be gotten away from entirely) he will make sure that the necessary cross references are supplied to lead the index user about from heading to heading so that if any of the entries are missed it will be his own fault.

It is not hard to tell whether or not an index is a word index; when this is suspected or noted one should look around pretty thoroughly in its use instead of being satisfied that the entries found under the obvious heading are all that the index contains on the subject.

In an **index really based on subjects** rather than words one of course will not always find the word or words used as the index heading or even in the modifying phrase when he turns to the page of text referred to. It is important to bear this in mind for other-

wise it is easy to miss a subject and conclude that the reference is wrong. For example, in the text the wording might be "test for suprarenine" and yet the index entry be made under the heading "Adrenaline" (this being a preferable and more used name and therefore more obvious and more suitable as an index heading), with the modification reading "detection of" rather than "test for" if some standardization of modifications for the sake of bringing like entries together has been attempted. As a matter of fact it is conceivable that the same subject might be word-indexed in the same index under such a variety of headings as Epinephrine, Adrenaline, Suprarenine, Adrenine, Adnephrine, Adrine and Suprarenaline or under any one of these headings with such a variety of modifications as "detection of," "test for," "reaction for," "color reaction for," "qualitative analysis of" and "identification of," instead of all entries being grouped under one heading with one modification. Examples of just this sort of thing can be found. Or such a wording in the text as "unstable nature of hydrogen peroxide" may have as its counterpart in the true subject index the heading "Hydrogen peroxide" with the modification reading "stability of," for "stability" really expresses the subject even if the negative of it is involved and it is the word most likely to come to the mind of the index user who will of course not have the wording of the text in mind as does the indexer. In some indexes to abstract journals the location of subjects on the page is facilitated by giving author names along with subject index entries; this narrows the field for search down to one abstract in case there are more than one on the page. Another help in this direction is the practice of supplying the fraction of the page in ninths in which the subject is taken up. The fraction is given as a small superior numeral following the page reference.

Accuracy is usually good in subject indexes, better than in author indexes, as far as little mistakes are concerned. The serious type of inaccuracy that is to be found occasionally in subject indexes is the misinterpretation of the meaning of the text. While this sort of thing does not occur frequently it is nevertheless a source of weakness in the literature. A subject index entry may be several times removed from the original in point of interpretation. For example the entries in the subject index to an abstract journal represent the interpretation by the indexer of the subject as stated in the abstract, which statement is the interpre-

tation by the abstractor of the meaning of the original author. The index user may of course misinterpret the meaning of the entry in the index, and therefore misjudge as to whether or not he is interested. The meaning of index entries, especially brief ones, is sometimes obscure.

There is perhaps no definite point at which a subject index may be said to have attained **completeness.** Some are much fuller than others. A great many subject indexes are not as full as they ought to be. Word indexes are usually cluttered up with entries that are of no value, and lacking in needed entries. An index may be reasonably complete from one point of view and not from another. For example, a chemist may have occasion to make use of a publication on bacteriology, the index to which is reasonably full from the point of view of bacteriology, but find it incomplete from the point of view of chemistry. That is the reasonable thing to expect; it should be kept in mind in making searches. Completeness may be considered both with reference to headings and with reference to modifications (see page 169).

Some indexes to periodicals, particularly word indexes, are merely **indexes of** the **titles** of papers or abstracts as the case may be. These are always incomplete. Titles do not always tell the whole story as to the contents of papers even in very general terms. They vary greatly in this qualification. Very frequently indeed papers will contain new data with reference to specific substances not mentioned in the titles (possibly referred to in a general way, for example as "salts") which data should certainly be made available to those interested in the particular substances by means of specific index entries. And in a great many cases papers contain significant index information with reference to more or less abstract subjects, particularly in conclusions, which subjects are not brought out in the titles at all. For example, a paper entitled "The determination of the atomic weight of silver" may contain a description of a novel method of preparing pure silver chloride, of a new analytical procedure or of a new device to assist in making especially accurate weighings, any one of which might be of interest to some one not interested in atomic weight determinations. Or a paper entitled "Some dyes of the anthraquinone series" may contain some conclusions as to the relation between chemical constitution and color. It is obvious that if one finds an index to be based on titles only that index is to be put down

as very far from complete. Ingenuity will be required in the use of such an index if even a small part of the "buried" subjects are to be ferreted out.

The unfortunate tendency in recent years for technical periodicals to make the **titles of articles** which they publish read like newspaper headlines makes the titles even less suitable as an indexing basis. The form of title so popular with many technical editors in recent years is exemplified by the following newspaper headline actually observed: "Combustion Causes Costly Conflagration."

Of course the **need for full indexing varies** somewhat with the nature of the publication covered. It is much more important for an abstract journal to be thoroughly and properly indexed than for a journal publishing full papers only, for abstract journals are used much more as a means of locating information. Abstracts are not always complete, however, so that information that would be useful if available is often practically lost to use because it never gets indexed any place. This is minimized nevertheless by the special efforts made by some of the abstract journals to have their abstracts prepared from the indexing point of view and by the thorough indexing which is attempted. As an indication of how the abstractor and indexer, coöperating, endeavor to make the record complete the following rule is here reproduced from "Directions for Assistant Editors and Abstractors of *Chemical Abstracts*."

Since *Chemical Abstracts* is intended to be a complete and permanent record of all chemical work it is very important that abstracts should contain or make specific reference to all of the information in articles that is suitable to be indexed. This would include every measurement, observation, method, apparatus, suggestion and theory which is presented as new and of value in itself. All new compounds and all elements, compounds and other substances for which new data are given should be entered in abstracts. These data should be given, in abbreviated form if satisfactory abbreviation is possible (*e. g.*, averages only or possibly a formula or a curve), except where an excessive amount of space would be required. In such a case reference to them should be sufficiently specific and precise so that it will be possible to make definite index entries and there will be small chance that the user of the abstract will be misled into thinking that the article contains the particular information he wants when it does not, or *vice versa*. The decision in this connection should be influenced by consideration of the source of the article. Adequate precision is of course equally important when data are given. *E. g.*, it is usually not sufficient to refer merely to "steel" if "3% nickel steel" is specified and it is not satisfactory to omit temperature, pressure, etc., variations if these are significant. To facilitate the use

of an abstract and of the index it is often advantageous to call special attention to one or more *words or phrases designating subjects suitable for the index* which are not brought out in the general title. This is best done by underscoring with a single straight line to indicate that the printing is to be done in italic letters. These subtitles, if they may be so called, need not be set off alone but may be parts of sentences. *E. g*, if in an article entitled "The determination of the heat of combustion of naphthalene" directions are given for the preparation of pure benzene and a novel calorimeter is described, the abstract might well contain sentences starting and marked as follows: 'Pure benzene was prepd. by, etc.' and 'The determination was made in a special calorimeter, the novel features of which are, etc.' The names of new compounds should always be underlined for italics; the same is true of other substances not mentioned in general titles but suitable to be indexed except that it is better not to use italics when a considerable number of substances are given together (these stand out prominently enough without italics and the appearance is better).

And in the Key and the Introduction to the Decennial Index to *Chemical Abstracts* as well as in those to recent annual indexes to this publication one will find the following pertinent statements.

Subjects, not words, have been indexed.

Abstracts, not merely their titles, have been considered in indexing.

All new compounds and all elements, compounds and other substances for which new data are given have been indexed.

The farther back one goes in point of years the less thorough one may expect to find the literature covered by abstract journals (1) in the percentage of suitable journals covered, (2) in the nature of the abstracts and (3) in the character of the indexing. Indexing is receiving better attention than was once the case though the improvement is far from general.

Subject index modifications vary a good deal in several ways. A happy medium between desirable brevity and the supplying of details is the ideal. Adequate precision in phrases modifying subject index headings consists in supplying just as much information with reference to the contents of the text as is necessary to indicate its nature and scope and to prevent the searcher from being misled into thinking that he may find what he wants when it is not there, or *vice versa*. In many indexes, particularly word indexes, modifications are much too long. For example, such a title as "Study of a method for determining nitrites in water" will be indexed under the heading "Nitrites" with the modification reading "study of a method for determining, in water" when merely "determination in water" would be much better. Unnecessarily long modifications slow up the use of an index without anything being gained. On the other hand merely "deter-

mination of" would not be a sufficiently precise modification in the above case. If on looking over the entries under a heading a modification is found which indicates that the entry involved refers to the phase of the subject in which one is interested it is seldom safe to terminate one's search there even if the modifications have been arranged with some system. Suppose the modifications in an index were alphabeted and one were interested in learning what he could about the density of alcohol-water mixtures. Under the heading "Alcohol," or "Ethyl alcohol" as it is more likely to read, one may find a modification reading "density of mixtures with water" and then further on a modification "properties of mixtures with water," the latter more general entry being likewise of interest because one of the properties dealt with is density. In a word index there might also be an entry reading "specific gravity of mixtures with water." This illustrates the point.

Since the searching of the literature is a time-consuming task even under the best of conditions it is to be regretted that **convenience in use** has not received consideration in connection with many subject indexes. It is possible by efficient modification writing, systematic arrangement of entries and judicious selection of printing form and style to facilitate the use of a subject index greatly. General quality of the indexing and the use of cross references, which will be discussed later, are also important factors. It is hardly worth while to discuss the various printing forms and styles here; it would require a good deal of space. The most convenient scheme perhaps is the use of the entry-a-line form with alphabetic arrangement of modifications, the significant word of which has been brought to the front, as exemplified in the indexes to *Experiment Station Record.* A good discussion of the various forms with examples as well as of indexing in general, is to be found in *University of the State of New York Bulletin* No. 534, 76 pp.(Jan. 1, 1913).

The **alphabeting of headings** is done in accordance with two different plans. According to the more common plan (Plan A) when a heading consists of more than one word it takes its place among the other headings in strictly alphabetic order the same as if the words were run together to make a single word. This is the plan usually followed in dictionaries. In the arrangement according to the other plan (Plan B) only the first word in such headings is considered first, the additional word or words being

given consideration in a secondary alphabeting. For example, the heading "Heat of reaction" would follow the heading "Heaters" according to Plan A but precede it according to Plan B. Plan A has the advantage of greater simplicity. Headings with transposed words, as "Iron, metallurgy of," are usually alphabeted first on the basis of the part before the comma. In a few indexes headings and modifications are not considered separately in the alphabeting. When entries under a given heading are arranged alphabetically according to the modifications and there are entries with no modifications these latter are customarily placed first because of the recognized rule that "nothing comes before something."

Cross references are an important help to an indexer as well as to the index user. Word indexing is really hard to avoid and cross references are the great preventive. It is a good sign if an index has a plentiful supply of cross references, both of the "see" kind and the "see also" kind.[4] They make for uniformity and proper correlation, two very desirable qualities in indexes. "See also" cross references are of just as much importance as the "see" kind though not as much used. The service which they render in directing the index user to related headings or to headings which, though dissimilar for the most part, have entries under them likely to be of interest to the investigator who refers to the original heading, is often the chief means of making a search complete. It is not reasonable to expect an index user, or an indexer as a matter of fact, to think of all the headings representing related or significant subjects under which headings he may find valuable references that might otherwise be missed. Nevertheless in the careful indexing year after year of a periodical devoted to a more or less definite field, an abstract journal for example, subjects are come upon in such a variety of connections and from so many angles that it is possible for a truly comprehensive list of cross references to be built up. The suitability of a given "see also" cross reference may not be clear, let alone suggest itself, until a specific case in which it is helpful is observed. It often pays to follow up such a cross reference even when it does not look as if

[4] Cross references which refer from a possible heading under which no page references are given to the chosen heading where they may be found are called "see" references, as "Mineral oils. See *Petroleum;*" those which connect headings representing allied subjects or containing related entries are called "see also" references, as "Iron alloys. See also *Steel.*"

it applies in a given case. The indexer in surveying the whole field year after year is in a position to make valuable suggestions in the form of cross references calculated to lead the index user from place to place in the index so that the chances of his search being really exhaustive as far as that particular index is concerned are much bettered.

Suppose one were interested in temperature measurement or control in connection with a given process but did not happen to be familiar with the practice of using pyrometric cones in the ceramic industry. Suppose in addition that the pyrometric cone method, if not applicable in the case at hand, would at least be suggestive of the solution of the problem being investigated. In searching the literature such an individual would no doubt turn to the heading "Temperature" first in using available subject indexes. The advantage to him of finding a cross reference to "Pyrometric cones" or "Seger cones" under the heading "Temperature" in such a case is obvious. There is always the chance that the "see also" cross references under a heading may be suggestive of places to look which the index user might never have thought about and entries thus found may indeed be of more value to him than the entries under the heading originally used. This point is emphasized partly because the value of the "see also" cross reference is not always fully recognized by indexers (too many indexes are without them) but more particularly because of a suspicion that full advantage is not taken of them in the use of indexes in which they are to be found. It is surprising how often information of value in connection with a problem can be found under unexpected headings.

With a given problem at hand the **first step,** of course, is to think out the most likely places to look in the indexes to be used. This may be a simple matter or it may be a very difficult one, depending on the nature of the problem. Difficulty increases with indefiniteness. Experience is necessary. In fact the beginner is often completely at a loss to know what to do at this very first stage of his search. He tends to look for topics which are too general, failing to analyze the subject in which he is interested into its factors. If he fails to find any references to the problem as a whole as he has it in mind, he is likely to assume that there is nothing in the literature which will be of aid to him in his investigation. Were he to separate his subject into its essential

parts and then to consult the literature on each, he would probably find considerable information. Even though some index headings to which to turn, perhaps the more important ones, may be brought to mind without much ingenuity, the completeness of a search may be marred by a failure properly to analyze the problem. Indexes with cross references, particularly "see also" ones, help.

Too much dependence on cross references is not advisable. They may not be available at all and they are never complete. With a given heading in mind it is well to cudgel one's brain for **synonymous words** or phrases to try as well as for various **related subjects.** And it is advisable to try these even though entries as expected are found in the first place to which one has turned. Words or phrases with an *opposite* meaning to the one in mind may serve as subject headings under which desired entries may be found. For example, the searcher interested in viscosity may find significant entries under the heading "Fluidity" in addition to those under "Viscosity." Incidentally it may be noted that the word "consistency" may serve as a heading for still other related entries. Or, some entries under "Electric resistance" may interest the searcher whose thought on turning to an index was of "Electric conductivity," or "Conductivity, electric," as the heading may read. If such related subjects are not suggested by cross references and have not been thought of in advance they may be suggested by the nature of some entry under the heading first turned to if one is on the lookout for them. Such an instance would be that of the searcher interested in refractory materials who might observe an entry under the heading "Refractory materials" in an index which reads "for furnace linings;" his cue would be to look to see if there is also a heading "Linings" under which different entries might be found concerning materials which are just as much refractory as those referred to under the heading "Refractory materials." In a word index such materials would be referred to under "Refractory materials" only in case they happened to be called that in the text.

Other examples of words likely to be used to designate subject index headings under which like or closely related entries may be made in chemical indexes are: dehydration and desiccation; concentration, distillation and evaporation; fusion and melting; carbonization, coking, distillation and destructive distillation; adhesives, cement, glue, paste and mucilage; sewage, refuse and

waste; radiations and rays; electrolytes, electrolytic ions and salts; grinding devices, mills and pulverizers; disinfection and fumigation; drugs, medicines and pharmaceutical preparations; etc. In the case of processes such as carbonization entries may be found only under the substance to which the process has been applied in a study, as coal, or steel if the other meaning of the word is involved; or the entries may be limited to headings representing products of the process, as gas or tar. A patent, for example, may be entitled "Gas manufacture" and be indexed only under "Gas" and yet be as much a process of carbonization as other patents so called and so indexed.

The **resourcefulness** which may be **required** in making a thorough search through subject indexes can best be discussed by treating of an example. Suppose one were interested in looking up all possible references on vitamins. The first place to which to turn naturally would be the heading "Vitamins" in the indexes to the various reference sources to be used. This would rarely if ever be far enough to go. If only one of the indexes contained "see also" cross references these might be helpful in the use of the other indexes. This playing of one index against another, so to speak, is always a possible means of helping out. Cross references should be looked for. Since it is not always possible to find such cross references and it is not safe to depend too much on them to be complete one might well follow out in such a case a line of thought like the following: Vitamins are constituents of foods. It may be worth while to look under "Foods." Entries may be found there with some such modifying phrase as "accessory constituents of." Vitamins are a factor in health and the effect of foods on health involves the idea of diet or ration. These headings, or this heading if they are combined under "Diet," for example, as would seem best in a true subject index, would no doubt prove fruitful of significant references. Studies of proper diet or of adequate ration for an army would beyond doubt involve the vitamin theory. Experiments to determine the nutritional value of foods are frequently called feeding experiments, so a heading "Feeding experiments" may be looked for to advantage. Food is taken for the purpose of nutrition and the vitamin problem is a nutrition problem. Therefore the general subject "Nutrition" needs to be examined in the indexes. There is of course such a thing as plant nutrition as well as animal nutrition. One might

seek to determine, if he did not know, whether or not there is a theory of plant nutrition analogous to the vitamin theory in animal nutrition, so the heading "Plant nutrition" or the heading "Plants" would be suggested to try. If he did not know it he would likely learn that there are substances supposed to be factors in plant life, called auximones, which are analogous to the vitamins in animal nutrition. The heading "Auximones" would of course then be suggested for reference. The lack of vitamins in the diet is considered by many to be the cause of certain diseases (beriberi, pellagra, polyneuritis, scurvy, xerophthalmia). These ought to be referred to, therefore, as index headings. The general heading "Diseases" should be tried also, such a modification as "deficiency" being looked for. Perhaps the next thing for the index user to do would be to ask himself, or someone else, whether or not there is a definite name for this general type of disease; he would find that there is and that the name is avitaminosis, which should then be turned to as a heading. Certain specific foods have been used and studied particularly with reference to the vitamin theory, as, for example, polished rice, milk, butter, orange juice, yeast, tomatoes, etc. It seems unreasonable to be expected to think of these or at least all of them and yet an article entitled, say, "The effect on pigeons of eating polished rice" may be word-indexed only in some index and therefore only get under the headings "Rice" and perhaps "Pigeons." Vitamins have been differentiated as "fat-soluble A," "water-soluble B," etc., and are sometimes spoken of merely in these ways. It is conceivable that some indexes may have these names as headings. In the earlier literature on the subject vitamins may be found referred to under the name nutramines (a name introduced by Abderhalden). The text referred to from any one of the above-mentioned headings may suggest still other headings to try, as the names of specific foods supposed to be rich in vitamins.

The **principle of referring to the general as well as to the specific subject,** as exemplified in the preceding paragraph by the subject "avitaminosis" for the general and by the individual deficiency diseases (beriberi, etc.) for the specific, is a good one to keep constantly in mind in using subject indexes. If, to give a further example, one is interested in the action of, say, diastases in any general way it would not be at all unlikely that he might find useful information by referring to the heading "Enzymes" as well

as the heading "Diastases" in indexes used. The reverse of this may also be true.

The resourcefulness necessary in the location of information by means of the great variety of subject indexes in existence may seem to be little more than clever guessing at times. A paper on milk, so called and indexed only under "Milk," may reveal information of general significance regarding emulsions. Authors often fail to see the full significance of their experimental results and it is not often that the indexer will go further than the author in bringing out this significance for attention. The kind of **flexible ingenuity** necessary for the location of information in this way is perhaps only to be acquired by experience. It is really more than guessing that results in the location of information in this way and yet it seems as if a little more than reasoning power, something like intuition, is necessary sometimes.

Chemical compounds in indexes. Chemical publications present a special problem both to the subject indexer and to the index user in that many headings must consist of the names of chemical compounds. The difficulties encountered are to be attributed to the facts that (1) many compounds have, or may have, more than one name, (2) the names or at least the best names of the more complex compounds may be difficult to ascertain and (3) new compounds are constantly being prepared which, if named at all, may receive more than one name which is justified from one point of view or another. The possibilities of incorrect names are great.

With the **simple and more commonly known compounds** there is not much trouble. There is usually a best name for each of these that is pretty well known among chemists; other names can readily be and frequently are taken care of by cross references. The use of a good dictionary will often help if one wishes to look up such a compound but is not sure that the name which he has in mind is the best one or at least the one most common or most likely to be used as a subject index heading and if the index or indexes to be used do not solve this problem by cross references. Furthermore if more than one index is to be used it may be well to have in mind more than one name as indexes vary somewhat in the names chosen for index headings. Webster's New International Dictionary (G. & C. Merriam Co.) adheres closely to preferred usage in chemical nomenclature. Dictionaries of chemical substances (see page 23), as The Condensed Chemical Dictionary and Chemical Syn-

onyms and Trade Names (Gardner) and chemical encyclopedias (see page 13), as Thorpe or Watt, may be very helpful in such a situation, particularly on account of their cross references. The indexes to certain standard reference books are very good to use as a help in ascertaining the various names for compounds and to some extent at least (from the text) the preferred ones. Roscoe and Schorlemmer's "Treatise on Chemistry" (Volume I, The Nonmetals; Volume II, The Metals) and J. W. Mellor's "Modern Inorganic Chemistry" are excellent as standards for inorganic compounds. The Edgar F. Smith translation (not the more recent one) of Victor von Richter's Organic Chemistry is a good reference book for learning the names of the commoner organic compounds but there are more variations in names in organic chemistry and this book is not as good as a standard of nomenclature as is Roscoe and Schorlemmer. Effective helps in restricted fields are the National Formulary, the United States Dispensatory, the United States Pharmacopeia and New and Non-Official Remedies (American Medical Association) for compounds of pharmaceutical interest, the Dorland Medical Dictionary and such books as Mathews' Physiological Chemistry for compounds of biochemical interest and Dana's System of Mineralogy for mineral names. The indexes to the *Journal of the Chemical Society* (London), to *British Chemical Abstracts* and to *Chemical Abstracts* can be used to advantage as a source of information as to the preferred names of compounds. In the preparation of these special effort has been made to keep the nomenclature good and they contain many names as index entries or cross references.

So much for the simpler, more common compounds. It is with the thousands of more or less **complex compounds** that the real difficulty comes in; but few of these are so commonly met with as to be generally known by some simple name. Complex organic compounds, being so plentiful, have chiefly to be dealt with. It is not possible to index these compounds by name with entire satisfaction. They cannot be so named and entered that the average chemist will be sure to find every one given which he may seek to locate. It is on this account and because of language differences that some other basis than the names has been sought for the indexing of compounds; their empirical formulas have been chosen. Formula indexes will be discussed a little further on in this chapter. They are few in number. Those in connec-

tion with periodicals usually do not stand alone; they are made supplementary to name indexes as a less convenient (in many cases at least) but more certain means of locating individual compounds.

The entering of compounds in subject indexes to publications is desirable even though formula indexes may be provided. A very useful grouping of related compounds is possible in indexing by names.

The **first prerequisite** in the proper indexing of chemical compounds by names is the adoption and consistent application of **a definite system of nomenclature.** This is far from being done always. The system should come as close to common usage as possible. It is a distinct advantage if it is described in connection with the index to which it is applied so that the index user may become familiar with the general principles followed. This is justified in connection with the larger indexes at least.

Consistent nomenclature is hardly enough. Names satisfactory for general usage may not be wholly satisfactory for index entries until inverted so as to bring the so-called parent compound part of the name to the front. For example it is better to have the three chloroacetic acids entered as *Acetic acid, chloro-* (monochloro is usually to be assumed when only chloro is used), *Acetic acid, dichloro-* and *Acetic acid, trichloro-*, thus bringing them all together, than to have them one under the C's, one under the D's and one under the T's. The indexes to the *Bulletin de la société chimique de France* serve as an example of this plan of indexing. The systematic arrangement of radical names in the names of compounds is also advantageous (see p. 183). The value of the grouping of derivatives and otherwise related compounds under the name of the **parent or index compound**[5] is obvious. This is a case in which the true purpose of indexing is not sacrificed, is in fact helped, by a kind of classification. If a supplementary formula index is supplied the indexing of compounds is thus made to approach the ideal as nearly as is possible.

Of course the necessity for so much care in the handling of

[5] The main part of the name, the part expressing the chief function, as aldehyde, alcohol or amine, and placed first in the index entry (the names of substituents following), has been called the *index compound* in the system used in *Chemical Abstracts.* It may be the parent compound (*e. g.*, Anthracene) or it may be some derivative (*e. g.*, Anthraquinone).

compounds varies in urgency with the nature of the publication being covered. A smaller publication, such as a textbook, may within reason index the compounds described or discussed in it under several names in each case where several are known but it is not reasonable to expect a more comprehensive publication, such as an abstract journal, to do this as the expense would be prohibitive. There are chemical indexes in which different entries for the same compound are to be found scattered under different names (word indexing), others in which different names are used as headings but each group of entries is made complete (this type is rare), still others in which one name is used consistently as the heading but no cross references are supplied, and finally the type in which one name is used consistently with cross references given directing the user from other names to the one used as the index heading (the best type). Once an index is thus classified in one's mind it is possible for it to be used with greater efficiency.

Importance of learning chemical nomenclature. The only chemist competent to use the existing subject indexes to chemical publications with genuine efficiency as far as the location of compounds other than the simple and more common ones is concerned, is the chemist who is reasonably well informed on chemical nomenclature. This is true with reference to the most carefully prepared indexes; no one can use some of the indexes with efficiency. A knowledge of chemical nomenclature is a prerequisite if one expects to be able to make effective searches of the literature of chemistry. This is particularly important for the organic chemist. Every chemist ought to give adequate attention to chemical nomenclature anyhow. It is important. It is a factor in exactness in scientific discourse and exactness in this connection is just as important as exactness in scientific work in the laboratory. Every chemist should consider it a duty to attempt to learn the best name for each compound which he has occasion to mention, particularly if he is a teacher or if he is writing for publication. Except that very commonly accepted names must be recognized, systematic names of compounds should as a rule be such as to bring out clearly the composition and constitution so that structural formulas can be ascertained from the names alone. This is usually possible in organic chemistry.

Unfortunately there is no single authoritative standard of good nomenclature to be used as a guide. Nevertheless there have

been efforts in the direction of standardization and it is usually possible to learn what the **preferred usage** is for a known compound or what the best name or at least a good name would be for a new compound. The various national chemical societies have nomenclature committees and the International Union of Pure and Applied Chemistry has active committees for inorganic, organic and biochemical nomenclature. Rules covering some of the more general points, particularly as regards endings, are given below; these rules were worked out by committees of the Chemical Society (London) and the American Chemical Society, working in coöperation.

Nomenclature Rules Adopted by the Nomenclature Committee of the American Chemical Society and that of the London Chemical Society

1. In naming a compound so as to indicate that oxygen is replaced by sulfur the prefix *thio* and not *sulfo* should be used (sulfo denotes the group SO_3H); thus, HCNS, *thio*cyanic acid; H_3AsS_4, *thio*arsenic acid; $Na_2S_2O_3$, sodium *thio*sulfate; $CS(NH_2)_2$, *thio*urea. The only use of *thio* as a name for sulfur replacing hydrogen is in cases in which the sulfur serves as a link in compounds not suitably named as mercapto derivatives; thus, $H_2NC_6H_4SC_6H_4NH_2$, thiobisaniline. *Hyposulfurous acid*, not hydrosulfurous acid, should be used to designate $H_2S_2O_4$.

2. The word *hydroxide* should be used for a compound with OH and *hydrate* for a compound with H_2O. Thus, barium hydroxide, $Ba(OH)_2$; chlorine hydrate, $Cl_2.10H_2O$.

3. Salts of chloroplatinic acid are *chloroplatinates* (not platinichlorides). Similarly salts of chloroauric acid are to be called *chloroaurates*.

4. Hydroxyl derivatives of hydrocarbons are to be given names ending in *—ol*, as glycer*ol*, resorcin*ol*, pinac*ol* (not pinacone), mannit*ol* (not mannite), pyrocatech*ol* (not pyrocatechin).

5. The names of the groups NH_2, NHR, NR_2, NH or NR should end in *—ido* only when they are substituents in an acid group, otherwise in *—ino;* thus, MeC(:NH)OEt, ethyl im*ido*acetate; $NH_2CH_2CH_2CO_2H$, β-am*ino*propionic acid (not am*ido*propionic acid); $NHPhCH_2CH_2CO_2H$, β-anil*ino*propionic acid; $CH_3C(:NH)CO_2H$, α-im*ino*propionic acid.

6. *Hydroxy—*, not oxy—, should be used in designating the hydroxyl group, as *hydroxy*acetic acid, $CH_2(OH)CO_2H$, not *oxy*acetic acid. *Keto—* is to be preferred to *oxy—* to designate oxygen in the group —CO—.

7. The term *ether* is to be used in the usual modern acceptation only and not as an equivalent of *ester*.

8. Salts of organic bases with hydrochloric acid should be called *hydrochlorides* (not hydrochlorates nor chlorhydrates). Similarly hydrobromide and hydriodide should be used.

9. German names ending in *—it* should be translated *—ite* rather than *—it;* as permut*ite*. If it seems desirable to retain the original form of a trade name it should be placed in quotations, as "Permutit." Alcohols such as dulcitol (German Dulcit) are exceptions.

10. German names of acids should generally be translated by substituting *—ic acid* for "—säure." Some well established names are exceptions, as Zuckersäure (saccharic acid), Milchsäure (lactic acid), Valeriansäure (valeric acid), etc. When the names end in —"insaure" the translator *may* substitute *—ic acid* unless another acid already bears the resulting name; thus, Acridinsäure, acridic acid, but Mekoninsäure, meconinic acid, because meconic acid (Mekonsäure) is different. Names ending in "carbonsäure" are to be translated —carboxylic acid (not —carbonic acid).

The activities of the international committees are reported in the printed proceedings of the annual meetings, called *Comptes rendus de la cinquième* (or other number) *conférence internationale de la chimie* (Jean Gérard, 49, rue des Mathurins, Paris). Abbreviated reports[6] of these activities are usually published in one or more of the important chemical journals of the coöperating countries. It is difficult to attain **international agreement** and still harder to bring changes into common usage but it is to be hoped that acceptable international standards may eventually be established, at least on the more essential points.

Until recent years **inorganic chemistry** has had to do almost exclusively with more or less simple compounds, except in the field of mineralogical chemistry, where mineral names are used. The nomenclature problem for the chemist interested in inorganic compounds has passed from a comparatively simple one to one of great difficulties with the preparation and study in late years of many complex inorganic compounds, such, for example, as the Werner type of complexes.

The system proposed by Werner[7] for naming these compounds is not regarded as altogether satisfactory, and modifications of it are being considered by both the international and the German committees on inorganic nomenclature. It is to be hoped that whatever names receive general recognition will be suitable for indexing purposes. International Critical Tables, on account of the difficulties involved, has discarded inorganic names altogether in its tables, and has indexed by formulas alone. Such inorganic complexes may be indexed under headings like "Cobalt compounds" or "Platinum compounds," depending on the significant element in them. The formula indexing plan helps much with them. An

[6] See, for example, *Ind. Eng. Chem.* **18**, 320–321(1926); *Chem. Weekblad* **23**, 86–99(1926).

[7] *Z. anorg. Chem.* **14**, 21(1897).

entry in a subject index of a new compound under such a name as *dl*-1,2-chloroaquodiethylenediamine-cobaltibromide is a waste of space.

More attention has been given to the nomenclature of complex **organic compounds** and more systematic names are usually used. Nevertheless it is frequently a problem to ascertain just what name may have been given to a compound which one may wish to look up, partly because the proper naming of complex compounds is often difficult in itself and partly because different names correct from one point of view or another may be used. In addition the number of poorly chosen and unsatisfactory names to be found in the literature is large.

In 1892 representative chemists of various countries convened at Geneva for a discussion of the nomenclature of carbon compounds with the object of arriving at systematic names which would express constitution. An extensive system was worked out which is usually referred to as the Geneva nomenclature.[8] The application of the Geneva nomenclature has met with difficulties and it has never been adopted in any thoroughgoing fashion. The directions for the former abstractors of the *Journal of the Chemical Society* (London) and for those of *Chemical Abstracts* include nomenclature rules which agree closely and which represent what is considered the best usage. The rules of the former journal, until its discontinuance of abstracts in 1925, were published each year at the end of the index number;[9] those of *Chemical Abstracts* are issued in pamphlet form, copies of which can be obtained from the editor. These rules together with the indexes to these journals constitute about as good a general reference source for nomenclature information as is available. The introductions to Richter's Lexikon and some of the volumes of Stelzner's Literatur-Register contain discussions of organic nomenclature, particular attention being given to ring compounds. An extensive discussion of the nomenclature of ring compounds by Richter is published in *Berichte* **29,** 586(1896). In connection with indexing work for *Chemical Abstracts* Patterson and Curran have made an extensive study of chemical nomenclature; they have described the system worked

[8] Tiemann, *Ber.* **26,** 1595(1893).

[9] *British Chemical Abstracts,* which has taken the place of the *Journal of the Chemical Society* abstracts, will no doubt publish similar directions.

out.[10] The annual ring index of *Chemical Abstracts* (see p. 192) is helpful in the determination of accepted names of ring compounds.

A few more or less **general points on the nomenclature of compounds or on indexing procedure** with reference thereto to be borne in mind in index searches are noted below.

(1) Inorganic compounds are preferably named in the simple form "potassium chloride" rather than "chloride of potassium" or "chloride of potash" and are so entered in indexes. Even the French, who do not say "potassium chlorure," but "chlorure de potassium," recognize, in most instances, that "Potassium, chlorure de" is the preferable index entry.

(2) In looking up compounds of copper, gold, iron and tin it is necessary to remember that index entries may be found under headings beginning "cupric (ous)," "auric(ous)," "ferric(ous)," and "stannic(ous)," respectively, rather than under headings beginning "copper," "gold," etc.

(3) Acid salts may be named as shown by the following names for $NaHCO_3$: "sodium hydrogen carbonate," "sodium acid carbonate," "sodium bicarbonate," and "sodium hydrocarbonate." They may be indexed under any of these names or under such a heading as *Sodium carbonates.*

(4) Organic salts and esters are often indexed under the names of the acids involved, as the acid is usually the significant part of the compound. For example, sodium naphthalenesulfonate or ethyl naphthalenesulfonate would be indexed under *Naphthalenesulfonic acid,* with a modification "sodium salt of" or "ethyl ester of" as the case may be. If the base is the more significant, as in geranyl acetate, the full name may be used for the index heading or the entry may be made under the name of the base, as *Geraniol.*

(5) A principle used by some in the naming of organic compounds is that of expressing the chief function in the main part of the name wherever possible, and not as a substituent, thus: pyrrolecarboxylic acid, not carboxypyrrole; pentanone, not ketopentane. This is important for indexing by the so-called parent compound or inverted-name system. In compounds of mixed function an order of precedence is to be followed.[11] The parent compound is preferably made as large, and the substituents are made as small, as is practicable in conformity with the above principle; as, ethylbenzene, not phenylethane.

(6) The arrangement of the names of substituent radicals in the names of compounds naturally affects their place in a subject index, particularly in one which does not use inverted names This is very frequently not done systematically. Some prefer a so-called logical order, some an alphabetic order. An approximately complete list of preferred names of organic radicals arranged by empirical formulas as well as by names, is to be found in the Introduction to the 1916 annual index to *Chemical Abstracts* and in that to the first Decennial Index.

[10] *J. Am. Chem. Soc.* **39,** 1623–38(1917), outlined briefly in the Introduction to the subject part of the Decennial Index or any recent annual index to *Chemical Abstracts.*

[11] See the Introduction to the subject part of the Decennial Index to *Chemical Abstracts* or that to any recent annual index thereto.

The introductions to subsequent annual indexes contain supplementary lists of a few entries. "Mono-" is usually not used as a prefix to radical names in the names of compounds, the assumption being that mono will be understood where di, tri, etc., are not used.

(7) The names and also the numberings of complex organic ring systems vary in many cases; thus, one author may call a certain hydrocarbon naphthofluorene which another calls benzofluorene, while for acridine two conflicting systems of numbering are in use. The searcher needs to know what particular system, if any, is used by the index he consults. To this end it is a great advantage to have synonyms, structural formulas and numberings freely given, as is done for example in the subject indexes of *Chemical Abstracts*.

(8) Trade names for compounds may come into sufficiently general use to be justified as index headings at times for entries referring to the compounds when not the products of particular firms, this practice being justified on the principle that entries in an index should be made where the most users may be expected to look first. Examples: Adrenaline and Aspirin.

Group versus specific names for compounds. The principle, discussed previously in this chapter, of referring to general as well as to specific subjects applies aptly in searches for information regarding compounds. Group names for compounds may serve as headings under which entries of interest to the searcher interested in an individual compound may be found. An example will serve to illustrate. Suppose one were interested in finding all the information he could with reference to the electrolysis of sodium chloride. In addition to looking up the references under the heading "Sodium chloride" in the indexes to be used it would be desirable to look also for entries of interest under such headings as the following: "Alkali chlorides" or "Alkali metal chlorides," "Sodium halides," "Alkali metal halides," "Chlorides" and "Halides." A process described for the electrolysis of alkali metal halides in general may be of just as much interest and value to the search in hand as one specified to be particularly for sodium chloride and yet the indexes are not likely to carry entries under each of the members of a group of compounds if a definite group is under discussion. Cross references may be supplied in some cases but it is hardly reasonable to expect an index to go further. A process for electrolyzing chlorides, for instance, could not within reason be entered under headings representing each of the numerous known chlorides. The index user must expect to think of such possibilities and make his search complete accordingly. Another, different kind of lead to follow to ensure a complete search, particularly when word indexes are involved, is to think of the prod-

ucts of the process being studied, in this case chlorine, sodium hydroxide and possibly sodium hypochlorite. And in addition to looking up the headings represented by the names of these compounds completeness is ensured only by trying the headings "Halogens," "Alkalies" or "Alkali metal hydroxides" and again possibly "Alkali metal hypohalites" and "Hypohalites." The product of some simple electrolytic process which does not involve the recovery of chlorine or alkali may be called merely "bleaching solution" or be given some like name. And still further it may be worth while to look up such a heading as "Potassium chloride" as representative of a closely related compound which might be studied with a similar purpose. It would probably be a waste of time, however, to look up the heading "Sodium iodide," at least if commercial processes were the kind in which one were interested. Still other headings worthy to be tried are "Electrolytic cells" or rather "Cells, electrolytic" as it is more likely to be given, and possibly "Electrolysis;" this last heading, however, is too general to be used as an index heading for every process involving electrolysis and is not likely to be used for studies or discussions of specific substances. This whole example serves to show again that resourcefulness and the use of one's general knowledge of chemistry must come prominently into play in the making of index searches.

In some studies involving compounds only one constituent of the compounds in each case may be of significance and the indexing may be influenced thereby. This is particularly likely to be true in biological chemistry. For example, some one may study the effect of calcium chloride and calcium sulfate on muscle contraction. Any one of the following titles might reasonably be used for a paper reporting such a study: (1) "The effect of calcium chloride and calcium sulfate on muscle contraction," (2) "The effect of calcium salts on muscle contraction" and (3) "The effect of calcium on muscle contraction." Calcium is the significant thing and it would not be far out of the way if this study were indexed under "Calcium salts," under "Calcium," under "Calcium ion" or under the names of the specific salts. Of course metallic calcium was not used in the study but "calcium" is really the subject. The point is that calcium the subject is not limited to calcium the substance, so that in making a search with reference to a specific compound it may be necessary to look not only under the

name of the compound but also under the heading represented by the significant constituent of the compound.

Related to the chemical nomenclature problem is the problem of **nomenclature in other fields.** Take botany for instance. The chemist interested in plants may want to look up a given plant in chemical indexes to see what chemical work has been done with reference to it. Plants usually have one or more common names as well as a scientific name (genus and species), as corn, maize and *Zea mays.* It is of course the same with animals. One indexer may prefer to make entries under the commonest of the common names as being the one most likely to come first to the mind of the index user and another indexer may prefer to use as a heading the genus and species name as being more scientific. And different authors may use different *scientific* names for the same plant. A word index may use more than one name, it not being realized that different names for the same thing are being used as headings, with resultant scattering of entries.

The fact that chemical literature searches frequently involve the use of publications printed in **foreign languages** complicates the problem of index examination considerably unless one happens to be especially well versed in the language involved. To the average individual it is much harder to recall the foreign language equivalent of a word or phrase in his native tongue than it is to translate the foreign word or phrase if it is before him. It is therefore a little hard to determine sometimes just where to look in a foreign-language index for a subject which one may have in mind, let alone select related and otherwise appropriate subjects to be looked for as index headings in order to ensure a complete search. The use of an English-foreign language dictionary is about the only help to be found. The following notes are intended to be of help in determining the **French and German equivalents of the English names of compounds.**

Endings corresponding to *-ide, -ate, -ite, -ic* and *-ous* in English are, respectively, in French *-ure, -ate, -ite, -ique* and *-eux* (feminine *-euse*). In German the forms corresponding to the first three of these endings are, respectively, *-id, -at* and *-it.* To indicate a lower compound in German the ending *-ur* is used where *-ous* or *sub-* would occur in English; thus, *Kubferchlorur* (cuprous chloride), *Silberchlorur* (silver subchloride). Another way in the German language of distinguishing between two compounds of the same element is to use Latin combining forms; as, *Cuprochlorid,* cuprous chloride; *Cuprichlorid,* cupric chloride; or to use *di-, tri-,* etc., as in English. Compounds are also named in German

merely by compounding the names of the elements; as, *Jodkalium* (potassium iodide), *Siliziumfluorwasserstoff* (hydrogen silicofluoride, fluosilicic acid); this practice is restricted largely to compounds named with the *-ide* ending in English.

Higher and lower oxides are distinguished as *-oxyd* and *-oxydul* (German) or *oxyde* and *oxydule* (French), respectively, as *Eisenoxyd*, ferric oxide; *Eisenoxydul*, ferrous oxide. In German the Latin forms, such as *Ferrioxyd*, ferric oxide, and *Ferrooxyd*, ferrous oxide, are also used. "Hydroxydul" may be used to designate an *-ous hydroxide* in German.

In French acids are named very much the same as in English except that the names of hydracids differ in construction from the English names; as, *chlorhydrique*, hydrochloric. In German the names of acids are formed merely by attaching the word *Säure* to some other word; *-säure* is usually the equivalent of *-ic acid* in English. Hydracids are designated by the ending *-wasserstoffsäure;* as, *Bromwasserstoffsäure*, hydrobromic acid. The German equivalent of *-ous* in naming acids is *-ig;* as, *schweflige Saure*, or, less commonly, *Schwefligsäure*, sulfurous acid. Similarly, *unter-* corresponds to *hypo-* and *uber-* to *per-* (*unterchlorige Saure*, hypochlorous acid; *Übermangansaure*, permanganic acid). The English *-carboxylic acid* is *acide -carbonique* in French and *-carbonsäure* in German. There are a few differences in the French and English equivalents of the German ending *-insaure*, the "in" being dropped sometimes in one language and not in the other and *vice versa*.

The hydroxyl group is not usually designated by *hydroxy-* in either French or German but by *oxy-*, though the latter usage is now recognized as less correct. *Oxy-* is also used sometimes in these languages to designate the ketonic group instead of *keto-* (careful writers use *keto-* or *oxo-*).

Amino- usually has *amido-* as its equivalent in French and German, but the use of amino- according to the rule given on page 180 seems to be on the increase.

The final *o* in such combining forms as chloro-, cyano-, etc., is not used in German and is frequently omitted in French.

In English the endings *-in* and *-ine* are usually differentiated systematically, the latter being used for basic substances and for them only and the former for glycerides, glucosides, bitter principles, proteins, etc.; in French the ending *-ine* is used for both basic and neutral substances and in German the ending *-in* for both kinds.

As between the endings *-ol* and *-ole* in the names of compounds, it is well to remember in making translations that the former ending is restricted to alcohols and phenols in good English practice, a distinction not made in French and German. Such rules as this cannot be applied with strictness to commercial names.

Hydrate in French is used to designate hydroxide as well as hydrate.

As between the endings *-an* and *-ane* in English the latter is used for hydrocarbons (and parent compounds of the heterocyclic series) which are fully saturated; in French the ending *-ane* and in German *-an* are used without differentiation.

In French the use of adjectives in organic names instead of combining forms as in English and German is to be noted; thus the compound $C_6H_4Cl_2$ (dichlorobenzene) is often called *benzène* (or *benzine*) *dichloré*.

Another peculiarity of the French language is the use at times of the name of the alcohol radical prefixed to the name of the acid in the names of esters; as, *éther amylacétique* (amyl acetate). It is to be noted that "ester" is *éther* in French.

FORMULA INDEXES

Owing to nomenclature and language differences and difficulties another basis than that of names has been sought by a few publications for the indexing of chemical compounds. The object has been to find a basis which is more definite so that every entry can be found with certainty by any properly informed user. Since the kind and number of component atoms of a chemical compound are its most unvarying characteristics, empirical formulas serve as the best basis for obtaining the desired certainty. It is sufficiently easy to ascertain empirical formulas to make this basis satisfactory from the point of view of convenience. While for some compounds the names may be more easily determined or brought to mind than the formulas the opposite is true in many other instances, and while it is always possible to ascertain empirical formulas it is sometimes impossible to find out names. There may be more than one name for a compound but there can be but one empirical formula (excepting disputed cases and polymeric forms, which cause very little trouble).

An index of compounds by names, particularly if the parent or index compound plan, with inversion of names, has been followed, serves as the best help in literature searches for information regarding related compounds, which will be found grouped largely there; an index by formulas is the best kind to use for the certain location of individual compounds. A comprehensive formula index is particularly helpful if one has prepared and analyzed a compound and wants to determine whether or not a compound of the same empirical formula, if not an identical compound, has been previously prepared. New compounds which are of unknown structure and are not named are at times described in the literature; a formula index is the only kind which will index these satisfactorily. Some subject indexes enter such compounds under the heading "Compound," arranging the entries there systematically by empirical formulas.

The symbols for the atoms of the individual compounds and then the complete formulas themselves must of course be arranged

systematically. There are two **systems of arrangement** which are in more or less prominent use. These may be called the Hill system[12] and the Richter system.[13] The former is simpler than the latter and easier to use.

In the **Hill system** the elements in formulas are arranged alphabetically except that in carbon compounds C always comes first, followed immediately by H if hydrogen also is present. In the **Richter system** the symbols in formulas are arranged in the order C, H, O, N, Cl, Br, I, F, S, P and the rest alphabetically. The arrangement of formulas in the Hill system is strictly alphabetical except that the number of atoms of any specific kind influences the order of compounds. For example, all compounds with 1 C come before those with C_2, thus: CCl_2O, CCl_4, $CHCl_3$, CHN, CHNO, CH_2Br_2, CH_2O, CH_3Cl, CO, C_2Ca, $C_2H_4Cl_2$. With the Richter system the arrangement of formulas is the same with one important exception, namely that according to this system the number of kinds of elements in each formula is first considered and formulas with the same number of kinds of elements are grouped together. This brings about a certain amount of classification but it complicates things and classification in a formula index is of doubtful value. It slows up the finding of compounds in it just as the location of words in a dictionary would be slowed up if the words were grouped according to the number of kinds of letters before being alphabeted. Experimentation by one familiar with the Richter system but unused to the Hill system has shown that compounds can be located in a formula index by the Hill system with greater rapidity and with less chance of oversight than in such an index by the Richter system. In addition to the advantage of simplicity the Hill system is better, for a general index at least, in that it is much more suitable for inorganic compounds than the Richter system. The latter system was worked out for organic compounds primarily; it is not suited to the indexing of inorganic compounds. Formula indexing is just as much needed and as helpful with complex inorganic compounds as with organic compounds although there are not nearly so many inorganic as organic compounds to be indexed. It is a distinct advantage for

[12] Hill, Edwin A., *J. Am. Chem. Soc.* **22,** 478–495(1900); **29,** 936–941(1907); **34,** 416–418(1912).

[13] See Introduction to Richter's Lexikon.

both kinds of compounds to be indexed together if the publication being indexed covers both kinds.

Compounds are not always formula-indexed under their own formulas. It would seem that any departure from the indexing of compounds under their own formulas is a departure from the ideal. Nevertheless some departure from a policy of making separate formula entries for derivatives of all kinds is customary and seems reasonable. The interest in a salt of a complex organic acid, for example, is likely to be mainly in the acid and it is more valuable to have the record of it under the formula of the acid for the use of searchers looking up that acid. Such departures are explained in connection with the existing formula indexes. The following statement from the Key to the 1926 Formula Index to *Chemical Abstracts* will serve to show more fully the nature of the exceptions made.

"Entries under their own formulas are made for all strictly inorganic and strictly organic compounds and for the true organic derivatives of organic compounds, both addition compounds and true reaction derivatives (this includes esters, hydrazones, methohalides, oximes, picrates, semicarbazones, etc). Inorganic salts of organic acids and inorganic addition compounds of organic compounds (hydrohalides, chloroplatinates, perchlorates, sulfates, etc.) are not given separate entries but are indicated in modifying phrases under the formulas of the compounds from which they are derived (under the acid in the case of a salt). Salts of formic, acetic and oxalic acids are exceptions; these are entered as such."

Water of hydration is usually not made a part of formulas indexed but is indicated following the formulas used as the headings.

Polymers are variously handled. The most common practice is to enter under their accepted formulas all polymers having different names and recognized as different substances, as acetaldehyde and paraldehyde, but to enter under the simplest formula only, definite compounds for which different polymeric formulas are in use, as Cl_3Fe for ferric chloride. Cross references are frequently used for formulas not used as headings for entries.

The **most important compilations** of compounds **arranged according to the Richter system** are Richter's Lexikon der Kohlenstoff-Verbindungen (see p. 20 for a description) and Stelzner's Literatur-Register (see p. 20), which is virtually a continuation of the Lexikon. These are in a sense formula indexes to *Chemisches Zentralblatt*, to which reference is continually made. Beginning in 1925 formula indexes have been published by *Chem-*

isches Zentralblatt. The Literatur-Register will hereafter be merged with the *Zentralblatt* as a cumulative formula index to the latter.

Organic compounds are indexed by formulas according to the Richter system in the following **journals.** All of these publish original papers only. The *Journal of the Chemical Society* (London) published abstracts up to 1926 but the formula indexing has always been limited to the original papers.

Annalen (Liebigs) (since 1899). Collective indexes cover volumes and years 277–328 (1893–1903) and 329–380 (1903–1911), respectively.

Journal of the Chemical Society (London). Transactions only (since 1907).

Berichte (since 1898).

Journal fur praktische Chemie (since 1899).

Recueil des travaux chimiques des Pays-Bas (since 1899).

The **most extensive formula index arranged according to the Hill system** is the one compiled under the direction of Dr. Edwin A. Hill himself for use in the classification division of the United States Patent Office. It is built on the card catalog plan. It was started in 1899 and had grown to a total of over a million cards in 1920 when active work on it was interrupted owing to inadequate appropriations and the view on the part of patent officials that because of the limited funds available and other more pressing needs it was inadvisable to incur the expense necessary to keep it up. It is to be hoped that it can eventually be brought up to date and kept so. Over 100,000 finished cards have never been sorted and filed for lack of filing space and help.

While this index is intended primarily for Patent Office use it is available for consultation by any one. It could at one time be consulted by correspondence for a fee but there is at present no Patent Office employee available for the necessary consultation and research. Moreover, the extent of its value to chemists in its present state is somewhat doubtful.

In the preparation of this index the aim has been merely to obtain one good reference to all known chemical substances, collect their various names, trivial and scientific, current and obsolete and connect them with the literature indexed by formulas and "incidentally to preserve such chemical titles and references of a general nature, as, *e. g.*, boiling points, specific gravities, molecular weights, etc., as may come to hand." The original purpose was to select for indexing the more important works of a general character such that the field could reasonably be expected to be covered fully so far as the books go in point of time and then to keep it up

to date by indexing the leading abstract journals as they appeared. Patents have been indexed. The publications covered are to be found listed in the *Journal of the American Chemical Society* **29,** 936–41(1907); **34,** 416–18(1912) and in the Report of the Investigation of the U. S. Patent Office made by the President's Commission on Efficiency and Economy, December, 1912, *H. R. Document* No. 1110, 62nd Congress, 3rd session, pp. 611–12. Those interested in the index should also consult pages 80, 89 and 599 to 678 inclusive of this document.

Beginning with the 1920 volume *Chemical Abstracts* has published annual formula indexes. Since this journal lays great stress on completeness and the policy as far as the formula index is concerned has been to enter all new compounds and all compounds for which new data are given this index is virtually a record by formulas of all compounds studied during the period covered. The Hill system, slightly modified, is used and inorganic compounds are entered as well as organic ones. The simpler and more common compounds are simply entered as cross references to the subject index. This index is supplementary to the subject index to *Chemical Abstracts.* The names of compounds given following the formulas are made to correspond exactly with the names used as headings in the subject index so that one can refer to that index for derivatives or related compounds which may be grouped there. A collective formula index has not been published.

RING FORMULA INDEXES

The number of parent ring complexes in organic chemistry has grown so large, and is being added to so rapidly that a key to them has become almost necessary as an adjunct to any comprehensive index of organic names. A convenient basis for such a key is found in the number of rings in the complex and the number and kind of atoms in each ring. A ring index of this kind is available in the Decennial Index to *Chemical Abstracts* and in the annual indexes commencing with 1916. In it the ring systems are arranged in order of complexity, commencing with single three-membered rings having formulas (ring atoms only) such as C_2O and C_3, following these with four-membered rings such as C_3N and C_4, then five-membered, six-membered, etc., and progressing to polynuclear systems such as C_5-C_6 and C_5N-C_6-C_6, the number of nuclei in the system extending even to ten and eleven. By

this means one can discover whether any particular ring system is represented in the index and if so under what names it and its derivatives will be found. For example, the searcher wishes to know if any system is described which combines a diazole ring, a triazine ring and a benzene ring. Looking under the III class (3 nuclei) and the "5,6,6" subdivision of this, he finds the formula C_3N_2-C_3N_3-C_6, which directs him to the name Pyrazobenzotriazine in the subject index.

PATENT-NUMBER INDEXES

Patents issued by the various countries are given numbers. A few publications which contain abstracts of patents furnish indexes thereto by numbers. The numerical order is naturally the one followed. In most countries the practice is to number patents continuously as issued (not true of German patents). Until 1916 it was the practice in Great Britain to start a new series of patent numbers each year so that the patent-number indexes for British patents previous to that year are arranged first by year and then numerically.

The **usefulness** of these indexes is apparently pretty much limited. Occasionally, a chemist will have the number only of a patent which he wishes to look up, in which case these indexes are undoubtedly helpful.

Patent-number indexes are to be found in connection with the following journals for the years indicated in parentheses.

Journal of the Chemical Society (London) (1913–1925).
Journal of the Society of Chemical Industry[14] (1901–1925).
Chemical Abstracts (1912–1914).
Chemisches Zentralblatt (1897–date).
British Chemical Abstracts (1926–date).

CARD INDEXES

Some business concerns and certain individuals find it expedient to maintain their own card indexes to the literature of subjects in which they have special interest. It is often the practice to copy or clip and paste on cards excerpts from papers or to make or take over abstracts. These cards must of course be arranged systematically, usually by subjects, with cross references added; they constitute a kind of index and more or less detailed information source

[14] For British patents only till 1916.

combined. The greatest drawback to such an index is the fact that a number of subjects may be covered in a single abstract so that for thorough indexing the card needs to be duplicated, in part at least, as many times (not often done fully). As such an index grows the classification problem increases. (See also p. 214).

The **preparation** of such an index and keeping it up to date present quite a task, more than most chemists feel that they have time to undertake. A good, well indexed abstract journal should go a long way toward making such indexes unnecessary in most instances. If business and other information outside the strictly chemical literature make up a part of personal or corporation card indexes the situation is somewhat different.

There is no existing strictly chemical card index service on the market so far as the authors know. **Libraries** usually have card catalogs (see p. 203) which are accessible by permission. Of special interest are those of the Chemists' Club Library, 50 E. 41st St., New York; the Library of the United Engineering Societies, 29 E. 39th St., New York; and the John Crerar Library, Chicago, Ill. (has a separate card index for medical literature). The Library of Congress and the John Crerar Library publish card indexes, individual sets of which can be purchased (see pp. 29–30).

EXISTING INDEXES

The indexes most used by chemists are the subject indexes to the chemical abstract journals. These indexes are briefly discussed as a part of the descriptions of the various abstract journals on pages 81–91, the index equipment of each being mentioned there. The more important ones will be described more fully here. The author indexes to abstract journals do not vary enough to require comment; the only formula indexes existing have already been discussed. For patent indexes see pages 113–5.

Chemical Abstracts. The most entensive of the abstract journal subject indexes is that to *Chemical Abstracts*. This index contains a good many more entries each year than do any of the other similar indexes. The 1926 subject index, for example, is estimated to contain approximately 100,000 entries. This is a true subject index for the most part (not a word index) and abstracts, not merely their titles, have been considered in the indexing. The entries are comparatively brief, only "essential" words being used, with frequent word abbreviations. The wording in the indexes

often differs from that in the abstracts or their titles. Since 1916 it has been the practice of this journal to publish a so-called Key and an Introduction to its subject indexes (placed at the beginning). It is recommended to the student of chemical indexes that these be examined (any year will do—they vary but little) because they serve to point out, with examples at hand, the various considerations that enter into chemical subject index building. The Introduction contains rules for the systematic naming of organic compounds for indexing purposes, a list of names of organic radicals and the ring index described on page 192. From 1916 on the *Chemical Abstracts* subject indexes furnish a typical example of the entry-a-line form with alphabetic arrangement of modifications. Organic compounds, after being systematically named, are entered by the so-called parent compound, or more accurately, index compound[15] method in the subject index and by formulas in the formula index. Cross references are numerous and notes explaining the indexing practice with reference to certain subjects are to be found here and there in the index. Page references are given to the fraction of a page (in ninths). The collective indexes, published at ten-year intervals, save much time.

Journal of the Chemical Society (London). There is a tendency in the subject indexes to this journal to use what might be called a logical instead of a simple alphabetical plan at times. For example, one will find hypobromites and bromides under *Bromine*, nitric acid under *Nitrogen*, and such a sequence of index headings as *Aluminium* (for entries relating to the element), *Aluminium alloys*, *Aluminium salts*, *Aluminium* (under which definite salts, as the chloride, are entered; also such compounds as chloroaluminates), *Aluminium organic compounds*, *Aluminium detection, determination and separation.* Furthermore one may find the same heading repeated for different types of grouped entries, as, *e. g.*, *Acetic acid* four times, (1) for the free acid, (2) for salts, (3) for esters and (4) for substituted derivatives. One must learn the plan of classification (it is not difficult) or be confused; cross references help. The 1925 subject index contains approximately 16,000 entries. Organic compounds (the nomenclature is good) are for the most part entered without inversion of the names to bring the so-called index compound[15] to the front. This

[15] See footnote, p. 178.

means that there are many entries under such radical names as "Methyl-," "Phenyl-," etc., when these are not the significant parts of the compounds. Author names are given in the subject index, an advantage at times. Abbreviated words are not used. Cross references are not very plentiful except that under certain headings designating groups of substances, *Colouring matters*, *Enzymes*, *Glucosides*, etc., one will find useful lists of the specific substances of these classes entered in the index. Subjects suitable for entry which are brought out in the body of abstracts but not in their titles do not seem to be covered in many instances and there is a tendency to "word-index," with resultant scattering. *E. g.*, in the 1924 index one will find separate entries under both *α-Particles* and *α-Rays*, under both *Electrolytic dissociation* and *Ionization* (meaning electrolytic), and under *Cathode fall* and *Potential*, "cathode fall of."

Journal of the Society of Chemical Industry. The subject index to this journal is based very largely on titles and the wording of these is adhered to closely. It is helpful to keep this in mind in its use. It has not been the policy of the indexer to change the wording even for index headings. *E. g.*, if the title used the expression "insecticidal powder" the entry is to be found under *Insecticidal powder* whereas if the next title said "insecticide" the index entry reads *Insecticide*, no grouping under a general heading *Insecticides* having been attempted. This is hardly a fault so long as entries come out close together as in the above example but it is a drawback when it results in entries for like subjects under different words, as *Cloth*, *Fabrics* and *Textiles*, *Explosives* and *Powders* (smokeless), *Cleaning* (preparations for) and *Detergents*, *Columbium* and *Niobium*. These were noted in a brief survey of the 1925 index. Cross references, which are used in considerable number, help straighten this sort of thing out in some instances. Author names are given with the subject index entries. The 1925 index contains approximately 17,000 entries.

British Chemical Abstracts. The subject indexes to this journal, which is a combination of the abstract sections of the *Journal of the Chemical Society* and the *Journal of the Society of Chemical Industry*, resemble those of the *Journal of the Chemical Society* (London) (see above).

Chemisches Zentralblatt. This index is good. It has shown distinct improvement from time to time, especially recently. For

example, a tendency to index words instead of subjects too much has largely disappeared. Word indexing is especially bad in German, in which language there are so many compound words. For example in certain of the earlier indexes instead of finding all of the entries relating to spectra under *Spektren* one is likely to find these scattered under *Absorptionspektrum, Bandenspektrum, Bogenspektrum, Elementarspektrum, Emissionsspektrum, Flammenspektrum, Linienspektrum,* etc. Cross-referring in such cases as well as general cross-reference entering has been pretty thorough, which helps much. Another improvement is the change in 1925 to the use of inverted names for organic compounds entered in the index (the index compound plan—see footnote, p. 178). Up to 1924 author names were given in the subject index; this is no longer done. Abbreviations are common, but not hard to comprehend. The fact that in this index the entries under each heading are set "running" instead of "entry-a-line" makes continued use a little tedious. This index has grown in fullness from a rather meager compilation to one estimated to contain more than 55,000 entries in 1925.

Bulletin de la société chimique de France. Full "modifications" are used and author names are given in this subject index. The entries under each heading are "run in" (not started on separate lines) and the numerical order of page references is followed. Since the number of entries under some headings is large this is not a convenient form of index to use. Some general groupings of entries as those under *Chimie biologique* (16 pages in 1925) seem unnecessarily big; only general entries seem needed under general headings. Organic compounds are entered under a modified inverted-name, parent-compound system; this journal was the first of the abstract journals to adopt such a form. Salts are entered under headings designated by the names of the significant elements involved, as Ferric chloride under *Fer.* Cross references are somewhat limited in number. The 1925 index contains about 24,000 entries. In using a French index it is necessary to bear in mind that the order of words in phrases is likely to be just the opposite of that in English, as *Terres rares, Points d'ébullition* and *Bleu de Prusse.*

Chimie & industrie. The subject index to this journal appears twice a year. With its roomy, entry-a-line form and its fairly numerous cross references it is easy to use in so far as it goes but

it seems to be rather far from complete. Apparently only titles are indexed and in them only outstanding subjects. *Chimie & industrie* publishes a large number of abstracts, yet the subject indexes run less than 6000 entries to the year. Specific salts and oxides are not indexed under names with the significant element first but under such headings as *Chlorure de magnésium* and *Oxyde de fer.* This practice in French of using an order of words opposite to that of English practice also has resulted in such headings as *Indice d'iode.* It seems unfortunate that the more significant word is not so placed that it becomes the one alphabeted.

INDEXES INDEPENDENT OF ANY SINGLE PUBLICATION

There are a number of compilations of more or less interest to the chemist which consist of indexes only or indexed lists of titles. Some cover journal articles only, some books only and some both. Catalogs of *books* are treated on page 28 and important ones are listed in Appendix 8 (list 2N3). Indexes which refer wholly or partly to *journal articles* are listed below alphabetically by titles, with descriptions of those of most importance to the chemist.

Agricultural Index, The. A subject index to a selected list of agricultural journals and bulletins. Established in 1916. Monthly except August and December. The H. W. Wilson Co., New York City.

Alphabetisches Verzeichnis von Trivialnamen der organischen Verbindungen. This is an index of about 8000 names of organic compounds, in which their empirical formulas are given according to the latest information. It was compiled from the five volumes of Stelzner's Literatur-Register and the *Chemisches Zentralblatt* index from 1922 to February, 1926. It covers the literature from January, 1910 to February, 1926. No pages or literature references are given, just the empirical formulas. There is a list of 242 common radical names at the beginning. It was compiled by the editorial staff of the *Chemisches Zentralblatt* and published by the Deutsche Chemische Gesellschaft in 1926 (2 marks to members, 63 pp.).

Bibliographia medica. Recueil mensuel. Classement méthodique de la bibliographie internationale des sciences médicales. 3 vols., 1900-1902. Paris: Institut de Bibliographie. See *Index medicus,* below.

Bibliographie der deutschen naturwissenschaftlichen Literatur. See under *International Catalogue of Scientific Literature,* below.

Bibliographie der deutschen Zeitschriften-Literatur. A classified list of articles arranged by subjects taken from over 2000 journals. The printing is close. Published by Felix Dietrich, Gautzsch bei Leipzig, Germany.

Bibliographie scientifique française mensuelle. See under *International Catalogue of Scientific Literature,* below.

Catalogue of Scientific Papers. This work of the Royal Society of London is the most comprehensive index to general science ever attempted. It is still in-

complete; when completed it will consist of a catalog of papers arranged alphabetically by authors and a subject index covering the century 1800–1900. During the period 1867–1923, 19 volumes in four series were published. First series (Vols. 1–5), 1800–1863; second series (Vols. 6–8), 1864–1873; third series (Vols. 9–11), 1874–1883; fourth series (incomplete), 1884–1900. The subject indexes are to be issued separately for each of the 17 branches of science dealt with in the "International Catalogue of Scientific Literature" (see below). This is a very valuable guide to nineteenth century scientific literature; it will be much more useful to chemists when the chemical subject index is published. Cambridge University Press.

Concilium Bibliographicum. A classified bibliography printed on cards, arranged in very minute subdivisions of the decimal classification. It is devoted to zoölogy, paleontology and anatomy, so that its chemical interest is small. Zurich, Switzerland.

Engineering Index. "A selective, cross-indexed digest" which now covers well over a thousand technical periodicals, foreign as well as American. This index (established by the late Professor J B Johnson, of Washington University, St. Louis, Mo.) first appeared in 1884 in the *Journal of the Association of Engineering Societies*. The first volume in book form appeared in 1892. The second volume covered the period 1892–1895, the third covered 1896–1900 and the fourth covered 1901–1905. For 12 years thereafter (1906–1917) it was published as the *Engineering Index Annual* by the Engineering Magazine Co., of New York, and then for two more years under this title by the American Society of Mechanical Engineers. Since 1920 this society has issued this index under the old name—*Engineering Index*. There is no author index but the subject index is good and contains many references of interest to chemists and chemical engineers. Photoprints of the articles listed can be obtained from the publisher.

Engineering Index Annual. (1906–1919). See under *Engineering Index*, above.

Index-Catalogue of the Library of the Surgeon General's Office, U. S. Army. A very extensive author and subject index. The first series consists of 16 vols. and covers the period 1880–1895; the second series has in it 21 vols. and covers 1896–1916. The third series is in progress. Much information of biochemical interest can be obtained by the use of this index. Washington: Government Printing Office.

Index Medicus. This is a classified record (titles) of the current medical periodical literature of the world. It was founded by John S. Billings and Robert Fletcher. The first series of 21 vols. covers the period 1879–1899. The index appeared as *Bibliographia medica* (see above) during 1900–1902. The Carnegie Institution of Washington assumed responsibility for publication in 1903 and the second series (18 vols.) covers 1903–1920. The third series (1921–) is in progress. There is an annual author index. The subject classification was simplified in 1921. Such subjects of chemical interest as deficiency diseases, immunology, metabolism, pharmacology, physiology, therapeutics and toxicology are included.

Index to the Literature of Explosives. By Charles E. Munroe. Part I was published in 1886, Part II in 1893. Since then no volumes have been published

but a new manuscript which includes the two earlier parts is on file with the Committee on Explosives Investigations, National Research Council, Washington, D. C. The aim has been "to get as complete a bibliography of articles published in periodical literature as possible." The list of periodicals covered is somewhat limited but it includes the more important ones. These periodicals have been examined back to their beginnings, the *Transactions of the Royal Society of London* back to 1665 for example. Titles of papers have not been depended on. "The titles of articles cited are accompanied not only by full bibliographic references but also, not infrequently, by critical, or explanatory, notes."

Index of Mining Engineering Literature. By Walter M. Crane. Two volumes were published, one in 1909 and the other in 1912. 1257 pp. A classified list of titles only, taken from 18 periodicals and published without an author index. New York: John Wiley & Sons, Inc.

Index of Periodical Publications in the British Patent Office Library, 1906. A large number of references are arranged alphabetically by titles.

Industrial Arts Index. This is a cumulative index to more than 200 engineering, trade and business periodicals (mostly American), including metallurgical and chemical journals. It was started in January, 1913, and was cumulated in annuals for 1913, 1914, 1915, 1916 and 1917. Since then it has been issued in two-year bound cumulated records every odd year, with an annual each even year. The entries are arranged alphabetically by subjects with repetition of entries when desirable and with cross references. The rate for the service is based on the number of periodicals indexed which the subscriber himself takes. This index is of particular value to one whose interest in the current periodical literature includes business and nonchemical technical subjects in addition to chemical advances. There is a rather wide variation in the values of the articles listed. New York: H. W. Wilson Co.

International Catalogue of Scientific Literature. A continuation, started in 1901, of the Catalogue of Scientific Papers (see above). Publication was authorized by an international conference held in London, credit established by the Royal Society of London having made it possible for the central bureau to proceed. Regional bureaus in the various coöperating countries furnish the material; that of the United States is under the direction of the Smithsonian Institution. This catalog was published annually for the period 1901 to 1914 (completed in 1921); the work of the regional bureaus is said to be still under way but as a result of the World War publication is suspended. Funds for resumption are being sought. A practically complete list is given of all purely scientific books and papers published each year in the 25 countries of most importance scientifically. Individual catalogs have been issued for each of the following 17 branches of science:

A. Mathematics
B. Mechanics
C. Physics
D. Chemistry
E. Astronomy
F. Meteorology
G. Mineralogy (including Petrology and Crystallography)
H. Geology
J. Geography
K. Palæontology
L. General Biology
M. Botany
N. Zoölogy
O. Human Anatomy
P. Physical Anthropology
Q. Physiology (including Pharmacology and Experimental Pathology)
R. Bacteriology

The annual volume of each part contains an author index and a subject index. The subject indexing is thoroughly done. Pure science is given greater attention than is applied science. There are 4673 journals on the list of those covered which was published in 1903. The "International Catalogue" is a very valuable index. London: Harrison & Sons.

The German titles for this work were published under the title "Bibliographie der deutschen naturwissenschaftlichen Literatur" covering the period 1901–1914; and the French titles were published as "Bibliographie scientifique française mensuelle" for the period 1901–1918.

International Index to Periodicals. A cumulative author and subject index devoted chiefly to the humanities and science. A selected list of periodicals of the world is covered. Volume 13 in 1926. H. W. Wilson Co., New York City.

International Institute of Bibliography. See p. 146.

Poole's Index to Periodical Literature. This sprung from the "Index to Subjects Treated in the Reviews and Other Periodicals' (1848, a curiosity now) and the "Index to Periodical Literature" (1853). Poole's Index, a subject index of titles, is of general, more or less popular interest, and is little used by chemists. The first volume, in two parts, covers the period 1802–1881; five other volumes bring the index down to 1907.

The Mining Index. An incomplete, poorly classified index which was published during 1918–1920 in the first number of each month of the *Engineering and Mining Journal.*

Mining World Index. This was published from 1912 through 1916 by the publishers of the *Mining and Engineering World* as "An International Bibliography of Mining and the Mining Sciences, compiled and revised semi-annually from the index of the World's Current Literature, appearing weekly in *Mining and Engineering World.* The references are classified by subjects and brief abstracts are given in some instances. Authors and subjects are both indexed.

Monthly List of Recent Engineering Articles of Interest. This appears as a part of the *Proceedings of the American Society of Civil Engineers.* Of little chemical interest.

Quarterly Cumulative Index to Current Medical Literature. This is a publication of the American Medical Association (Chicago). It has been appearing since 1916. The April number of each year covers the period January–March, the July number the period January–June and so on, each number superseding the preceding one to the end of the year. Subjects and authors are given in one index.

Readers' Guide to Periodical Literature. This subject index of titles resembles Poole's Index in being of general, more or less popular interest. It was started in 1896 and is still appearing.

Repertorium der technischen Journal-Literatur. The first volume, which covers the years 1823–1853, was published by F. Schubarth (Berlin, 1049 pages), the next six volumes by Bruno Kerl for the periods 1854–1868, 1869–1873, 1874, 1875, 1876 and 1877, respectively, and the annual volumes from 1878 to 1909 by the Kaiserliches Patentamt. Two volumes, for 1910 and 1911, were published as *Fortschritte der Technik.* It is a subject index to more than 400 periodicals (not limited to German journals), arranged alphabetically by the German

word, followed, in volumes from 1892 on, by the French and English equivalents. Each volume has a detailed subject index to this subject list and from 1897 on there are author indexes also. Prior to 1879 this index was called *Repertorium der technischen Literatur.*

Repertorium der technischen Literatur. See *Repertorium der technischen Journal-Literatur* (preceding entry).

Subject Index to Periodicals, The. *K. Science and Technology.* This is a publication of the Library Association, London. It was started in 1917(?). Over 400 British and foreign periodicals are indexed by subjects.

Technische Zeitschriftenschau. A weekly publication of the Verein Deutscher Ingenieure, Berlin, which publishes classified lists of articles of engineering interest. New books are also listed, with contents noted.

CHAPTER VII

LIBRARIES

The literature discussed in the preceding chapters must, to be of practical use, exist in ordered collections, that is, in libraries. The average chemist's collection is far too small for his needs; he must therefore look to the larger library of his college, his company, his technical society, his community or some other organization. Someone must care for these assemblages, must obtain, classify, catalog, deliver and receive books and other publications and make records. The modern librarian does all this and much more. He, or very often she, stands ready not only to make the information in the library accessible but to help the user in every possible way. The amount of time, thought and patience given to library work is almost incredible but not out of proportion to the need. It is an altruistic service of unobtrusive but immense value, abused and at the same time rarely utilized to its full extent.

It is not necessary for a library patron to understand much of the technic of library work, as an employee can always be found to serve as guide. Nevertheless, it will save the time of the library and of the reader and add much to the convenience of the latter if he familiarizes himself with some common **library practices.**

CATALOGS AND CLASSIFICATION

Card catalogs. Most libraries have catalogs of their own contents. Occasionally these are published in pamphlet or book form, but they then require supplements and in the course of time become inconvenient to consult. The usual form is the card catalog, arranged in drawers alphabetically. There should be both an author and a subject catalog. The best approved form is a combination of both, known as a *dictionary catalog.* A library

with branches may have a full catalog at the central library and a branch catalog at each branch. The catalog may also show additional material available elsewhere, as in another library in the same city or in the Library of Congress in Washington. Such alphabetical catalogs, like other indexes, yield their best results to an experienced user (for hints on this subject, see pp. 152ff.).

Systems of classification. Library material is classified by subjects, and for convenience the main classes and their subdivisions are denoted by numbers or letters. Many libraries have their own schemes of classification. For example, in the "Science and Technology Department" of the New York Public Library physical science is found under P and technological books under V; in the special Lloyd Library in Cincinnati nearly the whole alphabet is parceled out to chemistry and pharmacy. The **Library of Congress system** has attained importance because of the size of the collection and because of the distribution of its printed cards. The use of this system in the United States is widespread and on the increase. According to it, books on pure chemistry fall in the class QD and those on chemical technology in TP. The chief subclasses under QD may be seen in Reid's "Introduction to Organic Research" (Van Nostrand, 1924, pp. 119–23); the entire Library classification or selected parts may be bought from the Superintendent of Documents (Washington) at a nominal price.

The Dewey system. The most widely adopted library classification is the *decimal system* devised by Melvil Dewey, in which Arabic numerals are used. It is so called because the use of a decimal point makes it possible to subdivide a section by the addition of any number of digits to the section number, without shifting its position in the main classification. By means of three main figures a book can be assigned to any one of 999 sections. If the first of these figures is 5, the work is on natural science; if the first two are 54, it is on chemistry; if the three are 546, the subject is inorganic chemistry. Further subdivision is effected by adding a decimal point and more figures; thus, inorganic chemistry may be divided into subsections by writing 546.1, 546.2, etc. and each of these again by writing 546.11, 546.12, etc. This explains why so many shelf labels of chemical books begin with 54; many others begin with 66, because these initial figures stand for chemical technology. Certain correspondences run throughout the classi-

fication; for example, 0 denotes books of a *general* nature. General cyclopedias are 030, general periodicals 040, natural science in general 500, chemistry in general 540.

The **book** of the Dewey classification has gone through twelve editions. It may be consulted at any library using the system or may be purchased (Dewey, Melvil: Decimal Clasification and Relativ Index, Lake Placid Club, Adirondax, N. Y., ed. 12, 1926, $10; arrangements are being made to issue separates for individual subjects). The divisions of chief interest to chemists are as follows:

500	Natural science	570	Biology	640	Domestic economy
510	Mathematics	580	Botany	650	Communication, commerce
520	Astronomy	590	Zoölogy		
530	Physics	600	Useful arts	660	Chemic technology
540	Chemistry	610	Medicine	670	Manufactures
550	Geology	620	Engineering	680	Mechanic trades
560	Paleontology	630	Agriculture	690	Building

The Dewey classification for **chemistry and chemical technology** covers several pages and is complete enough for many uses. It is evident, however, that one may take a particular subject and expand it to any extent, or one may adopt the main headings and modify and expand the minor ones. Thus, Carleton E. Curran[1] has published a classification, filing and indexing system for pulp and paper libraries in which subdivisions of the Dewey number 676 (Paper and paper products) are modified and expanded while the rest of the system remains the same. The Institut International de Bibliographie of Brussels has adopted in its *Manuel du répertoire bibliographique universel* a **code based on the Dewey system.** Several periodicals, as Chemisch Weekblad and Recueil des travaux chimiques des Pays-Bas, give index numbers to their articles in accordance with it. The classification by this system is elaborate; for example, 547.63.07 denotes the synthesis of aromatic ketones and 546.32.0044 methods of protecting sodium from atmospheric action.[2]

The **Cutter expansive system** is much less widely used than the Dewey or Library of Congress systems. It resembles the latter

[1] *Paper* **28,** No. 19, p. 9; No. 20, p. 17; No. 21, p. 17(1921).

[2] Donker-Duyvis, *Chem. Weekblad* **17,** 189, 484, 625(1920); **18,** 142–4(1921); Frydlender, *Rev. prod. chim.* **23,** 687–96(1920); Hanauer, *Chem.-Ztg.* **45,** 389 (1921); Wester, *Pharm. Weekblad* **58,** 27–34(1921).

in using the letters of the alphabet to denote its main classes: L stands for sciences and arts, R for technology, S for constructive arts, T for fabricative arts.

The classification used in the Select Book List (Appendix 8) is a practical one based on the thirty departments of *Chemical Abstracts*. It might prove of value to chemical libraries wishing a simple system with the main classes of which many chemists are already acquainted.

Author numbers and call numbers. The object of the classifications just described is to bring together on the shelves all books on the same subject; but in what order shall these be among themselves? Custom answers: alphabeted by names of authors. For this purpose the names are abbreviated to an initial letter or letters, followed by numbers. Such a system has been worked out by C. A. Cutter and published in the form of a table, often called the *Cutter table*. For example, the author number, or *Cutter mark*, for "Mellor" is M48. The *call number* is the full symbol for a particular volume and is made up of the class number, the author number and any additional marks (for example "v. 1." meaning volume 1) that may be needed. It is used in asking for the book and gives the librarian its exact location on the shelves. The call number for any book may be found from the card catalog. The *accession number* is merely a serial number given to a book when it is received into the library.

CONSULTING SERVICE

Libraries vary greatly in the degree of freedom allowed to readers, but are usually willing to go just as far in this direction as is consistent with the general good. The smaller and more select the clientele, the greater the privileges; a great public library must obviously enforce more restrictions than a special library consulted by trained technicians. Nowhere else does conduct better proclaim breeding; quietness, orderliness and a considerate care for books and papers are among the cardinal virtues of a library patron.

The reference department. Works of general reference, such as dictionaries, encyclopedias and atlases are nearly always immediately accessible to the reader. They may be in a room by themselves or in the general reading room.

Current periodicals are usually free of access, in a reading room.

If the number is great, one may consult a list showing what ones the library takes and where they may be found. He may also consult *union lists*, showing what periodicals are in other libraries in the same city or in other cities. See Appendix 4 and page 101.

Using the stacks. If the reader is allowed to consult the books directly by going to the stacks where they are kept he should be all the more thoughtful, preserving silence, turning off again lights that he has turned on, etc. A little study of the library system and use of the card catalog will avoid his troubling the employees needlessly. Most librarians prefer to have the reader leave the books down after using them, as the risk that he will not put them back in the right place is too great. However, one should use common sense; if he is consulting a whole series of annual indexes one after the other it will be to everyone's advantage if he replaces them correctly.

The fact that the public is not admitted to the stacks promiscuously may not prevent the chemist from using them; in most cases a statement of his purpose, in nearly all others a letter of reference, will open them to him.

Peculiarities of arrangement. Some libraries, like that of the United States Geological Survey in Washington, separate the books of quarto size and larger (over ten inches high) from the smaller ones; hence there are two sets of shelves for the same subject. Usually, however, they are not far apart. A more frequent practice is to keep periodical files in one place and books in another. Pamphlet collections may also be kept to themselves. Such details of arrangement are dictated by some reason of convenience and may easily be learned on inquiry.

Change of shelf position. It should be remembered that the positions of books on the shelves may be shifted, due to new accessions or other reasons; it is their *relative* position that is important.

Calling for books. If the reader cannot go to the book he wants he may call for it, and he may elect to do this anyway. To get it promptly he should find the call number from the card catalog and record this with the author and title on a slip provided for the purpose. If he orders more than one at a time he is less likely to be disappointed. He should also observe the library's rules as to what he is to do with the books when he has finished with them.

LENDING SERVICE

Personal loans. Each library has its own rules as to the borrowing of books, and these must be ascertained. As a rule, reference books (including bound periodicals) are not lent or are lent overnight only, while ordinary books may be taken out for a certain period. The Army Medical Library in Washington (formerly called the Library of the Surgeon-General's Office) makes a practice of lending only to medical men; the Patent Office in Washington will not lend any book of earlier date than 1840. Most libraries are now free, but the borrower's responsibility must be established in some way.

Interlibrary loans. Libraries do not like to make personal loans to individuals living at a distance. Instead, they have worked out the system of interlibrary loans, by which the individual applies to his local library, which does the borrowing from the distant library and assumes the responsibility. The cost of transportation both ways is borne either by the borrowing library or by the individual (usually the latter). The willingness of the great libraries to lend in this manner books of great value, or even in some cases a volume from a journal file, is remarkable. Books obtained under this plan should of course be returned as soon as possible and must be returned within a set time limit.

SPECIAL SERVICES

Photographic copying. It frequently happens that one or more copies of a portion of a library book are desired. With the scientific worker it is usually an original article (or extract from one) that is wanted, occurring in a journal file that is not conveniently accessible to him. Formerly such copying had to be done by hand; now, however, photographic reproduction is the rule. The principal libraries have either installed equipment for making photoprints or send books out for this purpose to commercial photographers. Occasionally the latter are given quarters in the building, so that the books need not be taken away.[3] A paper negative may be had, the familiar sheet with white letters on a black ground, and this may be photographed again, giving a posi-

[3] The process of making photoprints is often called "photostating" from the trade name of a widely used machine, the Photostat. The prints made with it are properly called "Photostat prints."

tive; or, a transparent negative may be made and any number of positives printed from it (positives are less trying to read than negatives). The size of the original may be either enlarged or reduced. The cost varies; that for a single negative runs about 10 to 25 cents a page. Libraries usually do such work at cost. The United States Patent Office Library probably has the largest business of this kind in the country. It has a capacity of 2400 prints a day and fills orders from anyone at reasonable rates. It has a large collection of chemical books and periodicals, as well as patent literature, on which to draw.

The photoprint process has the advantages, beside cheapness, of faithful reproduction of the original and the ability to copy complicated diagrams and pictures. The important rôle which the process is coming to have in the study of scientific literature is worth emphasizing because many persons do not seem to know about it. In order to get the text of an article they search for a journal number or a reprint when a photoprint could be had with less uncertainty and delay.

Photoprints are accepted by the courts in patent and other litigation, especially if accompanied by a photoprint of the title page of the book from which they were made.

For the names of American libraries giving photoprint service, see Appendix 3.

Translating and abstracting. Translations, and also abstracts fuller than are furnished by the abstract journals or of different character, are frequently desired. Organizations sometimes have a service of this kind for their workers but libraries in general do not undertake to furnish it. They are, however, able in many cases to refer the inquirer to some individual, either connected with the library or not, who will do such work at commercial rates. If possible one should apply to a library specializing on the particular subject, as general translators and abstractors are often not familiar with the technical terminology involved. A good abstractor should be able, if the problem is explained to him, to use his judgment as to what kind of an abstract the chemist wants, and should know when to be brief, when to give more detail and when to order photoprints for material that will be wanted in full.

For information as to the files of journals kept by the different libraries, see page 101.

As to information service given by libraries and other organizations, see pages 144–5.

SPECIAL LIBRARIES

The needs of business men, manufacturers, scientists and others have called into existence special libraries which make no attempt to cover the whole field of knowledge but concentrate on specialties. The Special Libraries Association, founded in 1909, had 800 members in 1925. In this association is a technology group; in this group is a physics and chemistry committee. The librarians cooperate not only with one another but with outsiders, so that the library resources of corporations having chemical interests are of value to chemists in general. The address of the Association is 195 Broadway, New York City. It issues a journal, *Special Libraries* (monthly, $4 a year), a directory giving a paragraph of information about each special library (ed. 2, 1925, 255 pp., $4) and other material. In the directory 26 libraries are classified as primarily chemical, and 96 others give chemistry as an important subject in their collections.

An interesting symposium on library service in industrial laboratories appeared in the *Journal of Industrial and Engineering Chemistry* **11**, 578–89(1919).

SOME EUROPEAN CHEMICAL LIBRARIES

The library of the Chemical Society of **London** is one of the most complete chemical libraries in existence. Not only has it a large number of the journal files in which chemists are most interested and of current books on chemistry, but it also possesses a fine collection of old and rare chemical and alchemical books; furthermore, it has extra sets (in some cases more than one) of the more common journals, which are available for lending purposes. It is housed in the headquarters of the Society, in one section of the famous Burlington House on Piccadilly. In 1926 it reported 28,424 volumes.

The library of the Deutsche Chemische Gesellschaft in **Berlin** is another well-known collection, which amounted to over 20,000 volumes in 1919, at which time a catalog was compiled and published in connection with a cumulative author index to the *Berichte* (1920). The library is in the headquarters of the Society, known as *Hofmannhaus*, an attractive edifice on Sigismundstrasse. "Hof-

mannhaus" is at the present time the most active center of chemical literary activity in the world. In its different rooms the members of the staff are busily engaged on the *Berichte*, the *Zentralblatt*, Beilstein (both the fourth edition and its future supplement), Gmelin's Handbuch and other publications (the Literatur-Register has been merged with the *Zentralblatt* collective index). The workers, thirty or more in number, lunch together in one of the rooms of the building.

In **Paris** the most valuable libraries for the chemist's use are probably those of the École de Pharmacie (of the University of Paris) situated on the Avenue de l'Observatoire; that of the Collège de France (Rue des Écoles); and that of the Institut Pasteur (Rue Dutot). Some of the libraries in the research laboratories of the Sorbonne are very complete in limited fields. The Bibliothèque National has a very large collection of chemical books but is not convenient to use. The library at the Musée Nationale (Jardin des Plantes) also contains many chemical books. A collective index of the scientific publications contained in the libraries of Paris, known as the *Inventaire*, permits the location of the rarer journals. It is, therefore, possible to find in one library or another practically any chemical publication which may be sought. An effort is on foot at present to found in Paris a center of documentation in pure and applied chemistry. This is to be a memorial in honor of Berthelot and will be known as "La Maison de la Chimie."

American libraries. See Appendix 3.

CHAPTER VIII

PROCEDURE

Literature searching is an art. Efficiency can be gained in it only by actual experience, and one hesitates to offer instructions in a realm where no hard and fast rules can be laid down. The reasons for this lie partly in the great variety of the problems to be solved. A hint of this variety is given in Chapter I in the paragraph on "Kinds of Searches." They also lie partly in the heterogeneous nature of the material, about which the preceding chapters on books, journals, patents and other sources have attempted to convey some information. But the personality and the circumstances of the searcher also enter into the account. Each of us has his own mental habits and manner of working. One swears *by* card indexes and another swears *at* them. This chemist works forward through the literature and that one works backward. They seem to behave as variously as the five little pigs. It often happens, also, that the method of search is affected by the library facilities at the disposal of the worker or by what he discovers as the investigation proceeds.

Nevertheless, it is believed that some **general principles** can be outlined. They are offered rather as hints than as directions and will be followed by an "experience meeting" in which a number of chemists in different lines describe the way in which they go about the matter. Patent searches offer a special problem which is treated in the latter part of Chapter IV (pp. 122–6).

If the **question** is one **of simple fact,** a knowledge of the various sources described in this book will probably suggest the most convenient place to which to turn first. If a melting point or boiling point of a common substance is wanted, the chemist will be likely to look it up in his favorite pocketbook, or International Critical Tables, or Beilstein, or Gmelin, or some such authority that hap-

pens to be at hand; if a method of analysis is desired he may go to Treadwell and Hall, or Scott, or some other standard work on that subject; and so on. If he is particularly interested in the latest developments he may supplement this by checking up the recent journal literature to see if any corrections or improvements have been made. Many such questions can be answered quickly, even in a small library, and satisfactorily enough for the purpose. As one grows more familiar with his tools he gains efficiency by knowing which authority to choose and how to consult it readily.

But there are other problems which cannot be disposed of so summarily. In the following sections it will be assumed that the **search** is more **extensive,** involving a topic that is of some breadth or that must be hunted down exhaustively, so as to require a systematic search and a compilation of the results.

PRELIMINARY WORK

In a search of some magnitude it is usually worth while to do a certain amount of preliminary work (the "preliminary search" in patent work is a recognized procedure). The first step should be to **define** the nature, purpose and scope of **the search** as clearly as possible, for any vagueness on this point is likely to be reflected in looseness and lost effort in the subsequent work. It is well to state the subject in writing to make sure that it is clear, and to indicate at the same time the degree of thoroughness with which it is expected that the investigation will be made, whether a brief sketch, a general survey, or an exhaustive treatment. Drawing plans for a house is a good thing even if one decides to modify them later.

If the subject is a comparatively new or unfamiliar one, the next need will be a good **survey of** the **present** state of **knowledge** if one is available. Such surveys are found in the form of reviews (see p. 134), of books (the Select Book List, Appendix 8, may be of use here), or of articles in some of the encyclopedias and handbooks. For example, a beginner on colloids would do well to read one of the elementary books by Freundlich, Hatschek, Wo. Ostwald or Zsigmondy, while one wishing to learn about orientation in the benzene ring might read the reviews by A. F. Holleman in *Chemical Reviews* **1,** 187–230(1924) and A. W. Francis (*Ibid.* **3,** 257–89(1926)). The references given in these surveys can be used later in the systematic search.

A little **rummaging** may also pay. One will perhaps look in several works of reference, or even in beginning textbooks. Consultation of the card catalog of a library or of an index of periodical or abstract literature may, in suitable cases, turn up an address or a popular article bearing on the topic that will add zest to the search and suggest some of its possibilities. By all means one should attempt to get into the spirit of his subject and become thoroughly interested in it if he has not already brought that enthusiasm with him.

SYSTEMATIC EXAMINATION OF THE LITERATURE

Having found his bearings and acquired some notion of the general lines of the problem, our hypothetical worker is now ready to get down to systematic searching.

Taking notes. Card indexes. The question arises as to the form in which notes shall be taken, as notes of some kind are necessary. One plan found to work well is to select whatever style of pocket notebook is most convenient to the user, and to take the notes in this consecutively. Each note will begin with the proper data as to author, journal, volume, page and year. (The title is not absolutely necessary for identification purposes and can often be dispensed with unless a bibliography is to be prepared; however, as the same article may appear in two or three journals it is better to record it.) If the notes become numerous the pages of the notebook are numbered and an index of authors' names is made on slips or small cards. A separate small notebook, the leaves of which are marked with the letters of the alphabet, may be used instead of the card index if desired. By means of the index one can at once discover whether he has already made notes on a certain article or not. When one notebook is filled another of the same kind can be used and called "2," and so on. It is also advisable to have a place at the back of the notebook or on a separate paper for noting references to be looked up. If the number of references is large, cards or slips are better, as they can be sorted by authors or by journals.

The taking of notes on separate cards is less convenient than the use of a notebook but has the advantage that it constitutes its own index. The size 4 × 6 inches is recommended for this purpose, or a business half-sheet (about $8^1/_2 \times 5^1/_2$) may be used. The latter is less expensive and occupies less space. Occasionally

it may be found desirable to divide the object of investigation into separate topics and keep a large card or sheet for each topic. This obviates such classifying later.

Obviously, some of the advantages (and also, it may be added, some of the disadvantages) of the ordinary notebook and of the cards or sheets may be combined by using the loose-leaf plan.

If cards are used, light-weight stock should be purchased unless the cards are to have heavy wear. For many purposes 3 × 5 slips cut from a good quality and weight of bond paper[1] will answer better than cards because they are cheaper and less bulky. To hold them, pasteboard shoe boxes (ladies' size) make a cheap substitute for a filing cabinet. Such boxes are not very durable, but as they can be had for nothing the depreciation item is nil. There is a slight difference between the metric sizes and inch sizes in library cards. It is wise to adhere to the metric (*e. g.*, 75 × 125 mm. instead of 3 × 5 inches) as the tendency is in that direction. In any case one should select common standard sizes of cards and sheets on account of the great variety of apparatus (cabinets, folders, filing boxes, guide cards, etc.) manufactured for use with them.

A suitable starting point. It often happens that someone has already compiled and published a good bibliography on the subject of the search; if so, it furnishes an excellent starting point. It may be found in the survey that was used in the preliminary work, or in one of the great handbooks (such as Mellor or Gmelin in the case of inorganic chemistry) or in some other work, or in a journal article. West and Berolzheimer's Bibliography of Bibliographies of Chemistry and Chemical Technology[2] is very helpful in locating such a collection of references. Obviously, the later the date of the bibliography the better, other things being equal. The chances are that in the course of the search additional bibliographies will be discovered.

Indexes. Some workers prefer to go at once to the indexes of the abstract journals; and sooner or later these will have to be consulted, if for no other reason than to bring the work as nearly up to date as possible. A discussion of abstract journals will be found on pages 76–100. At the end of this chapter will be found a chronological table of abstracts and reports. Since

[1] Paper less than 20 lbs. per ream in weight is likely to curl.

[2] For this and similar works see Select List 2N4, Appendix 8.

completeness in covering the literature is the special aim of *Chemical Abstracts*, that journal is of particular value in locating references, even if the same articles are afterward looked up in other abstract journals. (Prior to 1907, however, when *Chemical Abstracts* was founded, older authorities must be consulted. Also it should be borne in mind that *Chemical Abstracts* has not covered certain foreign patents since 1914. See page 116.) A ten-year index covering 1907–1916 saves examining the first ten indexes separately and another ten-year index covering 1917–1926 will soon be available. These and other cumulative indexes are great economizers of time. Indexes and the way to use them have been discussed in Chapter VI, and information as to the way in which, by the use of different indexes, one may cover expeditiously any desired period of chemical literature, is given on pages 236–8.

The search proper. It will be assumed that the searcher is somewhat familiar with libraries and the way to use them. This subject is treated in Chapter VII (p. 203).

In looking up references one should go to the **original articles or patents** if possible and not depend upon abstracts. Abstractors have their faults, there is additional chance in abstracts for printer's errors, and even if the abstract is perfectly composed and printed it may not be prepared from the viewpoint in which the searcher happens to be especially interested. **Abstracts** are useful, however, as summaries for giving a general impression of the nature of the articles and enabling the reader to decide whether it will be worth while or not to consult the originals; and when the original is not available an abstract may prove invaluable.

The subcommittee on research headed by R. F. Bacon[3] reported that the average graduate is apt to look up **topics that are too general;** he should analyze them into their essential parts and consult the literature on each. He should examine the articles and interpret the work done, instead of merely making a few disconnected quotations.

In examining articles **time must be husbanded;** in an extended search one can scarcely read them all in detail. The faculty of scanning the material quickly and knowing when to read more closely is very valuable. Neither should time be spent uselessly in note taking; photographic copies can now be procured so easily

[3] *Science* **45**, 34–9(1917).

(see p. 208) that articles need not be copied by hand and often not even abstracted. The worker must learn to decide when to copy citations, when to abstract and when to order a photoprint.

He should be **thinking,** too, as well as merely taking notes; something he reads may suggest a new line of approach, a puzzling question to be solved by further searching, or a different explanation from that given in an article. Such things should of course be included in the notes; and references leading to new articles of interest should be watched for.

In addition to looking up the references found in bibliographies and abstract journals, and in other articles, it may be desirable to go through the files of one or more periodicals that specialize in the field of search. Nor should subject indexes alone be consulted; if it has been found that a certain man has been an important contributor on the topic in hand, his name should be run down in author indexes to make sure that nothing written by him on the subject has been missed.

The judgment of the worker must determine to what **extent to carry the search.** For instance, how far back should he go in the literature? This depends altogether on the nature of the subject. All the vital results may belong to the last ten years—or five years; on the contrary, if the topic is a historical one, they may go back to the very roots of the ancient science. It is perhaps true that most of the old work of value has been incorporated in treatises and compilations, while much other old work has been rendered obsolete by more recent experiment with improved methods; yet the old records should not be held in slight esteem (see pp. 3, 33, 34, 234). Again, how wide a territory should one cover? There is no rule for knowing, but the fact should be borne in mind that an entirely different science or different branch of chemistry has often furnished the answer to a perplexing question.

Final touches. The time comes when a well ordered search, if it is not too hopelessly wide, reaches the point where leads cross, where little important new material develops, and where the worker begins to feel that the ground has been fairly well covered.

If possible he should not stop quite yet. Is there not some other way of getting at the matter? Is the feeling of completeness possibly due to a fixed state of mind into which the investigator has fallen, rather than to the actual state of the search? Perhaps it will pay to "browse about" a little and look at almost any-

thing that might have a bearing. This seems a haphazard way of behaving but experienced workers testify to its value. It may not be entirely a matter of luck. It may be a drawing, by some subconscious mechanism, on all one's previous experience with the literature and on one's whole store of information. If this is true the scientific reading that one does in various lines, merely on account of finding it interesting and without hope of remembering it in detail, may prove unexpectedly of use.

Perhaps, too, the searcher prefers at this point to arrange his material and work it roughly into shape, whereupon he discovers certain gaps to be filled in; or as a result of considering all his data he develops certain definite ideas or raises certain questions that necessitate further examining of the literature. In these cases the final touches on the search go hand in hand with the recording of it in finished form.

THE WRITTEN RECORD OR REPORT

The nature of the final record will vary greatly according to circumstances. If a research worker has been consulting the literature in connection with his own problem to see what has already been done by others, he may not need to recast his original records at all.

If, on the other hand, he is expected to make a report or is preparing a monograph or review the writing-up process is important. Many organizations require the reports of literature searches to be prepared in a standard way on a standard size of paper for distribution and filing, and some go into details such as specifying the abbreviations to be used.

In any case, the final record should be of such a nature that it is clear and will enable the user to avail himself readily of whatever has been noted, and to refer to the original sources as far as he desires.

Critical *vs.* noncritical compilations. There are many noncritical compilations from the literature. Numerous books and reviews, as well as minor reports, are exactly this, and they have their place. If they are clearly written they say to the user, "Here is what the literature says—draw whatever conclusions you wish." Indeed, a searcher who is not a competent specialist on the subject in question can scarcely do more. When one reflects, however, on the great difference in quality of chemical articles and the

satisfaction it is to find a presentation in which each piece of work is considered critically and given its due weight, he can hardly avoid concluding that the reporter should use his critical faculty to the extent that his training and ability will permit. It is possible to do this without warping the statement of facts or coloring the statements of authors with one's own ideas. A critical compilation when well done is always more valuable than a noncritical one.

Scientists are constantly being reproached for their sins of expression. Perhaps this book is an instance that justifies the procedure. It is a fact that many scientific writings are less pleasant reading than they should be, or convey wrong impressions, because of a poor style. Those interested in **technical composition** are referred to select list 2N1 (Appendix 8). See also Reid, Introduction to Organic Research, Chapter 18, pages 313–30.

Titles. E. W. Gudger[4] has called attention to the importance of wording the titles of scientific papers properly. See also the discussion of titles under Indexes, page 167. Titles should give a clear and exact idea of the contents of the papers and make it possible for them to be classified and indexed correctly.

Citing references. Citations to the literature are frequently given carelessly. The editors of *International Critical Tables*, who verified all references, found a regular and not insignificant percentage wrong. Some of the errors made in citing references are: giving the page preceding the right one, transposing numbers, as 68 for 86, reading from the line above or below in a bibliography. *Quoted references should always be verified.* If they cannot be verified it should be stated that they are given second-hand. Reprints should not be used for giving citations if the original is available. Inasmuch as many people do cite from reprints, it may be worth while to remark here that these documents should have a standard form and should give the title, author, volume, pages and date just as they are in the original. Errors also arise in citing from photoprints. The practice should be avoided if possible but where it cannot be, errors will be minimized if correct procedure is followed in ordering and delivering the photoprints. The worker should make out a clear memorandum and this should be returned attached to the print; the complete

[4] *Science* **60**, 13–5(1924).

reference, so far as it is not shown in the print itself, should then be written on each copy of it.

It should not be forgotten that errors in references are less likely to be detected by the proof reader than in ordinary reading matter; hence the manuscript must be absolutely clear.

Citations are given as footnotes to the text, or arranged all together as a bibliography (see the following section).

The preparation of bibliographies. The bibliography as a form of chemical literature has been discussed in Chapter V (p. 138). A few words should be added here regarding its preparation. As to arrangement, there are at least four possibilities: by dates, by authors, by sources and by subjects. The chronological order has the advantage that it shows at once the earliest and the latest dates covered and displays the progress of the subject with time. A reader interested in the early history, or one wishing only the latest developments, can make his selection quickly. Such an arrangement is also common in giving the published works of an individual. For the average small bibliography an author arrangement is convenient, because citations usually begin with the author's name. An order in which citations from the *Annalen* (let us say) would come first, then those from the *Berichte*, then from the *Comptes rendus*, etc. in alphabetic order, has something to recommend it but the writers do not recall seeing it used. A large bibliography, however, in which the material covers a wide field should be classified by subjects; under each class or heading the arrangement might well be by authors. Such a bibliography really should have an author index also. Or, it could be arranged by authors and be provided with a subject index. A third possibility is to arrange it chronologically and provide both subject and author indexes. If the entries of a bibliography are numbered serially the index can refer to the individual entry instead of to the page merely. Also, if such a numbered bibliography is published in connection with an article or chapter, references can be made to it conveniently from the text.

The following **form of reference** is recommended for general purposes: (1) author's last name, (2) author's first and middle names or initials, (3) title, (4) name or abbreviation of the journal in which the article is found, (5) number of the series if the journal has had more than one, (6) volume number, (7) page numbers *inclusive*, (8) the year. Sometimes a foreign title is given in the

original language, sometimes it is translated; the thorough way is to give the original title followed, in brackets, by the translation. It is a common practice to put series numbers in brackets or parentheses, volume numbers in bold-face or italic type and the year in parentheses. The author's name is often in small capitals. Example:

SOSMAN, ROBERT B. The distribution of scientific information in the United States. *J. Wash. Acad. Sci.* **11,** 69–99(1921).

Opinions will differ in particular cases as to giving also the month, the journal number or other data, but usually the above will suffice. A discussion of the value of simplified literature citations will be found in *Science* **62,** 419–20(1925) and **63,** 68–9, 187–8(1926). For standard abbreviations of the names of journals see the List of Periodicals (Appendix 6).

If the article is cited through an abstract journal, the reference to the abstract should be given also; this is a good thing to do anyway if the journal is an obscure one. If the article is printed in more than one journal or if it has been translated it is well to add these references.

In the case of a book the reference should include (1) author's name, (2) title, (3) publisher's name, (4) publisher's address if it is not well known, (5) date, (6) number of edition, (7) volume number if there are more than one, (8) pages inclusive. It may be advisable to separate references to books from references to periodicals; this depends on circumstances.

The worker who has gone to the trouble of preparing a good bibliography should be encouraged to publish it if possible. This is not always easy but the value of bibliographies is becoming more and more recognized and many have been issued in recent years. Accuracy in all such work cannot be overemphasized.

EXPERIENCES OF OTHERS

A few years ago, when the present book was first projected, the writers asked a few of their chemical acquaintances to describe their methods of using the literature. Extracts from their replies are given below.

From a Physical and Colloid Chemist

I should say that the most important point to know, before "looking up the literature," is *the object of the investigation.* For example we may be undertaking a research demanding a complete rehearsal of *all prior work;* or a patent-testing

investigation requiring just *one evidence of prior use;* or a commercial investigation to discover the *present* state of an art without reference to ancient history.

As to *sources of information:*

(1) Indexes to chemical journals, especially abstract journals.
(2) Indexes to libraries, especially technical libraries; also encyclopedias.
(3) Information from fellow chemists and friends.
(4) General knowledge.

Under (4) would come the results of a man's general reading apart from technical books. For example I once read a book about the customs of certain savage African tribes, and when the validity of a certain patent was in question, produced a picture showing that the process claimed as new was known from ancient times. Things, methods and principles well known in one industry may be new to another, and only a comprehensive knowledge will make this known to the investigator.

Naturally all the sources of information above mentioned will yield *collateral branches* which may be profitably followed.

One great difficulty in depending upon indexes of all kinds is that the index title often does not reveal the actual content of the book or paper. To discover this *cryptic or occult information* requires a certain flexible ingenuity and experience which cannot be expressed in words. Call it gumption, insight, clever guessing if you will. A paper on glass will sometimes reveal a principle governing the action of metals or other supercooled melts. Authors often fail to see the significance of their experimental results.

From an Organic Chemist

In looking up literature on any topic in organic chemistry the *Zentralblatt, Chemical Abstracts* and Richter indexes are usually my starting points, and from these enough can usually be obtained to result in at least finding articles which have other references which may prove valuable.

From a Technical Bibliographer

In looking up the literature on any subject, no matter what is the latest date to be covered, I always start with the latest completed year and work backward as a bibliography is often encountered. This, of course, *after* reading a general account on the subject in Ullmann, Thorpe, Gmelin-Kraut, Abegg or the like, and after looking through my collection of bibliographies for one on the subject or closely related thereto.

From an Industrial Chemist

I find that my personal card index which I have made up as the result of years of desultory reading will yield information more quickly than general reference works on the few subjects which I have particularly covered. I make it a practice whenever I read an article which contains information of interest to me, to put this information on a 4 × 6 card and file it away under the proper heading for future reference. This takes a little time but it is well worth while.

From a Mineralogical Chemist

I have no definite, systematic plan of operation, but am inclined to do as they say of democracies, "muddle along."

In all of my scientific work I have been hampered through lack of space, and I have never felt that I would stay in any one position indefinitely, so I have never accumulated card catalogs of data. Filing cards are bulky and heavy, yet seem too good to destroy; whereas sheets of so-called scratch-pad paper 5 × 8 inches can be kept in small envelopes and then, after a study has been completed and published, can be destroyed without hesitancy.

From a Teacher and Analytical Chemist

I generally vary my method of starting work in accordance with the nature of the problem. For matters of analytical chemistry, I generally look in Treadwell and Hall first, then pass to *Chemical Abstracts*. For straight inorganic chemistry I usually start with Gmelin-Kraut. For technical analytical methods I often go to Lunge-Berl. Ost is very good in industrial chemistry. We all depend upon Beilstein in organic chemistry.

As a rule, the German books of the Handbuch type contain a very carefully prepared bibliography and it is rare that the same time and patience are expended in an English book.

From a Sanitation Specialist

The general method is, of course, to refer first to *Chemical Abstracts*. Usually, references given in articles referred to by abstracts give us a complete bibliography. It has been my custom to prepare card indexes of bibliographies showing what we have consulted and I believe it is necessary to keep track of all references consulted.

For recording bibliographies in our publications and in theses, I have followed the method adopted by the United States Geological Survey which I believe is general for U. S. publications. This scheme for recording bibliographies is to arrange alphabetically by authors and use numbers corresponding to the authors' names throughout the text so that the same number might appear on the first page and on the last page if it referred to the same article, and the highest number might appear on the first page if that reference was called for at that time.

From an Organic Chemist

Whenever I want to look up the literature on a definite compound of known composition or constitution, I of course always turn first to the Richter Lexikon and the Stelzner Literatur-Register, and I have occasionally been helped by looking through the formula indexes of the *Berichte*, beginning where the Stelzner Register ends. If what I am interested in is a type of compounds rather than any single one, I naturally turn to Beilstein, but often I have found Meyer-Jacobson and even Richter's Organische Chemie more satisfactory. Then, of course, I always consult the Decennial Index and succeeding indexes of *Chemical Abstracts;* the formula indexes are invaluable in this respect.

For animal products I have found Oppenheimer's Handbuch der Biochemie, Abderhalden's Biochemisches Handlexikon and Maly's "Jahresbericht über die Fortschritte der Tierchemie" most useful.

From a Pharmaceutical Chemist

Collective indexes are indispensable, and to them, as a rule, we turn for first aid. We make a proper record of the references, examine each article, making

a more or less extended abstract of each, and noting additional references it may indicate.

In regard to our system of recording the information found, my present idea would be the following:

Write the abstract of a *given topic* upon a sheet of convenient standard size and shape and give it the following heading:

(1) Blank space for serial number, (2) year of publication (heavy-face numbers), (3) name of author, (4) title of topic, (5) journal references: *a*, the original reference; *b*, *c*, *d*, etc., abstract references in other journals.

Then follows the abstract itself. If copied from another abstract *b* or *c* or *d*, etc., the corresponding letter should precede it. The letter *a* would indicate that the original reference has been consulted.

Finally the sheets are put into chronological order, and the serial numbers are given.

The topics themselves are conveniently placed into alphabetical order.

From a Research Chemist and Bibliographer

While one might write a volume on the compilation of bibliographies, the thing really is extremely simple after all. That is, I find that there are a certain few aids which are invaluable: The indices of *Chemical Abstracts*, the *Journal of the Society of Chemical Industry*, the *Journal of the Chemical Society*, the *Zentralblatt*, the *Agricultural Index*, *Experiment Station Record*, the *Industrial Arts Index* and the *Engineering Index*.

These, of course, do not cover all possible sources of information, but they do give the principal ones, and if one uses these indices intelligently he can feel rather sure that the more important articles are covered There is, however, this precaution which must always be taken if one desires absolute accuracy, and that is, that all references should be checked back to the original. This unfortunately is not always possible with the library facilities at our command.

As regards the larger question of finding information about a particular subject or substance, the success or failure will depend almost entirely upon two things: first, the ingenuity of the man who is making the search and second, the library facilities at his disposal. I think that I would find it very difficult to attempt to lay down any rules for this sort of work. I am doing it constantly, and in attempting to analyze the method of procedure I find that it depends almost entirely upon my knowledge of the subject. There are certain obvious places for information on paint, for example, but one has to know what these are from previous experience. The same is true of any other subject. It would seem that the efficiency of any reference librarian or any director of an information department would depend upon his knowledge of sources.

From an Industrial Chemist

Frequently I have been moved to advise young chemists in the following vein: Whenever you read a chemical paper, or abstract, or patent that arouses your interest, take a memorandum of it at once. The fact that it has interested you is exceedingly good evidence that it is valuable to you. Taking this memo accomplishes two ends. First, it tends to fix the essence of the matter in your

mind Second, it gives you a record, if the work be well done, by which you may find that article again One 3 × 5 card has plenty of room for the purpose. When these cards have become numerous, they should be alphabetically arranged and classified.

For example: in my index is the class, AIR. Every card in this class is headed by that word The class comprises all physical and chemical data relating to air and to its component gases, method of analysis, separation of the rare gases, utilization of atmospheric nitrogen, utilization of the cold produced by the expansion of compressed air for obtaining low temperatures, etc., etc. Again in this list, every element constitutes a class; the operations of distillation, crystallization, precipitation, etc. constitute classes.

The young man who starts this plan in earnest will of course at first find trouble because of the variety of possible classes in which any card can be put, but a liberal use of cross references, and the limitations imposed by the man's own field of interests will soon show him the way out of such difficulties. He will before long naturally convert some of the classes of his general index into entirely separate indexes on special subjects.

From a Photographic Chemist

As far as benefit to the individual is concerned, I do not advise keeping a card index, the information one wants is usually not there.

When I desire to look up the published information on a given subject, I take *Chemical Abstracts*, *Science Abstracts*, *Physical Review*, the various Bulletins of the Bureau of Standards, and a few other publications of similar nature. One does not have to look very far before coming across a paper which contains an extensive bibliography, and in recent years this sort of thing is becoming increasingly important and valuable in our American scientific journals. Then, as one looks further, other bibliographies turn up, until finally, as in tracing genealogies, the lines begin to cross; and by that time one is down to the old standard published indexes in most cases.

This is, I admit, a rather slovenly method and wholly unsystematic; but I really believe that it brings results as quickly as any other. Of course, a book on a new subject, if available, will probably contain footnotes enough to give one a fresh start if the trail should be lost, but this is not always the case. The search through journals is generally more profitable, in my experience. The obscurely published paper can rarely be brought to light in any other way. But somebody has dug it up somehow, and has listed it, and it can very frequently be located through the paper of the digger.

From a Dye Chemist

In the special field of dye chemistry there are several special works which cover the ground, as a whole thoroughly; *e. g.*, the patent digests of Heumann, Friedlaender and Winther, beside lesser works, as Schultz, Cain and Thorpe, Cain, Lange, etc.,[5] which take up more restricted fields. Beside these works, named and unnamed, there are the various patents of recent years, not yet included

[5] See Select List 25B in Appendix 8.

in Friedlaender. Our library is not yet as rich in such works as we could wish, though we are adding frequently such works as are obtainable.

But as it is frequently impossible to find a given subject in the larger (and more important) reference works, on account of faulty indices for example, we have begun the compilation of a digest for our own use, which when completed will contain all known information regarding each dye and each intermediate of which we have any knowledge. This compilation is to be on 5 × 8 index cards, a card to a dye or intermediate, including compounds which have any bearing whatever upon dyes or intermediates used, obsolete, or if possible for future use or trial. The cards will probably be arranged alphabetically, with synonym cards and cross references.

The undertaking is of considerable magnitude, and we are able to work upon it only in the intervals of our routine work here; but some progress has been made, and the beginnings have already proved very useful.

From an Industrial Chemist

In the first place we go to the standard publications on the subject in question and to the various dictionaries and technical handbooks on the subject. We find therein numerous references to the literature and to patents, which we consider to be rather important. After we have obtained as many references as possible from these sources, we proceed to run them down through the various periodical publications, thereby obtaining a considerable amount of information, which when digested and arranged gives us a very valuable basis on which to work.

If we are not satisfied with the information so far obtained, our next step is to refer to the various indexes and bibliographies published in connection with technical books and periodicals, such as *Chemical Abstracts*, *Journal of the Society of Chemical Industry*, London Chemical Society *Journal* and *Zentralblatt*. We keep a card index of all bibliographies so that we can refer to them at once. We are usually able to obtain pretty full information on the topics found in those indexes and bibliographies. After this information is gotten together and sifted, we enter it on filing cards which are filed away to serve as a bibliography of the subject.

For the primary research we refer to such books as: Thorpe, Watts, Wurtz, Gmelin-Kraut, Muspratt, Ullmann, Abegg, Moissan, Beilstein, Meyer-Jacobson, Richter and Lunge. References obtained from these sources are run down through such sources as the Jahresbericht, which is especially valuable for German patent literature, Liebig's *Annalen*, *Berichte*, *Journal of the Chemical Society*, *Journal of the Society of Chemical Industry*, American Chemical Society journals. In these sources we are usually able to obtain information on nearly all of our references in one form or another. After these are exhausted, we use the indexes which we mentioned above, thus being able to practically exhaust the field as we have found that the publications noted above contain nearly all of the material sought for.

From an Industrial Chemist

Illustration of a search for established facts: A company desires to broaden out and establish a sulfuric acid plant. Textbooks, handbooks, reference tables, etc. furnish information on the properties of sulfuric acid, physical, chemical,

electrical. Lunge, Davis, etc., give data on design and construction. Chemical catalogs and trade catalogs furnish data on the raw materials, sulfur and pyrites, on apparatus and machinery (place, sizes and cost), also on contractors and plant designers; Government publications show export and import, freight rates, rules for packages, containers and shipping; trade journals give an idea of market conditions and patent literature shows the legal limitations of the process and valuable suggestions regarding the same. Ready-made bibliographies will aid greatly in the search.

Illustration of a search for information in an undeveloped or partly developed field: Subject, hydrogenation of oils. All books and pamphlets on the subject—probably a dozen or so. All U. S. patent specifications and most important foreign copies (some 200 in all). Abstracting all papers on hydrogenation in all journals that publish pertinent matter—requires the special service of a librarian. Trade journals and catalogs; clippings, reports, photos, blue prints.

Illustration of an intensive search such as is required of patent attorneys: All kinds of questions from all angles may arise and no specific general outline can be attempted. Let us suppose a patent litigation—where the defending patent uses a temperature above 100° C., the other uses the temperature of boiling water This means a close study of *all* published papers and matter on the subject up to a given date to prove or disprove that temperatures above 100° have been used or mentioned, with pressure or without pressure or vacuum, direct heat or indirect heat, etc., etc Each search will call for its own treatment.

Records: Index cards are handiest for book titles, pamphlets or papers (references to the same). Perforated loose sheets in book form are convenient for abstracts or descriptions of methods. Loose leaves in folders take care of catalogs, clippings, blue prints, photographs, etc.

From a Physical and Metallurgical Chemist

I first obtain, if possible, the books dealing with the subject and read them carefully. Then I start in on the annual reviews, beginning with Reports on the Progress of Chemistry, and the similar ones on Applied Chemistry (England). These I find very valuable, as you can trace the growth of the subject year by year. "Mineral Industry" is very useful in the same way, and I always go through it as far back as it runs, whenever I am working in its field and even when I am not, as it is apt to contain all sorts of information on "side issues."

All references found in all of these are of course preserved but I do not look them up till later, as I usually run across them again anyway. Clarke's "Data of Geochemistry," an invaluable book for all sorts of work except pure theory in chemistry, is consulted at this stage. It is a mine of information. By this time I am ready to start in on *Chemical Abstracts, beginning with the most recent number,* and running back as far as it goes. The English Abstracts come next, in the same way, and then the *Chemisches Zentralblatt.*

I make a practice of noting carefully the names of the men who have done the most work in my particular field for the time, and looking them up carefully in the author index. Sometimes articles will be found in this way which have escaped indexing under any one of the usual headings.

I look over also the indexes and tables of contents of most of the periodicals which appear annually or semiannually, like the *Transactions* of the American

Institute of Chemical Engineers, the American Institute of Mining Engineers, the American Electrochemical Society, etc. Sometimes an article in these has a title which does not indicate its nature, but it will be placed with a group of similar articles or in a symposium. I captured an article just the other day in this manner, which would otherwise have escaped me.

The annual reports of mining companies, or at least the reviews of them that appear in mining journals, are useful for certain kinds of investigation. A year ago I was looking up aluminium production, and the only information I could find on bauxite in Brazil was contained in the annual report of the St. John Del Rey Gold Mining Company, which I looked over purely from habit, and without any expectation of finding anything.

Hitherto I have not had enough references to collect for one piece of work to make it necessary for me to use any very elaborate scheme in keeping them. I do *not*, however, find the card index system adapted to my habits. I prefer to use a notebook and carry everything in it.

From a Sugar Chemist

We have to do the best we can with the limited means at our disposal I generally go about it in this way. My starting point is the indexes of *Chemical Abstracts*, first the decennial one, and then the succeeding annual ones, plus the current numbers. Any title which might have a bearing on the subject is looked up. I at once make cards, with cross references, which are arranged alphabetically according to subjects, and also alphabetically by authors. From 1907 back I use the *Zentralblatt*, as far as we have it at the Experiment Station, in exactly the same way as the *C. A.* Then I try to look up all the references which I can find here, and this usually results in a number of new titles referred to in the articles.

I do not know of any general bibliography on sugar, but I have found the decennial indexes of the *Z. Ver. Zuckerind.* and also the files of *Sugar Cane* and *Intern. Sugar J.* as well as the *Bulletins* of the Java, Hawaii and Louisiana Experiment Stations very valuable. There are no handbooks I know of which refer throughout to the original articles, except Von Lippmann's "Chemie der Zuckerarten."

During the last few years I have been paying particular attention to the colloid chemistry of cane sugar products, and in this connection I have found the complete files of the *Kolloid-Zeitschrift* and the *Kolloidchem. Beihefte* very useful, also the Reports on Colloid Chemistry issued by the British Assn. Adv. Science.

From an Organic and Biological Chemist

Chemical literature relates to three kinds of things: facts, technique and theory. To ferret out facts from the literature is frequently easy, especially if the facts desired relate to some concretely known subject, as tin or nitraniline. Matters relating to technique and theory or interpretation are oftener difficult to find. In any case the procedure in looking up any question in the literature is seldom just the same and differs according to the matter to be looked up and according to the reason for doing so.

A common reason for consulting the literature is that you have tried J. Jones' procedure for a certain chemical operation and have had some difficulty with it.

In this case what should be done? The first thing to be done is to find the original account of this procedure This is frequently rendered difficult owing to the fact that the average American or English chemical book gives very few references to sources. If, however, you will consult a German book of the same class you will generally find the reference to the original account. This should be studied carefully and sympathetically. If the original is in a foreign language, the notes taken should contain a verbatim account of the procedure in the original language and should be studied as to details given and omitted, as to quality and condition of reagents and especially as to carelessness in translation

Other things are also to be considered while reading the original description of the procedure. What was the state of mind of the author while writing the paper? Was he thinking in engineering terms or in mathematical terms? Was he writing briefly, as so many French writers do, or hurriedly so that he could easily omit important details? Many such questions should be thought of and considered while studying the original article or notes upon it. Meanwhile it is good to spend some time looking through the indexes to the abstract journals to find out if others have reported trouble with the procedure. Usually the indexes will contain headings under which the procedure in question will be classified. The reason for not doing this latter first is that it puts you in a critical state of mind toward the procedure and you lose something of the constructive impulse of desiring to make it work. If you fail to find criticisms of the procedure it means either that it is a reliable easy procedure or that no one else is using it. If it is not being used this may be due to ignorance of the procedure or to the fact that a better one is being used of which you are ignorant

If this study has solved the difficulty for you the urgency of your search is past. If the difficulty remains unsolved what you will do next will depend upon circumstances. Just one of these possible circumstances will be discussed here. Suppose you have failed to make this procedure work but that a successful procedure is desired if it can be found in the literature. It is well now to assume a negative critical attitude. You approach the literature as one who knows nothing about the subject in question and who must be convinced that this or that procedure is better than another.

Your search may now well be systematic You begin with the best text available. You then proceed to the manuals and handbooks. You list in your mind or on paper the various procedures and the advantages claimed for each. You note the materials and apparatus required and strike out those that are out of the question because of lack of, or inability to obtain, these materials. You then proceed to go through the best abstract indexes. The search may be as extensive and intensive as the library or your time permits

The answer to the question as to when one may stop searching the literature again varies with the case. In truth it may truthfully be said that one need never stop. On the other hand, work in the library will never make a chemist and is not a substitute for work in the laboratory. A suitable happy compromise is the wisest course. On continuing his search for aid in the library, things of interest and value are always found unless the searcher has a very narrow-gauge single-track mind. Of course as the systematic search is concluded haphazard methods may be adopted. Such methods will vary widely with the problem and

the ingenuity of the worker. No good rules or directions can be laid down. Most of this sort of search is intuitive. The searcher has completed his regular task or else has a few spare moments and takes up a volume somewhat automatically and turns pages. To say what book he has in hand or why he picked it up or what he expects to find is impossible. But presently a word catches the eye, it associates itself with some unanswered question in the reader's mind and he pauses to read a sentence, a paragraph or more. This is perhaps a fair description of how a mind that has made a systematic careful search continues the search of the literature. Such a method was much used by Wilhelm Ostwald, for instance, and was stated by him to be one of the most important factors in his success. However, here again one must be on his guard not to waste time merely. Whatever the permanent value of this habit may be it is probably the most delightful and refreshing part of this search of the literature which is often so laborious.

SECURING BOOKS, JOURNALS, BULLETINS, ETC.

Information as to the best way of obtaining access to the literature is found in various parts of this book. The ordering of books is discussed in Chapter II (p. 30). Obtaining journal articles is treated in Chapter III (p. 100). The List of Periodicals (Appendix 6) gives subscription prices and the prices of single numbers of journals, also the addresses of their publishers. Chapter IV describes the obtaining of patent specifications (p. 126). Chapter V gives the requisite data as to bulletins, theses and many other sources of information. Finally, Chapter VII tells how one may consult all these forms of literature in the libraries. It will be seen that, while a large and well equipped technical library is the ideal place in which to conduct a literature search, much can be done in less favored spots, and that the man in the out-of-the-way laboratory who is in need of any particular piece of information now has many resources at his disposal.

FILING CHEMICAL LITERATURE

The cataloging of books has been discussed under Libraries (p. 203), and the use of cards under Card Indexes (pp. 193 and 214). There are several books on library practice, and also books on indexing and filing, which may be obtained from any librarian. Let it suffice to mention here that pamphlets of all kinds, such as catalogs, bulletins and reprints are usually filed in one of the three following ways: (1) alphabetically by authors or dealers (may be accompanied by a subject index); (2) by serial numbers (accompanied by author and subject indexes); (3) by a classifying system such as is used for books (*e. g.*, Dewey decimal). Clippings and

articles on loose pages may be filed similarly but must first be inclosed in a folder or envelope, which is suitably labeled. Clippings are sometimes mounted on standard-size (*e. g.*, $8\frac{1}{2} \times 11$ inches) manila sheets for filing. The indexes may be of the card type or some other form. The Wilson Topical Index (Wilson Index Co., East Haddam, Conn.) is in book form.

FOREIGN LANGUAGES

One cannot advance far in any branch of science without being confronted with articles or books in foreign languages. The chemist might as well face the problem of learning to read them; otherwise they will dog him all his life. No one can afford to cut himself off from a knowledge of what the rest of the world is doing, or rely on abstracts and translations. Even those who have no taste for language study as such can acquire enough facility for their purpose. The English-speaker should give first attention to German, both because more chemical literature has been published in that language than in any other and because the Romance languages can usually be picked up with less study. French comes next. With a knowledge of English, German and French the chemist is pretty well equipped, and he will then find that he can, when necessity demands, tackle articles in Italian, Spanish, Dutch, etc. with more success than he is likely to expect. Some important chemical literature exists in Russian and Japanese but these languages most of us may never hope to master.[6]

How is the necessary knowledge to be **acquired?** The writer, as one who has been through the classical and modern language mill in the schools, believes that a good deal of time can be wasted on grammar. It is a valuable help to an adult, but it is really a special science. There is but one natural way to learn a language and that is to live in the midst of it. Americans are the worst linguists in the world because they come so little in contact with other tongues. Three months spent where German only is spoken

[6] A small amount of chemical literature has appeared in Esperanto, and it is quite possible that some day international abstracts will be published and international chemical congresses will be held in some easily learned auxiliary language. Esperanto has so many more adherents than any similar idiom and has demonstrated its practicability in so many ways that it seems likely to remain the leader in this field. Ostwald (see Appendix 1) has been a champion of Ido, which is in part an improved Esperanto. Idists are, however, much fewer in number than Esperantists.

is better than four years of ordinary college German. Many students who cannot go abroad could get room and board with an intelligent foreign family.

However, it is not necessary for the chemist to *speak* the foreign language. The way to learn to read it is—to **read** it. A beginning course will usually be the best approach. If he cannot get that, a beginning book will do. Then let him start off with the help of a dictionary and a grammar for reference and read a simple textbook on general chemistry or on some subject in which he is interested, say organic chemistry. The difficulty is not so great. In the first place, he is interested in the subject, which is a great advantage, and in the second, he will find that a great many scientific words are international. The preface or introduction is to be avoided at the start, for it is likely to prove far more difficult than the body of the book. Some sheer memorizing must be done. It is a bad habit to look up the same word over and over again in the dictionary. The writer has found it useful to have his students get small cards and write at one end the foreign word they wish to remember and at the bottom the English equivalent. These cards can be carried anywhere in the pocket. They should be learned until the student can give the English on seeing the foreign word, and *vice versa*. As the words are learned the cards can be put aside for review and new ones added. Others use an alphabeted notebook for the same purposes.

But the memorizing should not be allowed to prevent a good volume of reading. One should not stop too long over words. He should stumble ahead, trying to get as much of the sense as he can but not trying to make a finished translation. As an intermediate step many find it helpful to read aloud the translations of the words in the order in which they occur in the sentence. The goal constantly to be kept in mind is the ability to read the foreign language and get its full sense without any relation to English words whatever, and to do this rapidly; in other words, to **think in the new language.** Foreign pronunciations offer a difficulty. Psychologists tell us that even when we read silently our throat muscles go through their motions. If one can learn correct pronunciation from a teacher so much the better, but if not he should do the best he can. If he is afraid of forming bad habits he can even fabricate an absurd anglicized pronunciation which he knows is not correct, while waiting for an opportunity with a native

teacher. The writer did this in learning to read French, and considers that he had less to unlearn afterwards than if he had attempted to learn correct French pronunciation from a book, for the humorous pronunciations were readily discarded. But perhaps this is advice of doubtful merit. In any case, the learner should read, read, read. "Practice makes perfect." The same passages may be read over and over again if necessary till their meaning becomes familiar, but not to the extent of covering too little ground. Words will become familiar as they are met again and again in fresh reading and will begin to take on the fullness of meaning that comes only from sensing them in varied contexts. After a textbook or two, one may proceed to other books and original articles. The goal is not attained till one is able, not merely to read straight away but to scan whole paragraphs and glance through the text for what is really wanted.

It is evident that one can "kill two birds with one stone" and gain much chemical knowledge in the above process as well as the ability to read. The broader one's knowledge can be of the general literature of the language the better, but chemical material must be read, too, since its special vocabulary must become familiar.

The making of a **smooth translation** into one's native language should also be cultivated as a valuable training in expression. Some chemists who read German or French readily cannot state in good English what they have read. It is necessary to know the exact native equivalent of technical terms in foreign languages, and it is highly desirable to be able to express the meaning of whole passages clearly and promptly.

Several **helps** to acquiring German and French have been published for the benefit of the English-speaking chemist. Information about them will be found in Select List 2M (Appendix 8).

Chemical **books** in foreign languages can be obtained from any dealer in foreign books or can be ordered direct from the foreign publisher (for addresses of publishers and dealers, see Appendix 7). The titles of many German and French books are given in the Select Book List, Appendix 8 (this does not include very many small beginning texts). It is possible in many cases to get a foreign book and its English translation. Benrath's "Chemische Grundbegriffe" is available in inexpensive form in Harrap's Bilingual Series, with German and English on opposite pages.

NOTES

By E. J. Witzemann[7]

The Old Literature

Many chemists and others nowadays say that if nothing has been written upon a subject within the past ten years, that subject is dead and it is unnecessary to go farther back. It must all be reinvestigated. Some of them at times suggest that if all books and works of art could be destroyed every ten years man would be greatly benefited. None of this is true, in chemistry at least.

At one time a chemist desired to obtain a certain metallic "salt" of common sugar. The handbooks mentioned these salts but gave no references. The abstract indexes for many years back gave no references. No book or source of information that could be regarded as modern or up to date was of any value. Finally some old out-of-date handbooks that our grandfathers used to swear by were examined more by accident than intent and the information was found. References to original papers were given. An abundant but old literature was opened up, which because of little interest and no recent revisions had gradually dropped out of sight in recent times. Of course the conclusions are still being transferred from one book to the other but the data upon which they rest were long ago left behind.

Reflection on this presently leads one to see that theories change with the seasons but that facts do not. Theories are structures built of facts cemented together with some idea. The stones may be used in any theoretical structure into the form and pattern of which they fit. Theories are therefore changeable like the seasons or fashions while facts are perennial. These are wholesome lessons to be learned from the older literature.

Technique

This aspect of chemical knowledge is usually handed down from teacher to pupil. It constitutes the "trade secrets," if there are any, of the chemical profession and together with secret formulas caused early chemists to be regarded as followers of the "black art." In modern days owing to large classes the teacher has minimum opportunity to develop and perfect his own technique

[7] Contributed to this book.

and to transmit what he has to his pupils. This is perhaps part of the reason that so much attention is given by teachers to theory. Theory can be presented well to classes but technique is a matter of practice and is really only well presented through the hands of the master to the hands of the apprentice. That the teaching of technique also requires attention has gradually come to be realized more clearly and the need is being met in part. In recent years more and more books relating primarily to technique have been prepared. Unfortunately most of these books are still in German. They usually have titles containing the word "Arbeitsmethoden" to distinguish them from the books dealing primarily with facts or theory. From these books the thoughtful students may learn many tricks of technique that his teachers themselves have not learned. Extensive books of this kind are available in organic, inorganic and biological chemistry.

It must not be forgotten that this aspect of chemistry is the most difficult part to reduce to writing and it is to be hoped that the way will soon again be opened so that the teacher and pupil can work in the laboratory of the master and acquire much of his technique by personal contact.

What to Remember

What should a working chemist try to remember? Of course in the beginning some of us wish to remember everything. We soon learn that selection is necessary if one wishes to remember the things that he has need for. Naturally that fund of information which is in use by the worker should be remembered or reduced to an orderly written record for ready reference. Besides this, however, the habit of looking at books of all kinds closely or remotely related to chemistry should be developed. The subject matter of the book and its general scope should be fixed in mind. The title and author's name need not necessarily be remembered accurately because these can be recalled when looking at the catalog. Handbooks should be examined with considerable care to determine how complete they are, whether the author is a compiler or whether he is biased, whether many references are given, etc. The titles of journals of all kinds together with the character of their contents should be learned. Such things can often be done in spare or idle moments. They result in a catholicity of interests and knowledge, which is growing rare in

this age of intense specialization, but which is bound to be a valuable personal asset.

The History of One's Subject

It is rather surprising to some people that the best exponents of the most recent developments of any line of human thought are the most deeply versed in the history and significance of the older work in the line of thought. This is so often true that it is almost a rule. Of course, individuals will occasionally be found with a mass of facts and no outlook but generally if you want a vital glowing account of the history of a subject, go to an advanced thinker in that subject. In some ways it is apparently a case of action and reaction. The historically interested student vitalizes the history of his subject and it in turn vitalizes him. He goes to the literature or records to get facts and gets them together with inspiration.

This theme could be developed most interestingly and at length but enough has been said to point the moral for chemists. Go to the past and the rebound with which you come back will drive you out into the future. Repeat this course often enough and the path you break will become the road for progress in your subject.

CHRONOLOGICAL TABLE OF ABSTRACTS AND REPORTS OF CHEMICAL INTEREST

The following table of some of the more important serials publishing abstracts and summaries gives the dates of the periods during which they have appeared and the fields covered. The dates in italics refer to collective indexes. By this arrangement one can tell at a glance what publications are available for any period back to 1779 which he may wish to cover and at the same time, from the field covered, he can judge whether or not a given publication is at all likely to yield the particular information wanted.

1779–1786. *General.* Crell's Chemisches Journal (1779–81) and Die Neuesten Entdeckungen in der Chemie (1781–86).

1784–1803. *General.* Chemische Annalen (Crell).

1785–1787. *Pharmacy.* Magazin fur Apotheker (Elwert).

1790–1796. *General.* Repertorium für Chemie (Elwert).

1795–1840. *Pharmacy.* Berlinisches Jahrbuch für Pharmacie (annual).

1803–1818. *Agriculture.* Archiv der Agrikulturchemie (Hermbstaedt).

1807–date. *Mineralogy, etc.* Jahrbuch für Mineralogie, Geologie und Paläontologie (now with "Neues" prefixed). Annual. Ten-year indexes *1830–79,* five-year indexes *1880—.*

1815–1876. *Pharmacy.* Repertorium fur die Pharmacie (Gehlen). *1815–48.*

1820–date. *Industrial.* Dinglers polytechnisches Journal. *1820–40, 1841–50, 1851–60, 1861–70.*

1821–1847. *General.* Berzelius' Jahresbericht (annual). For continuation see 1847–1915, Liebig and Kopp.

1830–date. *General.* Chemisches Zentralblatt (called Pharmaceutisches Centralblatt 1830–50, and Chemisch-Pharmaceutisches Centralblatt 1850–55). Applied chemistry not covered before 1919. Semiannual author indexes. Subject indexes now annual. Formula indexes 1925–date. *1870–81, 1897–1901, 1902–06, 1907–11, 1912–16, 1917–21.*

1847–1915. *General.* Liebig and Kopp's Jahresbericht uber die Fortschritte der Chemie und verwandter Teile anderer Wissenschaften (annual). Continuation of Berzelius' Jahresbericht. *1847–56, 1857–66, 1867–76, 1877–86, 1887–96, 1897–1906.*

1855–date *Industrial.* Jahresbericht über die Leistungen der chemischen Technologie. *1855–64, 1865–74, 1875–84, 1885–94, 1895–1904.*

1858–date. *General.* Bulletin de la société chimique de France. *1858–74, 1875–88, 1889–98, 1899–1906, 1907–1916.*

1862–date. *Analysis.* Zeitschrift fur analytische Chemie. *1862–71, 1872–81, 1882–91, 1892–1901, 1902–1911.*

1868–1896. *General.* Berichte der deutschen chemischen Gesellschaft. *1868–77, 1878–87, 1888–96.*

1869–date. *Ferrous metals.* Journal of the Iron and Steel Institute.

1871–1925. *General.* Journal of the Chemical Society (London). (For continuation see 1926–date, British Chemical Abstracts). *1841–72, 1873–82, 1883–92, 1893–1902, 1903–12, 1913–22.*

1872–date. *Agriculture.* Zentralblatt fur Agrikulturchemie (Biedermann). *1872–96, 1897–1906*

1877–1919. *Physical science.* Beiblätter zu den Annalen der Physik.

1877–date *Analysis* The Analyst *1877–96, 1896–1905, 1906–15, 1916–25.*

1877–date *General.* Chemisch-technische Uebersicht (supplement to Chemiker-Zeitung; formerly called Chemisch-technisches Repertorium).

1882–1925 *Industrial* Journal of the Society of Chemical Industry. (For continuation see 1926–date, British Chemical Abstracts) *1882–95, 1896–1905*

1884–date. *Dyes, etc* Journal of the Society of Dyers and Colourists.

1887–1918 *Industrial* Zeitschrift fur angewandte Chemie (Zentralblatt fur technische Chemie). *1887–1907.*

1889–date *Agriculture.* Experiment Station Record. *1889–1900, 1901–1911, 1911–1918.* Earliest volumes not a complete survey.

1890–date. *Gas.* American Gas Association Bulletin of Abstracts.

1891–date. *General.* Jahrbuch der Chemie (Meyer). *1891–1900.*

1895–1906. *General.* Review of American Chemical Research. In Technology Quarterly during 1895–1901 and in the Journal of the American Chemical Society during 1897–1906. Discontinued when Chemical Abstracts began. American work only.

1898–date. *Physical science.* Science Abstracts.

1902–date. *Biochemistry.* Berichte über die gesamte Physiologie und experimentelle Pharmacologie (called Biochemisches Centralblatt 1902–09, and Zentralblatt für Biochemie und Biophysik 1909–18).
1904–1919. *Radioactivity.* Le Radium.
1904–date. *Metals.* Revue métallurgique.
1906–date. *Colloids.* Kolloid-Zeitschrift.
1906–date. *Leather.* Journal of the American Leather Chemists' Association. *1906–15.*
1907–date. *General.* Chemical Abstracts. *1907–16, 1917–26.* Annual formula indexes 1920–date.
1908–date. *Ceramics.* Transactions of the Ceramic Society (London).
1908–date. *Sugar.* International Sugar Journal.
1909–date. *Nonferrous metals.* Journal of the Institute of Metals. *1909–21.*
1910–date. *Textiles, etc.* Journal of the Textile Institute.
1911–date. *Metals.* Zeitschrift für Metallkunde (called Internationale Zeitschrift fur Metallographie 1911–18).
1912–date. *Leather.* Collegium.
1914–date. *Petroleum.* Journal of the Institution of Petroleum Technologists. *1914–23.*
1915–date. *Internal secretions.* Endocrinology.
1915–date. *Photography.* Eastman Kodak Co. Monthly Abstract Bulletin. Numerical classification, with author indexes.
1916–1926. *Bacteriology, etc.* Abstracts of Bacteriology.
1916–date. *Biochemistry.* Physiological Abstracts.
1917–date. *Glass.* Journal of the Society of Glass Technology.
1917–date. *Leather.* Journal of the Society of Leather Trades' Chemists.
1918–date. *Ceramics.* Journal of the American Ceramic Society.
1918–date. *Industrial.* Chimie & industrie.
1919–1926. *Plant chemistry.* Botanical Abstracts. *1919–22.*
1919–date. *Sanitation.* Journal of Industrial Hygiene.
1919–date. *Water.* Journal of the American Water-Works Association.
1920–date. *Fuels.* Brennstoff-Chemie.
1920–date. *Mineralogy.* Mineralogical Abstracts (quarterly appendix to Mineralogical Magazine). Covers 1915 on.
1920–date. *Physical science.* Physikalische Berichte.
1921–date *Photography.* Photographic Abstracts (quarterly). Author indexes only.
1926–date. *Biochemistry.* Biological Abstracts.
1926–date. *General.* British Chemical Abstracts. In two series, A (pure) and B (applied), continuing respectively the abstracts of the *J. Chem. Soc.* and the *J. Soc. Chem. Ind.*

APPENDIX 1.

BIBLIOGRAPHY OF ARTICLES RELATING TO CHEMICAL LITERATURE* 1907–1926

Allen, W. E. Repositories for scientific publications *Science* **56**, 197–8(1922). Discusses the question of repositories for records too detailed to publish.

Armistead, Lewis A., and others. Reports of the trade catalog committee and subcommittees. *Special Libraries* **14**, 112–14 (1923). Report of an effort to secure information and standardize practice on collections of trade literature. See Chap. V, p. 142.

Bacon, R. F., and others. Research in industrial laboratories. *Science* **45**, 34–9 (1917). A committee report calling attention to the need for courses on chemical literature and its use (pp. 36–7).

Barbour, W. The organization of a factory library. *J. Soc. Chem. Ind.* **38**, 37–40R (1919). Describes a system of classifying and indexing.

Barrows, Frank E. Investigations of the chemical literature. *Chem. Met. Eng.* **24**, 423–8, 477–9, 517–21(1921), *C. A.* **15**, 1234. A valuable general survey.

Bigourdan, G. French national bibliography project. *Compt. rend.* **177**, 989–92 (1923).

Bishop, Wm. Warner. The record of science. *Science* **56**, 205–16 (1922). Stresses the importance of bibliography in science and discusses the problems of American scientific libraries Predicts cooperation in buying and exchanging publications.

Cade, Arthur R. Chemical literature course at the University of Pittsburgh. *Crucible* (Pittsburgh) **6**, 80–1(1923)

Searching chemical literature. *Chem Met. Eng.* **29**, 799(1923). Annotated list of references on sources of information

Clifford, F. W. The library of the Chemical Society. *J Soc. Chem. Ind.* **40**, 424–6R (1921). Descriptive of the character and scope of the collection and of the facilities available for searches.

Cockerell, T. D. A. The indexing of biological literature *Science* **57**, 22–3(1923)

Committees on bibliographic work, International Union of Pure and Applied Chemistry. Reports. Published in the *Comptes rendus of the Union* (Jean Gérard, 49, rue des Mathurins, Paris), 1920—. (See also Gérard, Jean)

Crane, E. J. Chemical research in the various countries of the world. *J. Ind. Eng. Chem* **10**, 236–7(1918); **11**, 378 (1919); **16**, 754(1924) Gives data on the relative volumes of literature published by the principal nations, as shown by *Chemical Abstracts* for 1913, 1917, 1918 and 1923.

Current literature located. *J. Ind. Eng. Chem.* **14**, 1003(1922). Calls attention to the "List of periodicals abstracted by *Chemical Abstracts* "

The journal literature of chemistry. *J Ind. Eng Chem.* **14**, 900–4(1922); *C. A.* **16**, 3561 On exactness in writing, the distribution of journal literature, indexes and how to use them.

Curran, Carleton E. Classification, filing and indexing system for pulp and paper library. *Paper* **28**, No. 19, p. 9; No. 20, p. 17, No 21, p 17(1921). Includes a Dewey decimal classification for pulp and paper (modification and expansion of 676).

Cushman, A. S. Chemistry and American industry. *J. Franklin Inst.* **183**, 557–74 (1917); *C. A.* **11**, 1729.

Cushman, Josephine. A library for the

* For books on chemical literature see Select List 2N, Appendix 8. For lists of periodicals, see Appendixes 4 and 6.

rubber industry. *Rubber Age* **7**, 195–8 (1920).

Dammann, Kurt. Question of the organization of chemical literature. *Z. angew. Chem.* **25**, 1614–23(1912) An interesting general survey, with special discussion of abstract journals.

Dannerth, Frederic. Legal and official chemistry. *Chem. Met. Eng* **24**, 397–9 (1921). On obtaining information on custom house practice, fire and transportation hazards, patents, etc

Donaldson, H. H. More complete titles. *Science* **45**, 190(1917).

Donker-Duyvis, F. Decimal classification of *Chemisch Weekblad. Chem. Weekblad* **18**, 142–4(1921) Explains the system of the Institut International de Bibliographie of Brussels

International documentation relating to pure and applied chemistry. *Compt. rend. de la troisième conférence internationale de la chimie, Lyon,* **1922**, pp. 93–105. A Dutch report recommending the establishment of several central bureaus of chemical literature and the creation of systematic catalogs, indexes, etc.

Dox, Arthur W. The preparation and publication of research papers. *Am. J Pharm* **95**, 356–61(1923)

Dunsheath, P. Scientific literature and industrial research. *Electrician* **85**, 570 (1920). The importance is emphasized of properly filing and indexing scientific publications.

Dyrenforth, Lee, Chritton and Wiles. The organization of the Patent Office *Chem. Bull.* (Chicago) **9**, 93–4(1923) Discusses the classifications of most interest to the chemist

Eason, A. B. Coördination in libraries and abstracts. *Electrician* **85**, 471–2(1920) Suggestions for attaining better and faster dissemination of technical knowledge.

Sources of technical information. *Electrician* **82**, 326–7(1919). On sources of scientific information in the English language to consult when practical problems arise

Escher, Paul. Some observations on chemical bibliographies. *Chem. Bull* (Chicago) **7**, 43–5, 73–7(1920) Notes on the use of literature, with a list of important books and periodicals

Ferguson, Wm. C. A plan for organized research and analytical chemistry in successful chemical manufacturing. *J. Ind. Eng. Chem.* **4**, 905–8(1912). Contains remarks on literature searches. A review of the literature saves repetition of work, supplies suggestions and enlarges one's general knowledge of the subject

Fricker, F. The library of the chemical laboratories of the B. F Goodrich Co. *Special Libraries* **6**, 82–3(1915)

Frydlender, J. H. The international chemical index and the reproduction of documents. *Rev prod. chim.* **25**, 73–8(1922). A general discussion of literature searching and of obtaining desired articles.

International classification of bibliography. *Rev. prod. chim.*. **23**, 687–96 (1920); *C. A.* **15**, 793. International decimal indexing is discussed in detail.

Fulcher, Gordon S. Indexing of scientific articles. *Natl. Research Council, Reprint and Circ. Series,* No. **34**, 16 pp. (1922). Emphasizes the importance of a thoroughly classified subject index, based on the contents of the original articles

Scientific abstracting. *Science* **54**, 291–5 (1921).

The usefulness of analytic abstracts. *Science* **56**, 678–80(1922). Returns from 805 readers show that carefully edited abstracts accompanying original articles are decidedly useful.

Furfey, Paul Hanly. Literature citations. *Science* **63**, 231–2(1926) Concerns form in making citations

Gallup, F. L. Library service in the chemical department and chemical department laboratories of E. I. du Pont de Nemours & Co. *J. Ind. Eng. Chem.* **11**, 588–9(1919); *Special Libraries* **10**, 98–100(1919) Describes the activities of the five libraries of the department, and how they cooperate.

Gérard, Jean. The fourth international congress of chemistry. *Ind. Eng. Chem.* **15**, 1082–5(1923). Contains (p 1083, IV and VII) abstracts of reports of committees on bibliography of the International Union of Pure and Applied Chemistry. (See also the *Comptes rendus* of the Union.)

Greenman, E. D. The chemist and his library *Special Libraries* **9**, 194–5(1918) On the importance of the chemical library to the modern chemist and the need of instruction in bibliography for undergraduates.

The functions of the industrial library. *J. Ind Eng Chem.* **11**, 584(1919); *Special Libraries* **10**, 189–91(1919). A description of the activities of the library of Arthur D. Little, Inc.

Technical literature and how to use it.

Special Libraries **9**, 89(1918). Judging the value of books. Literature indexes, lists of bibliographies, etc.

Technical literature in reconstruction. *Special Libraries* **10**, 12–14(1919). Urges emulation of German literature production.

Grossman, H. The importance of the study of foreign languages for chemical education. *Z. angew. Chem.* **32**, I, 327–8(1919)

Thoughts and recollections in connection with the Deutsche Chemische Gesellschaft's fifty years of existence. *Chem.-Ztg.* **42**, 169–70(1918). Historical review, including the literary activities of the Society.

Gudger, E. W. On the proper wording of the titles of scientific papers. *Science* **60**, 13–15(1924). A plea for fuller and more accurate titles.

Hamor, W. A. Bibliography, the foundation of scientific research *Special Libraries* **14**, 17–21(1923); illus. Emphasizes the importance to research of the systematic use of scientific literature Describes the Mellon Institute and its library, and the course in chemical literature in the University of Pittsburgh.

Hamor, W. A., and others. Chemical reading courses. *J. Ind Eng. Chem.* **12**, 701–5, 806–12(1920). Lists of books in English, with comments

Hanauer, J. Decimal classification and chemistry. *Chem.-Ztg.* **45**, 389(1921). On the system of the Institut International de Bibliographie at Brussels.

Hansen, Hugo V. A system of laboratory notes. *Ind. Eng. Chem.*, News Ed., **2**, No. 17, 2–3(1924). Describes a loose-leaf notebook system for keeping track of a varied line of analytical and research work in an industrial plant.

H. G. The status of chemical publications in Germany, France and England during the war. *Chem. Ind.* **38**, 241–2(1915).

Hibbert, Harold. The art of searching chemical literature *Chem. Met. Eng.* **20**, 578–81(1919) A general survey with lists of chemical publications recommended for use in searches.

Hill, Edwin A. The card index to chemical literature of the United States Patent Office *J Am. Chem. Soc.* **34**, 416–8 (1912). (See also *H. R. Document* 1110, 62d Congress, 3d session, pp. 599–618.) Describes the progress of the index since 1907 (now contains about 1,200,000 cards).

The chemical card index of the Patent Office. *J. Am. Chem. Soc.* **29**, 936–41 (1907). Describes the formula index system devised by the author, and the card index in which it is used.

Hosmer, Helen R. Some axioms of service in the use and abuse of special libraries. *J. Ind. Eng. Chem.* **11**, 582–3(1919). What the technical librarian may and should do for consultants.

Indexing current chemical literature. *Mining Sci. Press* **123**, 180–2(1921). A long editorial.

Jacob, W. F. The technical library and its use. *Polytech. Eng.* **16**, 36(1916).

Jacobson, Paul. The Adolph Baeyer Gesellschaft zur Förderung der Chemischen Literatur. *Z. angew. Chem.* **33**, I, 177–80(1920). Discusses the publications of the Deutsche Chemische Gesellschaft.

Jessop, E. N. German patent bibliography. *J Ind. Eng. Chem.* **8**, 1053–4(1916) How to find the specification data of a German patent.

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APPENDIX 2

SYMBOLS AND ABBREVIATIONS USED IN CHEMICAL LITERATURE

In the following list unclassified symbols come first, then letters of the Greek alphabet in order, and finally Roman letters and abbreviations. The list includes many abbreviations for words that occur frequently in the titles of journals, as *Am.* and *Amer.* for American, *Ann.* for Annales, Annalen, etc., and *Soc.* for Society, Société, etc. By making use of these one can often decipher the title of a journal from its shortened form. The complete abbreviations adopted by the International Union of Pure and Applied Chemistry for journal titles are not included; they will be found in the List of Periodicals, Appendix 6.

The abbreviations in the present list are from various languages, but it has not been thought necessary to use the labels "German," "French," etc. English translations have been given in cases where the meanings of foreign words are not readily apparent.

= gives, forms, is equal to, equals
→ gives, passes over to, leads to.
⇄ forms and is formed from (reversible reaction).
≏ is equivalent to.
> is greater than; above
< is less than; below.
\+ plus, and, reacting with
− minus, less.
* asterisk, star (used to mark asymmetric carbon atoms).
′ prime; feet, ft.
″ second, inches, in.
(+) in Gegenwart von (in presence of).
° degree(s), vo (as, 8° or 8vo, octavo).
% per cent.
%ig. prozentig (per cent).
‰ig. promillig (per mille, per thousand).
ЖК *Journal of the Russian Physical-Chemical Society.*
α (alpha) degree of dissociation; angle of optical rotation; coefficient of linear or cubical expansion.
[α] specific rotatory power.
α- alpha- (1st in order or position).
β- beta- (2d in order).
γ (gamma) surface tension; ratio of specific heats; ionization; Newtonian gravitational constant.
γ- gamma- (3d in order)
Δ (delta) diffusion coefficient
δ (delta) density.
δ- delta- (4th in order)
ε (epsilon) dielectric constant, electrode potential.
ε- epsilon- (5th in order)
ζ- zeta- (6th in order)
η (eta) viscosity.
η- eta- (7th in order)
θ (theta) angle (plane), temperature Centigrade.
θ- theta- (8th in order)
ι- iota- (9th in order).
κ (kappa) electrical (volume) conductivity, magnetic susceptibility.
κ- kappa- (10th in order).
Λ (lambda) equivalent conductivity
λ (lambda) wave length.
λ- lambda- (11th in order).
μ (mu) micron (one millionth of a meter); molecular conductivity; magnetic permeability.
μ- mu- (12th in order).
μμ micromicron (one millionth of a micron).
ν (nu) frequency.
ν- nu- (13th in order).
ξ- xi- (14th in order).

o- omicron- (15th in order)
π (pi) ratio of circumference to diameter; osmotic pressure.
π- pi- (16th in order).
ρ (rho) refractive power
ρ- rho- (17th in order).
Σ (sigma) summation.
σ (sigma) Stefan's constant; surface tension; thousandth of a second.
σ- sigma- (18th in order).
τ- tau- (19th in order).
υ- upsilon- (20th in order)
φ (phi) fluidity, angle, aryl radical, specif. phenyl.
φ- phi- (21st in order).
χ- chi- (22d in order).
ψ- pseudo-; psi- (23d in order)
ω- omega- (denoting end or last, or side-chain position)
[ω] specific magnetic rotatory power
A atomic weight, maximum work, abaissement (lowering).
a- asymmetric.
A argon.
A *Annalen der Chemie* (Liebig's); Annales; Abstracts in the *Journal of the* (London) *Chemical Society* or part A of *British Chemical Abstracts;* Alkohol, Analyse (analysis).
Ä Äther (ether)
Å Ångstrom unit(s)
a. asymmetrisch (asymmetric)
A. A. I. *Atti della reale accademia nazionale dei Lincei.*
a. a. O. an anderen Orten (elsewhere), an angefuhrten, or angegebenen, Orte (in the place cited)
Abd. Rk. Abderhaldensche Reaktion (Abderhalden's reaction)
Abh., Abhandl Abhandlungen (papers, transactions)
abs., absol absolut, absolute
abst., abstr. abstract
Ac actinium; acetyl
Ac. Academy, Académie
ac. acide (acid).
a. c. alternating current
Acad. Academy, Académie
Accad. Accademia (Academy)
acct. account
Ac-Em actinium emanation, actinon
A ch Annales de chimie (et de physique)
Act actinium.
addn. addition
ad. lib. (ad libitum) at pleasure, as desired
Å. E. Ångströmeinheit (Ångstrom unit)
Ae Aether (ether)
A. G. Atomgewicht(atomic weight); Aktiengesellschaft (joint-stock company).
Ag silver
Agr., Agri., Agric. Agricultural; Agriculture.
aig. aiguilles (needles).
Ak., Akad. Akademie (academy)
akt. aktiv (active).
Akt.-Ges Aktiengesellschaft (joint-stock company).
Al aluminum.
alc. alcohol, alcool
ald. aldéhyde, aldehyde.
Alk. Alkohol.
alk. alkali, alkaline.
alkal. alkalisch (alkaline).
alkoh. alkoholisch (alcoholic).
alky. alkalinity.
allg allgemein (general)
a. m forenoon.
Am amyl.
Am American; *American Chemical Journal*
Amer. American
amp ampere(s)
amp.-hr ampere hour(s)
Am. Soc *Journal of the American Chemical Society.*
Amst. *Proceedings of the Royal Academy of Sciences of Amsterdam*
amt. amount.
amts. amounts.
An. Anales (annals), Anmerkung (remark).
an anorganisch(e)
Anal. Analyse (analysis)
anal. analytical, analytique, analytisch(e), anales (annals).
ang., angew. angewandt, – e (applied)
anh anhydride; anhydrous
anhyd. anhydrous
Anm Anmerkung (note, remark)
Ann Annalen, Annales, Annali, Annals; specif., *Annalen der Chemie* (Liebig's); Annual, Annuaire
anom anomal (anomalous).
anorg. anorganisch, -e (inorganic)
Anw. Anwendung (employment, use)
Anz. Anzeiger.
A. P. Amerikanisches Patent, Austrian Patent
Ap. Apotheker (druggist)
A. Ph. *Annales de physique*
App. Apparat (apparatus)
app apparatus
appl applicata, appliqué (applied)
approx. approximate, approximately.
A. Pth *Archiv fur experimentelle Pathologie und Pharmakologie.*
Aq, aq water, H_2O
aq aqueous; water.
aq. dest. (aqua destillata) distilled water
Ar *Archiv der Pharmazie*
Arb. Arbeiten (works, pieces of work)
Arch. Archief, Archiv, Archives, Archivio.
Arch. Gen *Archives des sciences physiques et naturelles,* Genève

Arch Néerl *Archives néerlandaises des sciences exactes et naturelles*
as- asymmetric.
A. S. Ampère-Stunde (ampere hour)
As arsenic.
Asoc. Asociación (association).
Assn. Association
asym. asymmetric, asymétrique, asymmetrisch
asymm. asymmetric, asymmetrisch
At Atom (atom), Atmosphare (atmosphere).
at. atomic
At.-% Atomprozent (atomic per cent).
At.-Gew. Atomgewicht (atomic weight).
äth., äther. ätherisch (ethereal)
atm. atmosphere(s), atmospheric
Atomgew. Atomgewicht (atomic weight)
at. wt. atomic weight.
Au gold.
a. u. a. auch unter andern (also among others).
Aufl. Auflage (edition)
ausg ausgegeben (produced, edited, etc).
Aust. P. Australisches Patent (Australian Patent).
av. average; avoirdupois
ä. W. äussere weite (outside diameter)
AZ. Acetylzahl (acetyl number)
Az azote (nitrogen)
B boron.
B. Bildung (formation), *Berichte der deutschen chemischen Gesellschaft*, Baumé.
b. boils at, boiling at
B. A. (balneum arenae) sand bath.
Ba barium.
Bact. Bacteriology.
bacteriol. bacteriological
B & S. Brown & Sharpe (wire gage)
Bastand. Barometerstand (height of barometer).
B. A. U. British Association unit.
bbl. barrel, barrels
Bd. Board; Band (volume).
Bde. Bande (volumes).
Be beryllium.
Beibl. Beiblatter (supplements)
Beih. Beihefte (supplements)
Beitr. Beitrage (contributions), Beitrag (contribution).
Belg. Belgian, Belgisch; Belgium, Belgique.
Ber. Berichte (reports); specif , *Berichte der deutschen chemischen Gesellschaft.*
ber. berechnet (calculated).
Berl. Ber Berliner Berichte (*Berichte der deutschen chemischen Gesellschaft*).
Best., Bestimm. Bestimmung (determination).
betr. betreffend (concerning)
bez., bezw beziehungsweise (respectively, or)
Bg Balling
b.h.p., b.hp., B H P brake horse power
Bi bismuth.
bibl. bibliothèque (library), bibliography.
Bild., Bildg. Bildung (formation).
Bioch., Biochem. Biochemical, Biochemische
Biol , biol biological, biologisch(e), biology.
Bio. Z. *Biochemische Zeitschrift.*
Bl. Bulletin; specif., *Bulletin de la société chimique de France.*
Bl. Belg. *Bulletin de la société chimique de Belgique.*
blf blätterformig (in leaflets or flakes).
Blg P. Belgisches Patent (Belgian Patent).
Blt Blattchen (leaflets, lamellas).
B.-M. bain-marie (water bath)
Boll. Bolletino (bulletin).
B. O. T. Board of Trade
Bot. Botanicsh, Botanical; Botany
B. P. British Pharmacopeia
b. p. boiling point(s).
B Ph British Pharmacopeia
B Ph P *Beiträge zur chemischen Physiologie und Pathologie.*
Br bromine.
Brit British
Bros Brothers
B th u British thermal unit(s)
B T.U , B t u British thermal unit(s), Board of Trade unit
Bu butyl.
bu. bushel, bushels
Bul Buletinul (bulletin), Bulletin
Bulet Buletinul (bulletin).
Bull Bulletin.
Bur Bureau
B W G Birmingham wire gage.
Bz benzoyl.
Bz. Benzol (benzene)
bzgl. bezuglich (respecting).
Bzl Benzol (benzene)
Bzn Benzin (benzine)
bzw beziehungsweise (respectively, or)
C concentration; molecular heat; capacity.
c specific heat; velocity of light in free space.
c_p specific heat at constant pressure.
c_v specific heat at constant volume.
C carbon.
C. Zentralblatt, Centralblatt; specif , *Chemisches Zentralblatt;* Centigrade, cathode.
c. centimètre, centimeter.
C. A. *Chemical Abstracts;* coefficient d'abaissement (coefficient of freezing-point lowering).
Ca calcium.
ca (circa) about, approximately.
c.-à-d c'est-à-dire (that is to say, that is, i. e.).
Cal. (large, or kilogram) calorie(s); Calico.

cal. calorie(s).
calc. calculate.
calcd. calculated.
calcg. calculating.
calcn. calculation.
Can. Canadian.
Cb columbium.
cbcm. cubic centimeter(s).
cbm. cubic meter(s), cu m
cc., c.c., c.cm. cubic centimeter(s).
cca. (circa) about.
Cd cadmium.
c. d. current density (or densities).
Ce cerium.
Cel. Celsius.
Cent. Centigrade.
cent. centième (hundredth), centime (1/100 franc).
cent cub. centimètre cube (cubic centimeter, c c)
Centr Centralblatt
cf (confer) compare
cg, cgm centigram(s).
C. G. S., cgs. Centimeter-gram-second system.
Ch. Chemistry, Chemie, Chimie, Chemical, Chemisch, Chimique
ch chapitre, chapter
chem chemical, chemisch
Chem Chemical, Chemisch, Chemists, Chemiker.
Chem. N *Chemical News.*
Chem.-Ztg. *Chemiker-Zeitung.*
Ch. I. *Chemische Industrie.*
chim. chimico, chimie, chimica, chimique (chemistry, chemical).
Ch. Ind. *Chimie & industrie.*
Chlf. Chloroform.
Ch. N. *Chemical News*
Ch Z. *Chemisches Zentralblatt; Chemiker-Zeitung*
Cie., C^{ie} Compagnie (Company, Co).
Cim. *Nuovo cimento.*
cir. circular.
Circ. Circular.
Cl chlorine.
cm. centimeter(s)
cm^q, cm^2 square centimeter(s).
cm^c, cm^3 cubic centimeter(s).
Co cobalt.
Co. Company.
coeff. coefficient.
coeffs. coefficients.
Col. Color, Colour; Colorant, Coloring; Colorist
Coll. College.
com. commercial.
comb. combinaison (compound, combination).
compd. compound.
compn. composition.
Compt rend. Comptes rendus (reports); specif., *Comptes rendus hebdomadaires des séances de l'Académie des Sciences.*
conc. concentrate; concentrated, concentré
concd. concentrated.
concn. concentration.
cond. conductivity
condens. condensation.
conf. compare, see, cf.
const. constant.
cont. continued; continental.
contg. containing.
cor. corrected.
corr. corrected, corrigé, corrigiert
corresp. correspondant (corresponding).
cos cosine.
cosec cosecant.
cosh hyperbolic cosine.
cot cotangent.
C. P. chemically pure.
c p, cp. candle power.
Cp cassiopeium (lutecium)
C r, C. R, CR = *Compt rend*, above
Cr chromium
crist. cristaux (crystals)
cristall. cristallisation (crystallization)
crit. critical
crys. crystal
cryst. crystalline.
crystd. crystallized.
crystn crystallization
C S current strength.
Cs cesium
Ct celtium (hafnium).
Cu copper.
cu. cubic.
cu. ft. cubic foot (feet).
cu. m. cubic meter(s).
cwt hundredweight.
Cy cyanogen, CN
cycl cyclisch (cyclic).
C Z. *Chemisches Zentralblatt*, Cellulosezahl (cellulose number)
D density
d diameter; total differential, density
d_c critical density
d- dextro-, dextrorotatory
D Dichte (density) Deutsch (German), *Dingler's polytechnisches Journal.*
d. density, penny, pence; des, der (of the); der, die, das, den (the); etc.
dad. gek. dadurch gekennzeichnet (distinguished, or characterized, by this).
dam. decamètre, decameter
Dan. P. Dänisches Patent (Danish patent)
Darst Darstellung (preparation)
d. c. direct current.
dch. durch (through, by).
D. D. Dichten (densities).

DD. Dampfdichte (vapor density).
DE. Dielektrizitätskonstante (dielectric constant).
déc. décomposition.
decompn. decomposition.
deg. degree(s).
Denkschr. Denkschriften (memoirs).
Dep., Dept. Department
depur. (depuratus, -a, -um) purified
Der. Derivat (derivative)
dér. dérivé (derivative, derived).
deriv. derivative.
Deriv. Derivat (derivative).
des. desmotropic, desmotrop.
dest. destilliert, -e (distilled); destillieren (distil)
Dest., Destillat Destillation (distillation).
det. determine.
detd. determined.
detg. determining.
detn determination.
Deut. Deutsch (German).
dg. decigram(s).
dgl. dergleichen (the like).
d. h. das heisst (that is, i e.).
Di didymium.
d. i. das ist (that is, i. e.).
diagr. diagram.
diam diameter(s).
dil. dilute
diln. dilution
Dingl. *Dinglers polytechnisches Journal.*
Disp. Dispensatory
Diss. Dissoziation (dissociation), Dissertation.
Dissert. Dissertation
Dissoz. Dissoziation (dissociation).
dist. distillation.
distd. distilled
distg. distilling.
distn. distillation.
d. J. dieses Jahr (of this year).
dl-, d,l- racemic.
dl. deciliter.
d. M. dieses Monats (of this month).
dm. decimeter(s)
dm^q, dm^2 square decimeter(s)
dm^c, dm^3 cubic decimeter(s)
D. P. = D. R. P.
D. Prior. Deutsches Priorität (German priority).
D^r Docteur (Doctor, Dr).
Dr. Doctor.
dr. dram, drams
drgl. dergleichen (the like).
D. R. P. Deutsches Reichs-Patent (Imperial German patent).
Dr. phil. doctor of philosophy, Ph.D.
Ds dysprosium.
dsgl. desgleichen (likewise, ditto).
Dy dysprosium
DZ., dz. Doppelzentner (double centner, 100 kilograms).
E electromotive force, electrode potential; energy.
e electronic charge; base of natural logarithms
E. Erstarrungspunkt (freezing point, solidification point), Eigenschaften (properties).
Eb. point d'ébullition (boiling point).
éb. ébouillit (boils).
ébull. ébullition (boiling).
effy. efficiency.
e g. (exempli gratia) for example.
Eg. Eisessig (glacial acetic acid).
e. hp. electric horsepower.
Eig. Eigenschaft (property).
Eigg. Eigenschaften (properties).
Einfl. Einfluss (influence).
Einw. Einwirkung (action, effect).
E K., EK. = E. M. K.
El. ch. Z. *Elektrochemische Zeitschrift.*
elec., elect. electric, electrical; electricity; electuary
Elekt. Elektrizitat (electricity).
elekt. elektrisch (electric).
Em radium emanation (radon)
E M. F , e. m. f., emf. electromotive force.
E M. K , EMK. Elektromotorische Kraft (electromotive force, e. m f).
Eng. Engineering; Engineer.
enth enthaltend (containing).
entspr. entsprechend (corresponding).
Entsteh. Entstehung (origin).
Entw. Entwickelung (evolution).
E. P. Englisches Patent, English Patent.
equil., *equilib.* equilibrium, *equilibria.*
equiv. equivalent; *specif.*, *electrochemical* equivalent.
Er erbium.
erh erhitzt (heated).
Erh Erhitzung (heating).
Erk Erkennung (detection, recognition)
Erstarr.-Pkt., Erstp. Erstarrungspunkt (freezing point).
erw. erwarmt (warmed).
esc. escompte (discount).
Esp. Espagnole (Spanish).
est. estimate.
estd. estimated.
estg estimating.
estn. estimation.
Et ethyl.
et seq. (et sequentes) and the following.
E. T. Z. *Elektrotechnische Zeitschrift.*
Eu europium.
ev. eventuell (eventual, in question, under consideration).
evap. evaporate.

evapd. evaporated.
evapg. evaporating.
evapn. evaporation.
event. eventuell (eventual, eventually).
ex. exemple, example.
examd. examined
examg. examining.
examn. examination
exp. experimentell, experimental.
exper. experimental.
expt. experiment, experimentell, experimental.
exptl. experimental.
ext extract, external.
extd. extracted.
extg. extracting.
extn. extraction.
EZ. Esterzahl (ester number)
F Faraday's constant (number of coulombs per gram equivalent of an ion)
F fluorine; free energy.
F. Fusionspunkt (melting point), fusible, Fahrenheit.
f fur (for); fest (solid), fein (fine), fond (melts), franc.
Fahr. Fahrenheit.
falsif. falsification(s).
Farb. Farben (colors).
farm. farmaceutico (pharmaceutical)
Fe iron.
F. E. M. force électromotrice (electromotive force, e. m. f.).
F f. Fortsetzung folgt (to be continued).
ff , f. f., fff. sehr fein (very fine); und folgende (and following, et seq).
fi fisica (physical).
F. i D. Faden in Dampf (thread in vapor)
fig figure.
fis. fisica (physical).
Fl. Flussigkeit (liquid, fluid)
fl. fluid, flussig (liquid, fluid), fluchtig (volatile).
fldr. fluidram(s).
Fll. Flussigkeiten (liquids, fluids).
fl. oz. fluidounce(s).
fluss. flussig (liquid, fluid).
Flussigk. Flussigkeit (liquid, fluid)
F. O. flamme oxydante (oxidizing flame, O. F)
F. P. French Patent, Franzosisches Patent; foot-pound(s).
Fp. Fusionspunkt (melting poiut).
f. p. freezing point.
F. R flamme réductrice (reducing flame, R. F).
Fr. Fresenius' *Zeitschrift für analytische Chemie.*
fr. frei (free), franc.
frakt. fraktioniert (fractionated).
frbl. farblos (colorless).
Frdl. Friedlander's Fortschritte der Teerfarbenfabrikation.
ft. foot, feet.
ft.-lb. foot-pound(s)
fum., fumar. fumaroid.
Fys. Fysik (physics).
g, G, g gravitation constant.
G. *Gazzetta chimica italiana;* Gesellschaft (society, company).
g. gram, grams.
Ga gallium.
gal gallon(s).
gasf. gasformig (gaseous)
Gaz , Gazz. Gazzetta (Gazette); specif , *Gazzetta chimica italiana.*
Gd gadolinium.
Ge germanium.
gebd. gebunden (bound).
geg gegen (toward, against, etc.).
Geh. Gehalt (content, contents).
gek. gekennzeichnet (distinguished, characterized).
gel. gelost (dissolved).
gem- geminate (said of two like groups attached to the same atom)
gem. gemein (common).
Gen. Genève (Geneva)
gén général
Geol. Geological, Geology
Ges. Gesellschaft (society; company)
ges. gesamt (whole, entire); gesattigt (saturated); gesetzlich (by law).
Ges.-Amt. Gesundheitsamt (health office, bureau or board)
gesatt. gesattigt (saturated).
ges. gesch. gesetzlich geschützt (protected by law, patented).
Gew. Gewicht (weight), Gewerbe (industry, trade).
gew., gewohnl gewöhnlich (usual, ordinary, usually).
Gew. T. Gewichtsteil (part by weight)
Geww. Gewichte (weights).
gg gegen (toward, against, etc)
Ggw. Gegenwart (presence).
Giorn. Giornale (Journal).
Gl glucinum, glucinium (beryllium).
GM. Goldmark(en), gold mark(s).
gm. gram.
G m. b. H. Gesellschaft mit beschrankter Haftpflicht (limited company).
Gott. N. *Nachrichten von der Königlichen Gesellschaft der Wissenschaften zu Göttingen.*
G P. German Patent.
gr grain, grains; (in French) gramme (gram); (in German) Gramm (gram).
grm gram, grams.
G. S. Geological Survey.
G. T. Gewichtsteil (part by weight).

gtt. (gutta, guttae) drop, drops.
GWF *Das Gas- und Wasserfach.*
h height; Planck's constant of action
H hydrogen; heat content.
h Planck's constant of action.
H. Hoppe-Seylers *Zeitschrift fur physiologische Chemie;* Harte (hardness), Höhe (altitude); Haben (credit), Hoheit (highness).
h. hour; horizontal, heiss (hot), hochschmelzend (high-melting), hoch (high)
ha. hectare(s).
Hal halogen.
He helium.
hect. hectoliter(s).
Helv. Helvetica (Swiss), *Helvetica chimica acta.*
Herst. Herstellung (preparation, production).
H.-F. high-frequency.
Hf hafnium
Hg mercury.
hg. hectogram(s).
H.-ion, H-ion. hydrogen-ion.
Hl. Halbleder (half-leather).
hl hectoliter(s).
Hlg. Halogen.
Ho holmium.
Holl. P. Hollandisches Patent (Dutch patent).
h p , hp., H. P. horsepower
hp.-hr. horsepower-hour
hr. hour.
hrs. hours.
h s. l. heiss sehr loslich (very soluble hot).
ht. height.
h. w. l. heiss wenig loslich (not very soluble hot).
Hyg. Hygiene.
H. Z. Hydrolisierzahl (hydrolyzation number).
I Electric current, intensity of magnetization.
i- (optically) inactive; iso-.
I iodine.
i in; im (in the); ist (is)
i. B. auf. in Berechnung auf (calculated on the basis of).
ibid. (ibidem) in the same place
I. C. T. International Critical Tables
i. D. im Dampf (in steam; in the form of vapor).
i. e. (id est) that is.
i. h. p., i. hp., I. H. P. indicated horsepower.
i.hp.-hr. indicated horsepower-hour
i. J. im Jahre (in the year).
Imp. Imperial.
In indium.
in. inch, inches.
inakt. inaktiv (inactive).
Inaug. Diss. inaugural dissertation.
Inc. Incorporated
Ind. Industry, Industrie, Industrial, Industriel.
inorg. inorganic
insol. insoluble
insoly. insolubility.
Inst. Institute.
Instit. Institut, Institute.
Io ionium.
I. P. Italian Patent, italienisches Patent.
Ir iridium.
Istit. Istituto (Institute)
ital. italiana (italian).
It. P. italienisches Patent (Italian patent).
I. U. immunizing unit.
i. V. im Vakuum (in a vacuum).
i. W. innere Weite (inside diameter).
J mechanical equivalent of heat, radiance.
J Jod (iodine).
J. Journal; (less often) Jahrbuch (yearbook), or Jahresbericht (annual report); specif, *Jahresbericht uber die Fortschritte der Chemie.*
J A C. S. *Journal of the American Ceramic Society; Journal of the American Chemical Society.*
Jahrb. Jahrbuch (yearbook).
Jahresb , Jahresber. Jahresbericht(e), specif , *Jahresbericht uber die Fortschritte der Chemie.*
Jahrg. Jahrgang (year).
Jb. Jahrbuch (yearbook).
Jber. Jahresberichte (annual reports).
J C S. *Journal of the Chemical Society* (London)
Jour , Journ. Journal.
J pr *Journal für praktische Chemie*
J S C I *Journal of the Society of Chemical Industry.*
J S D C *Journal of the Society of Dyers and Colourists.*
J Th *Jahresbericht der Tierchemie*
K constant; specif., chemical equilibrium constant; dielectric constant; electric dissociation constant.
k constant; specif., velocity coefficient of reaction; molecular gas constant.
K potassium; constant, Kelvin scale; karat.
k constant.
K. Kelvin (àbsolute centigrade) scale.
k. königlich, koninklijk (royal); kaiserlich (imperial); kalt (cold); kathode.
ka. kathode.
Kap. Kapitel (chapter).
Kem. Kemi (chemistry).
kg. kilogram(s).
kgl. königlich (royal).
kg.-m. kilogram-meter(s).

K. K., k. k. kaiserlich-königlich (imperial-royal).
k. Kal. kleine Kalorie (small calorie).
kl. kiloliter(s); kaum löslich (scarcely soluble).
klin. klinisch (clinical).
km. kilometer(s).
Koeff., Koeffiz. Koeffizient (coefficient).
Koll. Z., Koll. Zeits. *Kolloid Zeitschrift.*
kompr. komprimiert (compressed).
Konst. Konstitution (constitution).
Konz. Konzentration (concentration).
konz. konzentriert (concentrated).
kor., korr. korrigiert (corrected).
Kp. Kochpunkt (boiling point).
Kr krypton.
Kr. Krystallographie (crystallography)
Krist. Kristallographie (crystallography); Kristall(e) (crystals(s)); Kristallisation (crystallization).
krist. kristallisiert (crystallized), kristallinisch (crystalline).
Kristfm. Kristallform (crystal form)
Kryst. Krystallographie (crystallography).
k. s. l. kalt sehr loslich (very soluble cold).
kva. kilovolt-ampere(s).
kw., K. W. kilowatt(s).
kw.-an. kilowatt-an (kilowatt-year).
kw.-hr. kilowatt-hour(s).
k. w. l. kalt wenig löslich (not very soluble cold).
Kwst. Kilowattstunde (kilowatt hour).
KW-stoff. Kohlenwasserstoff (carbohydrate)
L latent heat per mole; conductance
l length; latent heat per gram
l- levo-, levorotatory.
L latent heat.
l liter, liters, löslich (soluble); lies (read).
La lanthanum.
lab. laboratory; labil, labile.
Landw. Landwirtschaft (agriculture); landwirtschaftlich (agricultural).
L. B. Landolt-Bornstein Tabellen
lb. pound(s).
L. B. V. Landolt-Bornstein Tabellen, 5th edition.
L. C. Library of Congress.
Leg. Legierung (alloy; alloying).
Legg. Legierungen (alloys).
leichtl. leichtloslich (easily soluble).
L.-F. low-frequency.
lfd. laufend (running, current, consecutive).
Lfg. Lieferung (issue, number, part).
Lg. Ligroin.
Li lithium.
lin. linear.
liq. liquor.
ll. leicht löslich (readily soluble).
log logarithm.
Lösl. Löslichkeit (solubility).
lösl. löslich (soluble).
Lösungsm. Lösungsmittel (solvent)
Lsg. Losung (solution).
Lsgg. Losungen (solutions).
Lsgs.-Mittel. Lösungsmittel (solvent).
Ltd. Limited.
Lu lutecium.
L. V. St. Landwirtschaftliche Versuchsstationen (agricultural experiment stations).
l. W. lichte Weite (internal diameter).
M molecular weight
$M[\alpha]$ molecular rotatory power.
$M[\omega]$ molecular magnetic rotatory power.
m mass.
m- meta-.
M Mark, Marken (mark, marks); metal (in formulas).
m^2 square meter(s).
m^3 cubic meter(s).
M. Masse (mass); Monat (month), Mittelsorte (medium grade), *Monatshefte fur Chemie;* Moniteur, Monsieur (Mr., Sir), Majesté, Majesty.
m. meter(s); melts at, melting at, minute(s); (meridies) noon; mit (with), mein, meine, meines (my, of my), mon (my); midi (south)
Ma masurium
Mach. Machinery.
Mag. Magazine, Magazin.
mal, malein. maleinoid.
m. amp. milliampere(s).
manuf. manufacture.
manufd. manufactured.
mat. matières (matters).
max. maximum.
m. E. meines Erachtens (in my opinion).
Me methyl; Metall(metal).
mech. mechanical.
Med. Medical; Medicine.
med. medizinisch (medical, medicinal).
Mem. Memoirs, Memorias, Memorie
Mém. Mémoires, *Mémorial des poudres et salpêtres.*
m. e. p. mean effective pressure
Met. Metallurgical; Metals, Metallurgie, Metallurgy.
Mét. Métallurgie (Metallurgy)
Metallk. Metallkunde (science of metals)
Meth. Methode (method).
mfg. manufacturing.
mfr. manufacturer.
M G. Molekulargewicht (molecular weight).
Mg magnesium.
m G. mit Goldschnitt (with gold edges)
mg. milligram(s).
Min. Mineralogical, Mineralogie, Mineralogy; Mining; Minute (minute).
min. minimum; minute(s).
Mitt. Mitteilung, ungen (communication, -s).

mitt. mittels (by means of).
mixt. mixture.
Mk. Mark, Marken (mark, marks).
mk. mikroskopisch (microscopic).
m.-kg. meter-kilogram.
mkr. mikroskopisch (microscopic).
ml. milliliter(s).
mm. millimeter(s).
m. m. f. magnetomagnetic force(s); magnetomotive force.
Mn manganese.
Mo molybdenum.
mol molecule; molecular.
Mol -% Molprozent (molar per cent).
Mol -Dispers. Molekulardispersion
Mol.-Gew. Molekulargewicht (molecular weight).
Mol.-Refr , Mol -Refrakt. Molekularrefraktion.
mol wt. molecular weight.
Mon. Moniteur (monitor), Monographie (monograph).
Monatsh. Monatshefte ("monthly numbers"); specif., *Monatshefte fur Chemie und verwandte Teile anderer Wissenschaften.*
Monit. Moniteur (monitor).
m. p. melting point.
m p. h. miles per hour
M. S. *Moniteur scientifique.*
ms- meso-.
Ms-Th mesothorium.
mv., m. v. millivolt(s).
N normal; Avogadro's number
N- united to nitrogen.
n refractive index; Loschmidt's number; variable number (as in C_nH_{2n+2}).
n- normal.
n_a transport number of anion
n_k transport number of cation
N nitrogen.
N. nachmittags (afternoon, p m), nachts (at night); Nord, Norden (north).
N°. numéro (number).
n normal; nördlich (northern), netto (net).
Na sodium
Nachf. Nachfolger (successor, successors).
nasz. naszierend (nascent)
nat. naturel (natural)
Nb niobium (columbium)
Nd neodymium.
Nd. Niederschlag (precipitate).
Ndd Niederschläge (precipitates).
Ne neon.
néerl. néerlandais (of the Netherlands, Dutch).
n. F. neue Folge (new series).
Ni nickel.
N. J. Neues Jahrbuch (new yearbook).
Nk. Normalkerze (standard candle).
nl. nicht löslich (not soluble).
No. Number, Nummer.
no. number.
norm. normal.
N. P. Norwegisches Patent (Norwegian patent).
Nr., Nro. Numero (number).
N. T. normal temperature
Nt niton (radon).
Ntf. Naturforscher (scientific investigator).
n. t. p. normal temperature and pressure
O- united to oxygen.
o- ortho-.
O oxygen.
O. Ost (east); ouest (west)
o. oder(or); oben (above), ohne (without)
o. drgl. oder dergleichen (or the like)
Oe. P. Oesterreichisches Patent (Austrian patent).
Oesterr. Oesterreichisch (Austrian).
O F. oxidizing flame.
of official
Off. Official.
ol. (oleum) oil.
ol. res. oleoresin
Ö P. Oesterreichisches Patent (Austrian patent).
opt. optical.
opt.-akt. optisch aktiv (optically active).
org. organic.
Os osmium
Öst Österreichisch (Austrian)
Ö.U.P. Österreich-ungarisches Patent (Austro-Hungarian Patent).
oz. ounce, ounces.
o. Zers. ohne Zersetzung (without decomposition).
P, p pressure
P- united to phosphorus.
p- para-
P phosphorus
P. Proceedings, specif., *Proceedings of the Chemical Society;* Patent.
p. point; page(s); parties (parts), pouvoir (power); pour (per).
p. 100 pour cent (per cent)
P. A. poids atomique (atomic weight)
Pa protoactinium.
P. AE. (partes aequales) equal parts.
PAe. Petroleumather (petroleum ether).
par. paragraph.
Pat. Patent, Patent Office.
Path. Pathologie, Pathology.
pathol. pathological.
P.-B. Pays-Bas (Netherlands).
Pb lead.
p. c. c. pour copie conforme (true copy).
P. C. H. *Pharmazeutische Zentralhalle*
P. Ch. S. *Proceedings of the Chemical Society.*

P. C N "physique, chimie, naturelle" (certificate given on completion of studies in physics, chemistry and natural history).
pctig. procentig (per cent).
Pd palladium.
p. d. potential difference
P. É. parties égales (equal parts), point d'ébullition (boiling point)
p. ex. par exemple (for example, e g).
Pf. Pfund (pound)
Pfg. Pfennig (pfennig, 1/100 mark)
P. G German Pharmacopeia
Ph Phenyl
Ph. Pharmacie, Pharmacy, Physique; Physikalisch
ph. physical, physique, philosophical
Phar Pharmacopeia
Pharm. Pharmacy, Pharmacie, Pharmazie; Pharmacopeia.
pharmacol. pharmacological
Ph Ch. *Zeitschrift für physikalische Chemie.*
Phil. Philosophical.
Ph Mag *Philosophical Magazine.*
Phot Photographic
Photog Photography
Ph. Rev. *Physical Review*
phys physical, physikalisch. Physics, Physik.
phys.-ch. physikalisch-chemisch (physico-chemical)
physik , physikal. physikalisch (physical)
physiol physiological, physiologisch
Ph. Z. *Physikalische Zeitschrift*
Pkt. Punkt (point)
P M. poids moléculaire (molecular weight).
p m. afternoon.
Po polonium
Pol. Polytechnisch
powd. powdered.
pp pages
ppd. precipitated.
p. p. m parts per million.
ppn. precipitation.
ppt precipitate; (in pharmacy) prepared.
pptation. précipitation.
pptd. precipitated.
ppté. précipité (precipitate, precipitated)
pptg. precipitating.
pptn. precipitation.
Pr praseodymium, propyl
Pr. Proceedings.
pr. praktisch (practical, applied), précédent (preceding).
prakt. praktisch (practical, applied).
préc. précédent (preceding)
prep. prepare.
prép. préparer (prepare), préparation
prepd. prepared.
prepg. preparing.
prepn. preparation.
prim.- primär, primary
Prior. Prioritat (priority), specif , Unionspriorität.
pro anal. for analysis.
Proc. Proceedings.
Prod. Product, Produit, Produkt
Prodd. Produkte (products)
proport. proportional, proportionnel
propr. propriété (property).
p. rot. pouvoir rotatoire (rotatory power).
Proz. Prozent (per cent).
ps- pseudo-.
P. S., PS., Pst Pferdestarke (horsepower, h. p.).
p. suiv. page suivante (following page)
Pt platinum.
pt. point; pint.
P. T. O. please turn over
pulv. (pulvis) powder.
Q quantity; heat absorbed
q quintal.
q. quadrat (square), quintal
qcm. Quadratcentimeter (square centimeter)
qdm. Quadratdecimeter (square decimeter)
q. m. quintal métrique (metric quintal, 100 kg.).
qmm Quadratmillimeter (square millimeter).
q s (quantum sufficit) a sufficient quantity
qt quart.
qual. qualitative.
quant. quantitative
qui., quim. quimica (chemical)
q v. (quod vide) which see.
R gas constant per mole of ideal gas, electrical resistance
r radius.
r_g specific refractivity (Gladstone and Dale).
r_L specific refraction (Lorentz and Lorenz).
R radical.
R- ring, cyclic, cyclo-.
R. Reale, Royal; Recueil, specif., *Recueil des travaux chimiques des Pays-Bas;* Réaumur, Russe, Russian; Referat (abstract, review).
Ra radium
Ra-Ac radioactinium
rac., racem. racemic, racemisch
Rad. Radioactivity, Radioaktivitat, Radium.
Ra-Em radium emanation (radon).
R. A. L. *Rendiconti della Accademia dei Lincei.*
Ra-Th radiothorium
Rb rubidium.
Re rhenium.
Rec. Recueil (compilation); Records.
recryst. recrystallize.
recrystd. recrystallized.
recrystn. recrystallization.

Red. Reduktion (reduction).
Rend. Rendiconto (report).
Rep. Report, Reports.
Repert. Repertorium (compendium).
Répert. Répertoire (compilation).
Res. Research.
resp. respectively; respektive (respectively, or rather, or).
Rev. Review, Revista, Revue; specif., *Revue générale de chimie pure et appliquée.*
rez. reziprok (reciprocal; reciprocally).
R. F. reducing flame.
Rh rhodium.
Riv. Rivista (Review).
Rk. Reaktion (reaction).
Rkk. Reaktionen (reactions).
R. M. réfraction moléculaire (molecular refraction).
RM., Rm. Rentenmark; Reichsmark
r. m. s. square root of mean square.
Rn radon.
Roy. Royal.
R-P. Reichs-Patent (imperial patent).
r. p m. revolutions per minute.
r. p. s. revolutions per second.
R R. Railroad.
R^t. rendement (yield).
Ru ruthenium.
Russ. Russisch, Russian.
Ry. Railway.
S, S entropy; point de solidification (freezing point).
S- united to sulfur.
s time of outflow.
s- symmetric.
S sulfur.
S. Society; Seite (page); Saure (acid); Sankt (Saint, St).
s. shilling(s); stere (cubic meter), siehe (see); symmetrisch (symmetric), son, sa (his, her, its); sauf (save, except).
Sa samarium.
s. a. siehe auch (see also).
sapon. saponification.
sapond. saponified.
sapong. saponifying.
sat. saturate; saturated.
satd. saturated.
satg. saturating.
satn. saturation.
Sb antimony.
Sc scandium.
Sc. Science.
Sch. School.
schm. schmelzend (melting); schmilzt (melts).
Schmelzp., Schmp., Schmpt. Schmelzpunkt (melting point).
Schw Schweizerisch (Swiss).
Schwed. P Schwedisches Patent (Swedish patent).
Schweiz. Schweizerisch (Swiss)
schwerl schwerloslich (difficultly soluble).
Schwz P Schweizerisches Patent (Swiss patent)
Sci., Scien. Science, Scientific, Scientifique.
scr. scruple
s. d. siehe dies (see this, which see, q. v).
Sd. Siedepunkt (boiling point)
sd. siedend (boiling); siedet (boils).
Sdp. Siedepunkt (boiling point, b p).
Se selenium.
sec secant
sec- secondary.
sec second(s).
sek.- sekundar (secondary).
Sek. Sekunde (second).
sep. separate.
sepd. separated.
sepg separating.
sepn. separation.
S. F. sans frais (without charges).
s. G spezifisches Gewicht (specific gravity, sp. gr).
s g sogenannt (so-called).
S. G D. G. sans garantie du gouvernement (not guaranteed by the government)
s hp. shaft horsepower.
Si- united to silicon.
Si silicon.
sied siedend (boiling).
sin sine.
sinh hyperbolic sine
Sitz., Sitz. Ber , Sitzber. Sitzungsberichte (Proceedings).
sl. slightly.
sll. sehr leicht loslich (very readily soluble).
S M. Seine Majestat (His, or Her, Majesty).
Sm samarium.
Sm. Smithsonian Institution; Schmelzpunkt (melting point).
Sn tin.
s. o. siehe oben (see above).
Soc. Société, Society; *Journal of the Chemical Society* (of London).
sogen. sogenannt (so-called).
sol. soluble; solution.
sol. alcool. solution alcoolique (alcoholic solution).
sol. aq. solution aqueuse (aqueous solution).
soln. solution.
solns. solutions.
soly. solubility.
So. Z. Sodazahl (soda number or value).
S. P. Swiss Patent.
sp. specific.
spec. specific, specifisch.
spektr. spektroskopisch (spectroscopic, -ically).

spez. spezifisch (specific).
spez. Gew, sp. G. spezifisches Gewicht (specific gravity, sp. gr.).
sp. gr. specific gravity.
sp. ht. specific heat.
Spl. Supplement.
spt. spirit.
sq. square.
sq. cm. square centimeter(s).
sq ft. square foot.
sq. m. square meter(s).
Sr strontium.
Sr. Senior; Seiner (His).
S S. Schwefelwasserstoffsäure (hydrosulfuric acid, H_2S).
SS. Säuren (acids).
s. S. siehe Seite (see page).
St. Saint, Sankt; Stunde (hour).
stab. stabil (stable).
Std. Stunde, Stunden (hour, hours).
std. stündig (-hour, -hours).
Stde. Stunde (hour).
stdg. stündig (-hour, -hours).
Stdn. Stunden (hours)
s u. siehe unten (see below).
Subst Substanz (substance).
supers. supersaturated.
s W. spezifische Wärme (specific heat).
swl sehr wenig loslich (very slightly soluble)
s. w. u. siehe weiter unten (see below).
sym, *sym-* symmetric, symmetrisch, symétrique.
symm symmetrisch (symmetric).
SZ., S. Z Säurezahl (acid number).
s. Z. seiner Zeit (in his, or its, time, at that time).
T absolute temperature.
T_c critical temperature (on the absolute scale).
t time; temperature centigrade.
t_c critical temperature centigrade.
T temperature.
T. Teil (part).
t. ton, tons; tome (volume); transcrivez (copy, transcribe)
Ta tantalum
tan tangent.
Tb terbium.
Te tellurium.
tech. technical, technisch
techn. technisch (technical).
Temp. Temperatur (temperature)
temp. temperature.
temps. temperatures.
Text. Textile.
Tfl. Tafel (table).
Th thorium.
Th-Em thorium emanation, thoron.
Thl. Theil (part).
Thle. Theile (parts).
Thln Theilen (parts).
Ti titanium.
Tids. Tidsskrift.
tinct. tincture.
Tl thallium.
Tl. Teil, Teile (part, parts).
Tle., Tln. Teile, Teilen (parts).
Tm thulium.
Tr. Transactions; Travaux (works, researches).
tr. tincture.
Trans. Transactions.
transf. transformation.
trav. travaux (works)
Tu thulium.
T. W. Teile(n) Wasser (parts of water).
U uranium, (ionic) mobility; internal energy.
U. University, Universität, Université; unit.
u. und (and).
u. a. unter anderen (among others).
u a a O. und an anderen Orten (and elsewhere).
u. a m. und andere mehr (and others); und anderes mehr (and so forth, and so on).
u ä m. und ahnliches mehr (and the like).
u a. O. und andere Orte (and elsewhere); unter anderen Orten (among other places)
üb uber (over).
Überf. Überfuhrung (conversion).
ubert. an. ubertragen an (assignor to).
Übf. Überfuhrung (conversion)
u. d. f. unde die folgende (and those following).
u. dgl. und dergleichen (and the like).
u dgl. m. und dergleichen mehr (and such like).
u e. a. und einige andere (and some others).
u. Mk. unter dem Mikroskop (under the microscope).
Umwandl. Umwandlung (transformation, conversion).
unges. ungesättigt (unsaturated).
Univ. University, Universität, Université
unk. unkorrigiert (uncorrected)
unl, unlosl. unloslich (insoluble).
uns. unsymmetrisch (unsymmetric).
unt unter (under, during, with).
Unters. Untersuchung (investigation, examination).
unv. unveröffentlicht (unpublished).
U. S. United States
u. s. f. und so fort (and so on)
U. S. P. United States Pharmacopeia; United States Patent.
u. s. w., usw. und so weiter (and so forth, and so on, etc.).
Uwp. Umwandlungspunkt (transformation point, transition point).
U X uranium X.

U Y uranium Y.
u Z, u. Zers. unter Zersetzung (with decomposition)
V volume, potential
v volume.
v- vicinal, neighboring.
V vanadium
V. Vorkommen (occurrence, presence); Verein (union, society), vormittags (in the forenoon, a. m).
v. volume(s); volt(s), velocity, vicinal; (vide) see; von (of, from, etc), vormals (formerly); votre (your).
va. volt-ampere(s)
Vak. Vakuum (vacuum).
var. variable; variant.
Vb. Verbindung (compound).
Vbb. Verbindungen (compounds).
v. Chr. vor Christo (before Christ, B. C.).
V. D. I *Zeitschrift des Vereines deutscher Ingenieure.*
v. d. L. vor dem Lötrohr (before the blowpipe, B. B)
Ver. Verein (union, society).
Verb. Verbindung (compound, combination).
verb. verbessert (improved, revised)
Verbb. Verbindungen (compounds)
verbr. verbraucht (consumed, used)
Verd. Verdunnung (dilution).
verd. verdunnt (diluted, dilute).
Verf Verfahren (process), Verfasser (author).
Verfahr. Verfahren (process).
Vergl. Vergleich (comparison).
vergl. vergleiche (compare, cf.).
Verh. Verhalten (behavior); Verhältnis (proportion, ratio); = Verhandl , below.
Verhandl. Verhandlungen (transactions, proceedings)
verm. vermehrt (enlarged); vermindert (diminished, reduced)
Veröff. Veröffentlichungen (publications).
Vers. Versuch (experiment; test); Versammlung (convention, congress)
Verss. Versuche (experiments, tests).
Vf. Verfasser (author).
Vff. Verfasser (authors).
vgl. vergleiche (compare, see, cf.).
vgl. a. vergleiche auch (see also).
v. H. vom Hundert (per cent).
Vhdl. Verhandlungen (Transactions).
vic. vicinal.
viz. namely, to wit.
v J. vorigen Jahres (of last year); vom Jahre (of the year).
V. M. voltmeter.
v. M. vorigen Monats (last month).
v. o. von oben (from above, from the top).
Vol. Volumen (volume).
vol. volume.
Vol. T. Volumenteil (part by volume).
vor. vorig (former, preceding)
Vork Vorkommen (occurrence)
vorm. vormals (formerly).
Vorr. Vorrichtung (device, arrangement; preparation).
V. S. volumetric solution.
vs. versus, against.
V. St. Vereinigte Staaten (United States).
V. T. Volumenteil (part by volume).
v. u. von unten (from below, from beneath, from the bottom).
VZ. Verseifungszahl (saponification number).
W electrical resistance (Widerstand).
W tungsten, wolfram; work.
W. Wasser (water); *Annalen der Physik* (Wiedemann-Drude).
w. watt, watts; warm.
Wa. Rk. Wassermannsche Reaktion (Wassermann reaction).
wasserl. wasserlöslich (water-soluble).
wassr. wässerig (aqueous).
W. E, WE. Wärmeeinheit (heat unit)
Wet. Wetenschappen (Sciences).
w.-hr. watt-hour(s).
Wied. Ann. *Wiedemanns Annalen.*
Wirk. Wirkung (action; effect).
wiss wissenschaftlich (scientific).
w. l. wave length.
wl wenig loslich (slightly, or difficultly soluble).
wlösl. wasserlöslich (soluble in water).
w. o. weiter oben (above).
Woch Wochenschrift (weekly).
Wochenschr. Wochenschrift (weekly).
w p. c. watts per candle.
Wrkg. Wirkung (action; effect).
Ws Wasser (water).
wss. wasserig (aqueous, hydrous).
wt. weight.
x unknown number or quantity.
X univalent negative radical (in formulas); xenon.
X^{bre} décembre (December).
Xe xenon
Y yttrium
Yb ytterbium.
yd. yard(s).
yr. year(s).
Yt yttrium.
Z atomic number.
Z. Zeitschrift, specif., *Zeitschrift für Chemie;* Zeile (line); Zeit (time); Zoll (inch).
z. zu (at, for, by); zum, zur (at the, for the).
Z. a. Ch. *Zeitschrift für anorganische Chemie.*
Z. Ang. *Zeitschrift für angewandte Chemie.*
Z. B. *Zeitschrift für Biologie.*
z. B. zum Beispiel (for example).

Z Ch. *Zeitschrift für Chemie.*
Zeit Zeitung (News), Zeitschrift
Zeitsch , Zeitschr. Zeitschrift
Z El Ch. *Zeitschrift für Elektrochemie*
Zentr Zentralblatt.
zerfl. zerfliesslich (deliquescent).
Zers. Zersetzung (decomposition).
zers. zersetzend (decomposing); zersetzt (decomposes); zersetzbar (decomposable).
Z. Instr. *Zeitschrift für Instrumentenkunde.*
Z. Kr. *Zeitschrift für Krystallographie und Mineralogie.*
zl. ziemlich loslich (fairly soluble)
Zn zinc.
Zp Zersetzungspunkt (decomposition point)
Zr zirconium
z. T. zum Teil (in part)
Ztg. Zeitung (News)
z. Th. zum Theil (in part).
Ztschr Zeitschrift (journal, periodical).
Zus. Zusammensetzung (composition); Zusatz (addition)
zw zwischen (between)
zwl. ziemlich wenig loslich (rather difficultly soluble).
Z. w. Phot *Zeitschrift für wissenschaftliche Photographie*
z. Z. zur Zeit (at present, acting).

APPENDIX 3

A LIST OF AMERICAN LIBRARIES OF INTEREST TO CHEMISTS

This list of Canadian and United States libraries was made upon the basis of all available information, with a view to selecting those most likely to be of use to chemists. The information presented was very kindly furnished by the libraries in response to personal visits and letters of inquiry.

The list includes 79 libraries: 7 in Canada and 72 in the United States. Of the latter 13 are in Washington, D. C., 7 in New York City, 6 in Boston and Cambridge and 17 others in the East; 5 in Chicago and 16 others in the Middle West; 6 in the West and 2 in the South. The Dewey classification is used by 33, the Library of Congress system by 23, the Cutter expansive system by 7 and the library's own system by 22.

"Photoprints" means that the library will fill orders for photoprints of material in its collection, either with its own equipment or through a commercial firm.

Abbreviations used are:

chem.	chemical	L. of C.	Library of Congress
classifn.	classification	pams.	pamphlets
dept.	department	vols.	volumes

Most libraries in the list below admit a reader to the stacks if his purpose is a serious one, make interlibrary loans for limited lengths of time, remain open during the summer, but are NOT open in the evenings. Unless otherwise stated it may be assumed that the library in question conforms to the general rule.

CANADA

Alberta

Edmonton. University of Alberta. 29,000 vols. (1926). Cutter expansive classifn. Access to stacks restricted. Open evenings, Oct.–Apr.

British Columbia

Point Grey. University of British Columbia. 60,000 vols. and 9000 pams. (1926). L. of C. classifn. Access to stacks restricted. Open evenings in term time. Fairly representative chemical collection.

Manitoba

Winnipeg. Manitoba University. 40,000 vols. and 5000 pams. (1926). Dewey classifn.

Ontario

Kingston. Queen's University. 175,000 vols. (1926). L. of C. classifn. Access to stacks restricted. Queen's Univ. publications not lent. Open evenings, Oct.–May. Corrosion and lubrication are specialties.

Ottawa. Mines Branch, Department of Mines. 20,000 vols. and many thousand pams. (1926). Own classifn. Interlibrary loans by special arrangements. Photoprints. Chemical technology and mineral industries are specialties.

Toronto. University of Toronto. 215,000 vols. and 75,000 pams. (1926). Own classifn. Access to stacks restricted. Very valuable material, unbound periodicals. etc., not lent. Photoprints. Open evenings.

Quebec

Montreal. McGill University. 260,000 vols. (1926). Cutter expansive classifn., modified. Access to stacks much restricted. Certain periodicals and reference books not lent. Photoprints. Open evenings in term time. The Baillie Library of Chemistry is strong in general reference books and journal sets.

UNITED STATES

California

Berkeley. University of California. 639,000 vols. (1926). L. of C. classifn. Access to stacks restricted. Very valuable or readily purchasable material not lent. Photoprints Open evenings in term time (including summer session).

Los Angeles. Los Angeles Public. 593,150 vols. and 101,757 pams. (1924–5). Dewey classifn. No access to stacks. Most reference books not lent. Photoprints. Open evenings. Chemistry is a specialty.

San Francisco. Mechanics-Mercantile. 100,000 vols. (1926). Dewey classifn. Interlibrary loans within the State only; encyclopedias, etc., not lent. Photoprints. Open evenings.

Stanford Univ. Leland Stanford, Jr., University 450,000 vols. Dewey classifn. Access to stacks restricted. Photoprints. Open evenings.

Colorado

Denver. Great Western Sugar Co. 2000 vols and 6000 pams. (exclusive of Govt. documents). Dewey classifn., expanded. A technical library with chemistry and sugar technology as main topics.

Connecticut

New Haven. Yale University. 1,697,332 vols. (1925–6). Own classifn. Access to stacks restricted. Rare material and current periodicals not lent. Photoprints. Reading rooms (not stacks) open evenings in term time. The Sterling Chemistry Lab. library has 5461 vols. exclusive of bound periodicals.

Delaware

Wilmington. E. I. du Pont de Nemours & Co. Technical. 8000 vols. and pams. (1926). Own classifn. Periodicals and much used reference books not lent. Photoprints. Strong on chem. technology, especially organic. Strangers must be properly introduced.

District of Columbia

Washington. Army Medical (formerly Library of the Surgeon General's Office). 344,000 vols. and 458,000 pams. (1923). Own classifn. No access to stacks. Personal loans only to M.D.'s or by special reference. Material

before 1840 not lent. Photoprints. Medicine and biochemistry are specialties.

Army War College. 250,000 vols. and pams. L. of C. classifn. Old and valuable books not lent. Photoprints can be arranged.

Bureau of Chemistry. See Department of Agriculture.

Bureau of Standards. 31,000 vols. (1926). Own classifn. Interlibrary loans for important research only. Most of the books are in the main library but there is a small branch library in the chemistry building.

Department of Agriculture. 200,000 vols. (1926). Own classifn. Books in frequent use in the Department, or readily available, or for ordinary student use, or very old or rare, not lent. Photoprints. Large chemical collection. Includes the libraries of the *Bureau of Chemistry* (in the latter's building, 10,000 vols. foods and drugs specialties) and the *Fixed Nitrogen Research Laboratory* (at American University, 7000 vols.).

Department of Commerce. 130,000 vols. L. of C. classifn. Access to stacks and interlibrary loans restricted. Reference books, foreign commerce reports, etc , not lent.

Fixed Nitrogen Research Laboratory. See Department of Agriculture.

Geological Survey. 195,000 vols. and 120,000 pams. (1924). Over 500 journal files. Dewey classifn. Photoprints. Collection of bibliographic aids (lists, indexes, catalogs of papers). Geology, mineralogy, etc., and inorganic chemistry are specialties.

Hygienic Laboratory. 12,250 vols. and 25,000 pams. (1926). L. of C. classifn. Access to stacks restricted. Interlibrary loans in Washington only. Has card bibliographies on pharmacology.

Library of Congress. 3,286,000 vols. (1925). Over 100,000 accessions yearly. L. of C. classifn. Access to stacks by special permission. Personal loans to officials or by special permit. Photoprints. Open 9 A.M. to 10 P.M. A great library, primarily for Congressional use but containing much scientific material, some of it (*e. g.*, on alchemy) not readily found elsewhere. Generous lending policy.

Office of Chief of Ordnance. Technical Staff Reference. 6000 vols. and 2000 pams. L. of C. classifn. Access to stacks restricted. Interlibrary loans to Govt. only.

Patent Office. About 3,000,000 foreign patents and 1,600,000 U. S. patents and 95,000 vols. besides. L. of C. classifn. Interlibrary loans in city—no loans outside. Photoprints for any one (15¢ single, 20¢ double, 8vo page; capacity, 2400 prints daily). Many old books as well as journal files. The Hill chemical card index is here (see p. 191). See also p. 122.

Public Health Service. 11,169 vols. and 5350 pams. (1926). L. of C. classifn.

Smithsonian Institution. 514,071 vols., 139,525 pams. and 23,887 charts. Dewey and L. of C. classifn. Very valuable books seldom lent. Photoprints.

Tariff Commission. 7800 vols. and 5870 pams. L. of C. classifn., modified. Access to stacks restricted. Material needed by Commodity Divisions not lent. Photoprints only for Govt. departments under certain conditions.

Good collection of chem. books and fairly representative collection of chem. trade papers.

Illinois

Chicago. Abbott Laboratories, North Chicago. 8500 vols. and 4200 pams. (1926). L. of C. classifn. Material much needed by staff not lent.

American Medical Association. 3500 vols. and 20,000 pams. Dewey classifn. Books not lent; other material to Assocn. members only.

John Crerar. 510,000 vols. and 300,000 pams. (1926). Dewey classifn. Access to stacks restricted. Books much used or very rare not lent. Photoprints. Open evenings except Aug. Specializes on science. Has over 18,000 chem. vols. Furnishes lists of books on special subjects and sells printed catalog cards.

Portland Cement Association. 6000 vols. and 9000 pams. (1925). Dewey classifn. expanded. Material for members only not lent. Photoprints. Extra copies of Govt. bulletins.

University of Chicago. 739,213 vols. and 275,000 pams. (1926). L. of C. classifn. Access to stacks restricted. Very valuable and rare books, unique copies of theses and current periodicals not lent. Photoprints. Open 4 evenings a week. Large collection of publications of learned societies.

Urbana. University of Illinois Chemistry Department. 12,000 vols. (1926). Dewey classifn. Important reference works not lent. Photoprints. Open evenings. About 5000 Ph.D. theses. The University library has over 650,000 vols., including much material of value to chemists.

Iowa

Iowa City. University of Iowa. 250,000 vols. (1926). Dewey classifn., modified. Access to stacks restricted. Reference and rare books not lent; restrictions on bound periodicals. Photoprints (through another Univ. dept.). Open evenings in term time. Chemistry dept. library has 5000 vols.; the pharmacy and botany libraries will merge with it soon.

Kansas

Lawrence. University of Kansas. 184,000 vols. and 25,000 pams. (1926). Dewey classifn. Access to stacks restricted. Periodicals and rare books not lent. Closed Aug. 15–Sept. 15. Open evenings. Good collection of periodicals.

Maryland

Baltimore. Johns Hopkins University. 283,150 vols. (1926). L. of C. classifn. Access to stacks restricted. Photoprints as an accommodation in emergency. Open 5 evenings a week in term time.

Massachusetts

Boston. American Academy of Arts and Sciences. 40,000 vols. Own classifn. Old or rare works not lent. Specializes on serials, not separate books. Nonmembers admitted by courtesy only.

Boston Medical. 140,000 vols. and 100,000 pams. Own classifn., accepted as standard for medical libraries by the Medical Library Assocn. No access to stacks. Rare and valuable books not lent. Photoprints. Open Mon., Wed. and Fri. evenings, Nov.–May.

Boston Public. 1,363,515 vols. (1925). Own classifn. No access to stacks. Much used, rare and reference books and material readily available elsewhere

not lent. Photoprints. Open evenings. The technology division will give all reasonable aid.

Cambridge. Arthur D. Little, Inc. 5000 vols. and very large no. of pams. (1926). Dewey classifn. Own reports and sheet patents not lent. Photoprints. Paper and petroleum are specialties. Has patents, clippings and data file. Translations and bibliographies furnished.

Harvard College. 1,251,700 vols. and pams. (1925). Own classifn. Access to stacks restricted. Interlibrary loans for use of Faculty members; periodicals, books from sets and rare books not lent. Photoprints. Reading room open evenings in term time. The chem. laboratory has 18,139 vols. and pams. Harvard Univ library has in all 2,416,500 vols. and pams.

Massachusetts Institute of Technology. 167,447 vols. and 60,943 pams. (1925). Dewey classifn. Access to stacks restricted. Reference books not lent. Photoprints. Open evenings. Reference and bibliographic service.

Michigan

Ann Arbor. University of Michigan. 661,150 vols. (1926). L. of C. and Dewey classifn. Access to stacks restricted. Photoprints. Open evenings.

Detroit. Detroit Public. 689,830 vols. and 173,324 pams. Dewey classifn. Access to stacks on request. Much needed material (reference books, patents, current periodicals) not lent. Photoprints. Open evenings. The technology department gives reference and bibliographic service

Parke, Davis & Co. 20,000 vols. and pams. (1926). Access to stacks restricted. No loans. Pharmaceutical and medical science are specialties.

Missouri

St. Louis. Washington University. 246,144 vols. and 90,816 pams. (1926; includes general and special libraries). Dewey classifn. Access to stacks restricted. Very bulky, costly or rare books not lent. Photoprints arranged for. Open evenings in term time. A good working library of 3600 vols. in the chemistry building, open 9 to 5.

Nebraska

Lincoln. University of Nebraska 204,500 vols. (1926). Dewey and Cutter expansive classifn. Access to stacks restricted. Periodicals and rare books not lent. Open evenings. The chemistry building has a good-sized department library.

New Jersey

Princeton. Princeton University. 600,000 vols. and 100,000 pams. (1926). Own classifn., partly L. of C. Photoprints. Open evenings.

New York

Albany. New York State. 520,695 vols. and 200,000 pams. (1925–6). Dewey classifn. Access to stacks restricted. Special reference books, genealogy and fiction not lent. Photoprints ("usually"). Open evenings, Sept. 15–June 15. Good collection of technical periodicals.

Buffalo. Grosvenor. 191,000 vols. (1926). Mixed classifn. Access to stacks restricted. Interlibrary loans only to serious workers, to be used in libraries. Photoprints. Open evenings.

National Aniline & Chemical Co. 8000 vols. and 2000 pams. (1926).

Dewey classifn. No loans. Outsiders must apply to the Company for admission.

Ithaca. Cornell University. 750,000 vols. L. of C. and own classifn. Access to stacks restricted. Rare material not lent. Photoprints. Open evenings.

New York. Chemists' Club. 25–30,000 vols. and 8–10,000 theses. L. of C. classifn. No loans. Photoprints. Translations. Information service of all kinds. Nonmembers of the Club or affiliated societies must be properly introduced.

Columbia University, Chemistry Department. 12,000 vols. (1926). Dewey and Cutter expansive classifn. Special reference books not lent. Photoprints. Open evenings except June and Sept.

Engineering Societies. 110,000 vols. (1926). Dewey classifn. No access to stacks. Loans for use of Societies members only; periodicals not lent. Photoprints. Open evenings except July and Aug. Specializes in engineering. Bibliographic and translating service.

New York Academy of Medicine. 141,000 vols. and 105,000 pams. Own classifn. Access to stacks restricted. Rare books and recent periodicals not lent. Photoprints. Open evenings to Fellows and library subscribers only.

New York Public. 2,847,275 vols. and pams. (end of 1925). Own classifn. (in reference dept.). No access to stacks in the reference dept. but many of the most used chem. books are accessible in a special room. No loans in the reference dept. Photoprints. Open evenings every day in the year till 10 P.M. Good chem. collection and many serials. Publishes bibliographies and lists.

New York Society. 100,000 vols. (1925). Own classifn. Access to stacks for members only. No loans. Contains the chemical library of John Winthrop, said to be the oldest in the United States.

Rockefeller Institute for Medical Research. 17,000 vols. and 7000 pams. Own classifn. Occasional loans of material not available elsewhere. Open only to members of the Institute staff.

Rochester. Eastman Kodak Co. Research. 10,000 vols. and 500 pams. (1926). Own classifn. Bound vols. of some journals not lent. Photoprints. Largest photography collection in the United States. Reasonable requests for information complied with.

Syracuse. Solvay Process Co. 5000 vols. and 5000 pams. Dewey and Cutter expansive classifn. Access to stacks restricted. Loans in local region only. Soda, coke and nitrogen fixation are specialties.

Ohio

Akron. Firestone Tire & Rubber Co. 8000 vols. and 5000 pams. (1926). Own classifn. No loans.

B. F. Goodrich Co Technical. 5000 vols. and 3000 pams. (1926). Dewey classifn. Much used and special reference books not lent. Photoprints. Has a collection of foreign language dictionaries. Rubber a specialty. Outsiders admitted by permission of the director of laboratories.

Cincinnati. Lloyd. 56,000 vols. and large no. of pams. (1926). Cutter expansive and own classifn. Devoted to botany (especially mycology) and

pharmacy and allied sciences. A list of current periodicals received is supplied to other libraries.

University of Cincinnati. 118,000 vols. and 40,000 pams. (1925). Dewey classifn. Access to stacks restricted. Much used and very valuable books not lent. Photoprints if necessary. Open evenings in term time. The chemistry library has 8000 vols.; it is not open evenings or Aug. 1–Sept. 15.

Cleveland. Cleveland Public. 1,000,000 vols. (in main and branch libraries) and 17,000 pams. Dewey classifn., modified. Access to certain stacks restricted. Much used and reference books not lent. Photoprints. Open evenings.

General Electric Co., Incandescent Lamp Department (Nela Park). 5570 vols. and 500 pams. Dewey classifn. Special reference books not lent. Photoprints occasionally. Open evenings by special arrangement only. Devoted mainly to physics but has a fair collection of chem. journals and books.

Columbus. Ohio State University. 276,996 vols. and 30,000 pams. L. of C. classifn. Access to stacks restricted. General periodicals and much used, rare, reference and bulky books not lent. Photoprints if necessary. Open evenings. Many valuable journal sets.

Pennsylvania

New Kensington. Aluminum Company of America, Research Bureau. 2000 vols. and 1100 pams. Own classifn. based on Dewey. No loans. Outsiders admitted only by permission of the director of research.

Philadelphia. Academy of Natural Sciences of Philadelphia. 90,000 vols. Own classifn. Access to stacks restricted. No loans.

Franklin Institute. 83,927 vols. and 22,183 pams. Dewey classifn. No access to stacks. No loans. Photoprints. Devoted to applied science and technology, especially chemistry and electricity. Complete sets of all important chem. journals.

University of Pennsylvania. 600,000 vols. and 50,000 pams (1926). Dewey classifn. Access to stacks by special exception only. Very valuable, fragile, readily obtainable or much used material not lent. Photoprints. Open evenings.

Pittsburgh. Carnegie. 591,630 vols. and cataloged pams. Dewey classifn., modified. Access to stacks restricted. Much used or valuable material not lent. Photoprints. Open evenings. Chemical and metallurgical patents are a specialty.

Mellon Institute of Industrial Research. 8000 vols. (1926). L. of C. classifn. Much used reference books not lent. Open evenings to Institute members only.

Rhode Island

Providence. Brown University. 330,000 vols. L. of C. classifn. (since 1924). Access to stacks restricted. Photoprints. Open evenings in term time. Has a chemical seminar library.

Texas

Austin. University of Texas. 286,376 vols. and 48,951 pams (1926; exclusive of certain special libraries). Dewey classifn. Access to stacks restricted. Much used and rare material not lent. Photoprints. Open

evenings in term time. The chemistry department has a good working collection.

Houston. Rice Institute. 50,000 vols. L. of C. classifn.

Washington

Seattle. University of Washington. 159,079 vols. (1926). Dewey classifn. Very rare or valuable books not lent. Photoprints. Open evenings.

Wisconsin

Madison. University of Wisconsin. 344,000 vols. and 62,000 pams. (1926). Cutter expansive classifn., modified. Access to stacks restricted. Much used, rare and reserve books not lent. Photoprints. Open evenings in term time.

For information on the location of particular files in particular libraries, see pages 101 and 111–113.

APPENDIX 4

A BIBLIOGRAPHY OF LISTS OF PERIODICALS

BY CHARLES WELLS REEDER[1]

American Chemical Society. List of periodicals abstracted by Chemical Abstracts. 1926. 89 p.

American Institute of Electrical Engineers. Catalogue of periodical publications. 1904.

American Institute of Electrical Engineers. Catalogue of the Wheeler gift books, pamphlets and periodicals in the library of the American Institute of Electrical Engineers. 1909. Section XI. *Periodicals* **2**, 375–405.

American Institute of Mining Engineers. A catalogue of periodical publications in the library. 1904. 47 p.

American Society of Mechanical Engineers. List of periodical sets, Library of Engineering Societies. 1913. 55 p.

Arizona. University. Library. List of serials in the University of Arizona library. 1918. 46 p. (*University of Arizona Record* **11**, No. 2. Library bibliography, No. 4.)

Berlin. Gesamt-Zeitschriften-Verzeichnis. 355 p. An alphabetical list of periodicals with references to German libraries which receive them.

Bolton, Henry Carrington. A catalogue of scientific and technical periodicals, 1665–1895, together with chronological tables and a library check-list. 2nd ed. 1897. 1247 p.

A list of American journals omitted from Bolton's "Catalogue of scientific and technical periodicals, 1665–1895" has been prepared by William J. Fox, and published in *Bulletin of Bibliography* **5**, 82–85 (1908).

Boston. Public Library. A list of periodicals, newspapers, transactions and other serial publications currently received in the principal libraries of Boston and vicinity. 1897. 143 p.

Boston. Public Library. A list of periodical publications currently received by the Public Library of the city of Boston. 1903. 78 p.

Brown, J. D. Classified list of current periodicals. 1904. Mentions 768 periodicals.

California. University. Library. Coöperative list of periodical literature in libraries of central California. 1892. 54 p. (*Library Bulletin*, No. 1,

[1] Compiled by Mr. Reeder in 1922; brought up to the end of 1926 by the authors.

2d ed.) Another edition was issued in 1902. 130 p. (*Library Bulletin*, No. 1, 3d enlarged ed.)

California. University. Library. List of serials in the University of California library. 1913. 266 p. (*Library Bulletin*, No. 18.)

Cambridge. University. Library. Select list of current English periodicals. 1915. 35 p.

Catholic University of America. Library. Periodicals and serials in the library of the Catholic University of America (Washington D. C.). 1910. 113 p.

Chemical Society (London). A catalogue of the library of the Chemical Society, arranged according to authors, with a subject index. Gurney, 1903. 324 p.

Chicago Library Club. A list of serials in public libraries of Chicago and Evanston, corrected to January, 1901. 1901. 185 p.

The John Crerar library issued a supplement, corrected to April, 1903. 101 p. A 2nd ed. corrected to November, 1905, was issued in 1906.

Chicago. Public Library. Periodicals currently received in the Chicago Public Library. 1924. 80 p.

Cincinnati (Ohio). University. Union list of chemical periodicals in the Cincinnati libraries, by Elizabeth Gates. 1925. 58 p.

Clark, Alvan Witcombe. Check list of indexed periodicals. 1917. 59 p.

Clark, F. C., and West, C. J. American and foreign paper trade periodicals. (*Paper Trade J.* **76**, No. 4, 45–8 (1923).)

Cobb, Ruth. Periodical bibliographies and abstracts for the scientific and technological journals of the world. 1920. p. 131–54. (*Bulletin of the National Research Council* **1**, Pt. 3, No. 3 (1920).)

Colorado. University. Library. List of serials in University of Colorado library. 1913. 82 p. (*University of Colorado Bulletin* **13**, No. 1, University extension division, General series No. 6, Library series No. 1)

Deutscher Zeitschriften Katalog. 1920. Verlagsbuchhandlung Schulze & Co. German periodicals only.

Faxon, Frederick Winthrop. A check list of American and English periodicals. 1908. 93 p.

Great Britain. Board of Agriculture and Fisheries. Catalogue of periodicals and serial publications filed in the library of the board. 1913. (*Miscellaneous Publication* No. 14.)

Grosvenor Library, Buffalo, N. Y. Medical periodicals in Buffalo libraries. (*Bulletin* **1**, No. 4, 9–21 (1919).)

Hartford, Conn. List of the current periodicals on file in the various public reading-rooms of the city of Hartford, Connecticut, 1896. 10 p. (Reprinted from *Hartford Courant* and corrected to March 1, 1896.)

Homer, Thomas J. Guide to serial publications founded prior to 1918 and now or recently current in Boston, Cambridge, and vicinity. 1922. 4 parts. A–Mat issued.

Illinois. University. Library. List of serials in the University of Illinois library together with those in other libraries in Urbana and Champaign, by Francis K. W. Drury. 1911. 233 p. (*University of Illinois Bulletin* **9**, No. 2.)

Indiana Academy of Science. Report of the committee on a list of the scientific and technical serials in the libraries of the State of Indiana. 1914. (Reprint from *Indiana Academy of Science Report for* 1913, p. 237–364.)

Institute of International Education. Serials of an international character; tentative list prepared in the Columbia University law library. 1921. 60 p. (Its *Bulletin* No. 3, second series.)

International Catalogue of Scientific Literature. List of journals, with abbreviations, used in the catalogue as references. 1903. 312 p. A supplementary list was issued in 1904. 68 p.

International Institute of Agriculture. Periodical publications reviewed by the Bureau of Agricultural Intelligence and Plant Diseases. (*International Review of the Science and Practice of Agriculture* **11**, No. 1, ix–xliii (1920).)

Iowa. University. Library. Iowa City. A list of serial publications in the libraries of the University. 1911. 32 p.

John Crerar Library, Chicago. A list of current medical periodicals and allied serials, December, 1909. 1910. 25 p. A 2nd ed. was issued April, 1913. 32 p.

John Crerar Library, Chicago. A list of current periodicals in the reading room, June, 1902. 1902. 97 p. 2nd ed, July, 1924. 236 p.

Johns Hopkins University. Library. List of biological serials in the libraries of Baltimore. 1901. 1902. 41 p.

Leland Stanford Junior University. Library. List of serials in the Leland Stanford Junior University library. 1916. 169 p.

Library Association (Great Britain). Technical and commercial libraries committee. Class list of current serial digests and indexes of the literature of science, technology and commerce. 1917. 13 p.

Lloyd Library, Cincinnati, O. Catalogue of the periodical literature in the Lloyd library, by Edith Wycoff. 1914. 12 p. (*Bibliographical Contributions from the Lloyd Library*, No. 14.)

Lomer, Gerhard R., and Mackay, Margaret S. A catalogue of scientific periodicals in Canadian libraries. McGill University (Montreal). 1924. 255 p.

Los Angeles. Special Libraries Association of Southern California. Union list of periodicals in libraries of Southern California. 1925. 183 p.

Market data book; containing a directory of class, trade and technical publications. 1926–27. G. D. Crain, Jr., Chicago. 1926. 439 p.

Middleton, Thomas Cooke. A list of Catholic and semi-Catholic periodicals published in the United States from the earliest date down to the close of the year 1892. 1893, 1908. (Reprinted from the *Records of the American Catholic Historical Society* **1893**, 213–42; **1908**, 18–41.)

Minnesota. University. Library. Check list of periodicals and serials in the biological and allied sciences available in the library of the University of Minnesota and its vicinity. 1925. 120 p.

Missouri. University. Library. List of periodicals currently received by the University library. 1921. 35 p. (*University of Missouri Bulletin* **22**, No. 16, Library series 11.)

Müller, C. F. Zeitschriften- und Zeitungs-Adressbuch. C. F. Müller Verlag, Leipzig.

National Carbon Company, Cleveland, O. Technical periodicals; complete record of technical periodicals in the Cleveland libraries. 1916. 22 p.

Newberry Library, Chicago. List of serials currently received by the Newberry Library. 1921. 83 p. (Its *Bulletin*, No. 9.)

Newcombe, L. Catalogue of the periodical publications in the library of the University College. 1912.

New York. Academy of Medicine. Library. List of current periodicals on file in the library. 1924. 47 p.

New York. Chamber of Commerce of the State of New York. Classified list of trade and allied associations and publications in the city of New York, with appendix of governmental offices. 1921.

New York (City). Public Library. Current periodicals and newspapers on file at the branches of the New York Public Library. 1915. 15 p.

New York (City). Public Library. Current periodicals in the reference department, the New York Public Library. 1920.

New York (City). Public Library. Latin-American periodicals current in the reference department of the New York Public Library. 1920 7 p.

New York (State). Agricultural Experiment Station. Periodicals received by the Station. (In the *39th Annual Report*, 1920, p. 561–65.)
Similar lists have appeared for several years in preceding reports.

New York (State). Library. Medical serials . . . (2d ed. rev. and cor.) 1910. 153 p. (Its *Bulletin*, Bibliography 47, *Education Department Bulletin*, No. 464.)

Ohio (State). Library. Newspapers and periodicals in Ohio State Library, other libraries of the state, and lists of Ohio newspapers in the Library of Congress. 1901. 171 p.

Oxford, England. University Library. List of periodicals received.

Pennsylvania. University. Wistar Institute of Anatomy and Biology. List of biological serials, exclusive of botany, in the libraries of Philadelphia. 1909. 61 p. (*Bulletin* No. 2 of the Wistar Institute of Anatomy and Biology.)

Phelps, Edith M., and Ball, Eleanor B. Periodicals of international importance. A selection of 600 useful periodicals in libraries everywhere. H. W. Wilson Co., New York.

Philadelphia. Free Library. A list of serials in the principal libraries of Philadelphia and its vicinity. 1908. 309 p. (Its *Bulletin*, No. 8.) A supplement was issued in 1910 as *Bulletin* No. 9, 88 p.

Pittsburgh, Pa. Carnegie Library. Periodicals and other serials currently received by the Carnegie Library of Pittsburgh. 8th ed. 1921. 53 p.

Providence, R. I. Public Library. List of periodicals, serials and annuals regularly received (revised to March 16, 1921). (In *Quarterly Bulletin* 19, No. 2, 107–11 (1921).)

Providence, R. I. Public Library. Technical and scientific serials in the libraries of Providence, 1920, ed. by Francis K. W. Drury. 1921. 63 p.

Rochester, N. Y. Public Library. Union list of serials in the libraries of Rochester, including periodicals, newspapers, annuals, publications of societies and other books published at intervals. 1917. 147 p.

Royal Society of London. Library. Catalogue of the periodical publications in the library of the Royal Society of London. 1912. 455 p.

St. Louis, Mo. Public Library. List of periodicals currently received in the St. Louis public library. 1923. (Its *Monthly Bulletin*, Aug., 1923, p. 191–237.)

San Francisco. Public Library. Current periodicals and serials. 1916. 27 p.

Scudder, Samuel Hubbard. Catalogue of scientific serials of all countries, including the transactions of learned societies in the natural, physical and mathematical sciences, 1633–1876. 1879. 358 p. (Library of Harvard University, *Special Publication* No. 1.)

Seattle, Wash. Public Library. Periodicals currently received by the Seattle public library and by the library of the University of Washington during the year 1910. 1910. 31 p.

Severance, Henry Ormal. A guide to the current periodicals and serials of the United States and Canada. 4th ed. 1920. 564 p.

Smithsonian Institution. List of periodicals received by the Smithsonian Institution. (In its *Annual Report*, **1880**, p. 98–106.)

Special Libraries Association of Boston, Mass. Union list of periodicals and annuals taken by eleven special libraries in Boston. 1921. 16 p.

Times, London. Tercentenary hand list of English and Welsh newspapers, magazines and reviews. 1920.

Toronto. University. Library. A joint catalogue of the periodicals, publications and transactions of societies and other books published at intervals to be found in the various libraries of the city of Toronto. 1913. 112 p.

Trinity College. Library. A list of current periodicals in the libraries of Hartford. 1916. 55 p. (*Trinity College Bulletin*, n. s., **13**, No. 2)

U. S. Bureau of Education. Union list of mathematical periodicals, by David Eugene Smith and Caroline Eustes Seely. 1918. 60 p. (*Bulletin* No. 9 (1918).)

U. S. Department of Agriculture. Library. Agricultural periodicals in department library, 1902. (In *Yearbook*, **1902**, p. 740–5.)

U. S. Department of Agriculture. Library. List of serials currently received in the Library of the U. S. Department of Agriculture, Jan. 1, 1922. (*Dept. Circ.* **187**, 352 p. (1923).) Contains subject and geographical lists.

U. S. Department of Agriculture. Library. List of periodicals currently received in the library of the U. S. Department of Agriculture. 1909. 72 p (*Bulletin* 75.)

U. S. Department of Labor. Labor and industry; list of periodicals and newspapers in U. S. Department of Labor library. 1920. 23 p.

U. S. Library of Congress. A union list of periodicals, transactions and allied publications currently received in the principal libraries of the District of Columbia, comp. under the direction of A. P. C. Griffin. 1901. 315 p.

U. S. Office of Experiment Stations. List of abbreviations employed in Experiment Station Record for titles of periodicals. 1905. 74 p. (Its *Circular* No. 62.)

U. S. Surgeon General's Office. Library. Alphabetical list of abbreviations of titles of medical periodicals employed in the Index-catalogue of the library of the surgeon general's office . . . from volume 1 to 21, inclusive, second series (including those current at end of the first series). 1916. 233 p.

University College. Library, London, England. List of periodicals received. 1912,

Voge, A. L. Bibliography of periodicals and serials and society publications of natural science and technology. 1909.

Washington (State). University. Library. Union lists of periodicals currently received by the library of the University of Washington and by the Seattle public library during the year 1909. 1909. 30 p. Another edition was issued in 1914. 47 p.

Washington University, St. Louis. Library. Washington University serial list. Inventory of serial publications in the collections of the library of Washington University (including department libraries) and libraries of Washington University Medical School and Missouri Botanical Garden (Shaw School of Botany). Ed. by Winthrop Holt Chenery. 1915. 86 p. (*Washington University Record*, Special No., ser. I, vol. 10, No. 6 (April, 1915).)

Wilson Co., H. W. Union list of periodicals in the libraries of the United States and Canada, edited by Winifred Gregory; now in course of publication. $60.00. (Indicates exact file of each periodical in nearly 200 libraries. The provisional list, now completed, contains 2518 p.)

Wisconsin State Historical Society Library. List of periodical sets in the libraries of the State Historical Society of Wisconsin and the University of Wisconsin that are indexed in Poole's index to periodical literature, Annual library index, Readers' guide to periodical literature, and Annual magazine subject index 1913. 21 p. (State Historical Society of Wisconsin, *Bulletin of Information*, No. 69.)

Wisconsin State Historical Society. Library. Periodicals and newspapers currently received at the library, corrected to January 1, 1918. 32 p. (Its *Bulletin of Information*, No. 92.)

World list of scientific periodicals published in the years 1900–21. Oxford University Press. 1925. First vol. (499 p.) contains names and cities of publication of 24,028 scientific periodicals. Vol. 2(1927) contains abbreviations and library location data.

Yale University. Library. List of medical serials in the libraries of Connecticut. 1919. (Reprinted from the *Proceedings of the Connecticut State Medical Society*, 1919, 163-256.)

APPENDIX 5

SCIENTIFIC AND TECHNICAL ORGANIZATIONS

There are many so-called academies, associations, institutes, societies, etc., which publish scientific papers of more or less chemical interest. Here is a list of them with their publications (in italics). For information regarding these publications one should refer to the List of Periodicals, Appendix 6.

Academiæ Scientiarum Fennicæ *Annales*

Academia nacional de ciencias de la República Argentina. *Boletin*

Académie de médecine (Paris) *Bulletin.*

Académie des sciences de l'union des républiques soviétiques socialistes *Bulletin.*

Académie polonaise des sciences et des lettres. *Bulletin internationale*

Académie roumaine *Bulletin de la section scientifique*

Académie royale de Belgique. *Bulletin de la classe des sciences*

Académie royale des sciences et des lettres de Danemark. *Mémoires*

Academy of Natural Sciences of Philadelphia. *Proceedings*

Academy of Science of St. Louis *Transactions*

Accademia delle scienze fisiche e matematiche (Napoli). *Rendiconto.*

Accademia di agricoltura, scienze e lettere di Verona *Atti e memorie*

Accademia di medicina di Torino *Giornale*

Accademia di scienze, lettere ed arti degli zelanti, Acireale *Rendiconti e memorie.*

Agricultural Research Institute, Pusa. *Bulletins, Indigo Publications, Scientific Reports,* etc

Akademie der Wissenschaften in Wien. *Anzeiger; Monatshefte für Chemie und verwandte Teile anderer Wissenschaften; Sitzungsberichte*

American Academy of Arts and Sciences. *Memoirs; Proceedings*

American Association for the Advancement of Science *Science*

American Association of Cereal Chemists *Cereal Chemistry; Journal.*

American Association of Petroleum Geologists. *Bulletin*

American Association of Textile Chemists and Colorists. *Proceedings* (published in *American Dyestuff Reporter*)

American Ceramic Society. *Bulletin; Ceramic Abstracts; Journal; Transactions.*

American Chemical Society. *Chemical Abstracts; Chemical Reviews; Industrial and Engineering Chemistry; Journal; Journal of Chemical Education; Journal of Physical Chemistry.*

American Concrete Institute *Journal; Proceedings*

American Dental Association *Journal.*

American Electrochemical Society. *Transactions*

American Foundrymen's Association. *Bulletin; Transactions.*

American Gas Association *Bulletin of Abstracts; Monthly; Proceedings.*

American Gas Institute. *Proceedings.*

American Institute of Chemical Engineers *Bulletin* (including *Proceedings*); *Transactions.*

American Institute of Electrical Engineers *Journal; Transactions*

American Institute of Homeopathy *Journal*

American Institute of Mining and Metallurgical Engineers. *Bulletin; Mining and Metallurgy; Transactions.*

American Iron and Steel Institute *Year Book.*

American Leather Chemists' Association. *Journal*

American Medical Association *American Journal of Diseases of Children; Annual Reports of the Chemical Laboratory; Archives of Internal Medicine; Archives of Neurology and Psychiatry; Archives of Surgery; Journal*

American Oil Chemists' Society. *Oil and Fat Industries*

American Paint and Varnish Manufacturers' Association. *Circulars* of the Scientific Section, Educational Bureau.

American Peat Society. *Journal.*

American Petroleum Institute. *Bulletin.*

American Pharmaceutical Association *Journal.*
American Philosophical Society *Proceedings; Transactions.*
American Phytopathological Society. *Phytopathology.*
American Railway Engineering Association. *Bulletin; Proceedings.*
American Society for Municipal Improvements. *Proceedings.*
American Society for Steel Treating. *Transactions.*
American Society for Testing Materials *Proceedings; Tentative Standards,* etc.
American Society of Agronomy. *Journal.*
American Society of Biological Chemists. *Journal of Biological Chemistry.*
American Society of Civil Engineers. *Proceedings; Transactions.*
American Society of Heating and Ventilating Engineers. *Journal.*
American Society of Horticultural Science. *Proceedings.*
American Society of Mechanical Engineers. *Journal; Mechanical Engineering.*
American Society of Refrigerating Engineers *Journal; Refrigerating Engineering*
American Urological Association. *Transactions.*
American Water Works Association. *Journal*
American Wood-Preservers' Association. *Proceedings; Wood Preserving News.*
American Zinc Institute. *Bulletin.*
Asiatic Society of Bengal. *Journal; Proceedings; Memoirs.*
Asociación Argentina de electrotécnicos. *Boletin.*
Asociación quimica Argentina. *Anales.*
Associaçao brasileira de pharmaceuticos. *Boletin.*
Association des chimistes de sucrerie et de distillerie de France et des colonies *Bulletin.*
Association for the Study of Internal Secretions. *Endocrinology.*
Association of Chinese and American Engineers. *Journal.*
Association of Iron and Steel Electrical Engineers. *Iron and Steel Engineer*
Association of Official Agricultural Chemists *Journal.*
Associazione italiana delle industrie dello zucchero e dell'alcool. *Bollettino.*
Associazione italiana di chimica generale ed applicata. *Gazzetta chimica italiana*
Australasian Institute of Mining and Metallurgy. *Proceedings.*
Bayerische Akademie der Wissenschaften zu München. *Sitzungsberichte der mathematisch-naturwissenschaftlichen Abteilung.*
British Association for the Advancement of Science. *Reports*
British Cast Iron Research Association. *Bulletin.*
British Non-Ferrous Metals Research Association. *Bulletin.*
California Academy of Sciences. *Proceedings.*
Cambridge Philosophical Society. *Proceedings; Transactions.*
Canadian Institute of Chemistry. *Canadian Chemistry and Metallurgy.*
Canadian Institute of Mining and Metallurgy. *Bulletin; Transactions.*
Cellulose Institute, Tokyo. *Cellulose Industry.*
Ceramic Society (England). *Transactions*
Chemical, Metallurgical & Mining Society of South Africa. *Journal.*
Chemical Society of Japan. *Bulletin; Journal*
Chemical Society of London *Journal.*
Chemisch-technisches Institut der technischen Hochschule Karlsruhe. *Mitteilungen.*
China Society of Chemical Industry. *Journal.*
Cleveland Scientific and Technical Institution. *Bulletin.*
College of Agriculture, Hokkaido Imperial University. *Journal.*
College of Agriculture, Imperial University of Tokyo. *Journal.*
College of Engineering, Imperial University of Tokyo. *Journal.*
College of Physicians of Philadelphia. *Transactions.*
College of Science, Imperial University of Tokyo. *Journal.*
Colorado School of Mines. *Quarterly.*
Colorado Scientific Society. *Proceedings*
Copper and Brass Research Association *Bulletin.*
Danske Videnskabernes Selskab. *Biologiske Meddelelser; Mathematisk-fysiske Meddelelser; Skrifter naturvidenskabelig og mathematisk Afdeling; Oversigt.*
Deutscher Apotheker-Verein. *Archiv der Pharmazie* with which *Berichte der deutschen pharmazeutischen Gesellschaft* has been combined.
Deutsche botanische Gesellschaft. *Berichte.*
Deutsche chemische Gesellschaft. *Berichte; Bibliographia chimica* (discontinued at the end of 1926); *Chemisches Zentralblatt.*
Deutsche Gesellschaft fur technische Physik. *Physikalische Berichte.*
Deutsche keramische Gesellschaft. *Berichte.*
Deutsche Landwirtschafts-Gesellschaft. *Mitteilungen.*
Deutsche pharmazeutische Gesellschaft.

Berichte, which has been combined with *Archiv der Pharmazie.*

Deutsche physikalische Gesellschaft. *Physikalische Berichte; Verhandlungen; Zeitschrift für Physik.*

Elisha Mitchell Scientific Society *Journal.*

Engineering Institute of Canada. *Engineering Journal.*

Engineers' Society of Western Pennsylvania *Proceedings.*

Entomological Society of America. *Annals.*

Facultad de ciencias quimicas (Universidad de La Plata). *Revista.*

Faculty of Engineering, Hokkaido Imperial University *Memoirs.*

Faculty of Engineering, Imperial University of Tokyo. *Journal.*

Faculty of Science, Imperial University of Tokyo. *Journal*

Faraday Society *Transactions*

Fédération des industries chimiques de Belgique. *Bulletin.*

Franklin Institute *Journal.*

Fuel Technology Institute of the Czech Polytechnic High School in Prague *Report.*

Highland and Agricultural Society of Scotland. *Transactions.*

Illuminating Engineering Society (New York). *Transactions.*

Imperial Industrial Research Institute, Osaka, Japan. *Reports.*

Imperial Institute (London). *Bulletin.*

Indiana Academy of Science. *Proceedings*

Indian Association for the Cultivation of Science *Proceedings.*

Indian Chemical Society. *Quarterly Journal.*

Indian Institute of Science. *Journal*

Indian Science Congress. *Proceedings.*

Institut colonial de Marseille. *Bulletin des caoutchoucs; Bulletin des céréales et plantes à fécule; Bulletin des matières grasses.*

Institut d'analyse physico-chimique, Leningrad. *Annales*

Institut des recherches agronomiques de l'état à Sofia (Bulgaria) *Rapport annuel; Revue*

Institute of Brewing *Journal.*

Institute of Economic Mineralogy and Metallurgy (Moscow). *Transactions.*

Institute of Economic Mineralogy and Petrography (Moscow) *Transactions.*

Institute of Fertilizers (Moscow). *Transactions.*

Institute of Margarine Manufacturers. *Bulletin.*

Institute of Marine Engineers. *Transactions.*

Institute of Metals. *Journal.*

Institute of Physical and Chemical Research (Tokyo). *Bulletin; Scientific Papers.*

Institute of Pure Chemical Reagents (Moscow). *Transactions.*

Institut international du froid. *Bulletin.*

Institution of Civil Engineers (London). *Proceedings.*

Institution of Electrical Engineers (London). *Journal; Science Abstracts.*

Institution of Engineers and Shipbuilders in Scotland. *Transactions.*

Institution of Engineers, Australia. *Transactions.*

Institution of Mechanical Engineers (London). *Proceedings.*

Institution of Mining and Metallurgy. *Bulletin.*

Institution of Mining Engineers (London). *Transactions.*

Institution of Petroleum Technologists. *Journal.*

Institution of the Rubber Industry. *Transactions.*

Institut Pasteur, L'. *Annales; Bulletin.*

Institut polytechnique à Ivanovo-Vosniesensk *Bulletin.*

International Association for Rubber Cultivation in the Netherland Indies. *Communications.*

International Association of Dairy and Milk Inspectors. *Annual Report.*

International Institute of Agriculture. *Bulletin of Agricultural Intelligence and Plant Diseases, Monthly; International Review of the Science and Practice of Agriculture.*

International Society of Leather Trades' Chemists. *Journal.*

International Society of Soil Science *Proceedings.*

Iowa Academy of Science *Proceedings*

Iron and Steel Institute (London). *Carnegie Scholarship Memoirs; Journal.*

Istituto sieroterapico milanese. *Bollettino*

Istituto storico italiano dell'arte sanitaria. *Bollettino.*

Japanese Ceramic Society. *Journal.*

Jefferson Medical College and Hospital *Publications*

Kaiser-Wilhelm Institut fur Eisenforschung zu Dusseldorf. *Mitteilungen.*

Karpov Institute for Chemistry. *Transactions.*

Koloniaal Instituut te Amsterdam *Berichten van de Afdeeling Handelsmuseum van de Koninklijk Vereeniging Koloniaal Instituut; Mededeeling.*

Kongelige Danske Videnskabernes Selskab. *Biologiske Meddelelser; Mathematisk-fysiske Meddelelser; Skrifter naturvidenskabelig og mathematisk Afdeling; Oversigt.*

Koninklijke Akademie van Wetenschappen te

Amsterdam. *Proceedings; Verhandelingen; Verslag.*
Kungl. Vetenskapsakademiens Nobelinstitut *Meddelanden.*
Kyoto Imperial University. *Memoirs of the College of Engineering; Memoirs of the College of Science.*
Landesanstalt fur Wasser-, Boden- und Lufthygiene zu Berlin-Dahlem. *Mitteilungen.*
Leeds Philosophical and Literary Society *Proceedings*
Linnean Society of New South Wales *Proceedings.*
Manchester Association of Engineers *Transactions.*
Manchester Literary and Philosophical Society. *Memoirs and Proceedings.*
Marine Biological Association of the United Kingdom. *Journal*
Marine Biological Laboratory. *Biological Bulletin*
Maryland Academy of Sciences. *Bulletin; Transactions*
Massachusetts Institute of Technology. *Journal of Mathematics and Physics.*
Missouri Botanical Gardens *Annals*
National Academy of Sciences of the United States of America *Proceedings*
National Association of Railroad Tie Producers *Proceedings.*
National Canners' Association *Bulletins; Circulars.*
National Fire Protection Association. *Quarterly.*
National Physical Laboratory (England) *Collected Researches; Reports.*
National Research Council (U. S.). *Bulletins; Reprint and Circular Series*
Naturforschende Gesellschaft in Zurich *Vierteljahrsschrift*
Nederlandsche Chemische Vereeniging *Recueil des travaux chimiques des Pays-Bas*
New England Water Works Association *Journal*
New Zealand Board of Science and Art *Bulletins,* etc
New Zealand Institute *Transactions* and *Proceedings.*
Norske Videnskaps-Akademie i Oslo *Skrifter*
North of England Institute of Mining and Mechanical Engineers. *Transactions.*
Nova Scotian Institute of Science. *Proceedings and Transactions.*
Ohara Institut für landwirtschaftliche Forschungen in Kuraschiki, Provinz Okayama, Japan. *Berichte.*
Oil and Colour Chemists' Association. *Journal.*
Oklahoma Academy of Science. *Proceedings.*
Optical Society (London). *Transactions.*
Optical Society of America. *Journal.*
Paint Manufacturers' Association of the United States *Technical Circulars.*
Paper Makers' Association of Great Britain & Ireland *Proceedings*
Pharmaceutical Society of Japan *Journal.*
Philippine Islands Medical Association. *Journal*
Physical Society of London *Proceedings*
Physico-Mathematical Society of Japan. *Proceedings.*
Preussische Akademie der Wissenschaften. *Sitzungsberichte*
Radiological Society of North America. *Radiology*
Real academia de ciencias y artes de Barcelona. *Memorias*
Reale accademia dei fisiocritici in Siena. *Atti*
Reale accademia dei Georgofili *Atti*
Reale accademia delle scienze di Torino. *Atti*
Reale accademia di agricoltura di Torino. *Annali.*
Reale accademia di scienze, lettere ed arti in Modena. *Memorie*
Reale accademia nazionale dei Lincei, Roma. *Atti, Memorie.*
Reale accademia virgiliana di Mantova. *Atti e memorie.*
Reale istituto Lombardo di scienze e lettere *Rendiconti.*
Reale istituto Veneto di scienze, lettere ed arti. *Atti.*
Rijksvoorlichtings dienst ten behoeve van den rubberhandel en de rubbernijverheid te Delft *Mededeelingen*
R. Institute of Applied Chemistry (Moscow). *Transactions.*
Rontgen Society *Journal; Roentgen Society Section of the British Journal of Radiology*
Royal Academy of Sciences of Amsterdam. *Proceedings; Verhandelingen; Verslag*
Royal Agricultural Society of England *Journal.*
Royal Army Medical Corps *Journal.*
Royal Canadian Institute *Transactions.*
Royal Dublin Society. *Economic Proceedings; Scientific Proceedings*
Royal Institution of Great Britain. *Proceedings.*
Royal Irish Academy. *Proceedings*
Royal Sanitary Institute. *Journal*
Royal Society of Arts. *Journal.*
Royal Society of Canada. *Transactions*
Royal Society of Edinburgh. *Proceedings; Transactions.*
Royal Society of London. *Philosophical Transactions; Proceedings.*

Royal Society of Medicine. *Proceedings.*
Royal Society of New South Wales. *Journal and Proceedings*
Royal Society of Queensland. *Proceedings.*
Royal Society of South Africa *Transactions.*
Royal Society of South Australia *Transactions and Proceedings*
Royal Society of Tasmania *Papers & Proceedings*
Royal Society of Victoria. *Proceedings.*
Royal Society of Western Australia *Journal.*
Royal Technical College (Glasgow) *Journal.*
Rubber Growers' Association. *Bulletin.*
Russian-Chinese Polytechnic Institute of Harbin *Journal and Transactions.*
Russian Metallurgical Society *Journal.*
Russian Physical-Chemical Society *Journal.*
Sachsische Akademie der Wissenschaften zu Leipzig *Abhandlungen der mathematisch-physischen Klasse; Berichte über die Verhandlungen*
Schweizerische Verein von Gas- und Wasserfachmannern *Monats-Bulletin.*
Science Association, Maharajah's College, Vizianagaram. *Journal*
Science Society of China. *Science*
Scientific Agricultural Society (Japan) *Journal.*
Scientific Chemical-Pharmaceutical Institute (Moscow) *Transactions.*
Sociedad cientifica "Antonio Alzate" *Memorias y revista.*
Sociedad cientifica Argentina *Anales.*
Sociedad colombiana de ingenieros. *Anales de ingeniería*
Sociedad cubana de ingenieros *Revista.*
Sociedad de fomento fabril *Boletin.*
Sociedad española de física y química. *Anales.*
Sociedad nacinoal de mineria (Chile). *Boletin*
Società italiana di scienze naturali e del museo civico di storia naturale in Milano *Atti*
Societas Scientiarum Fennica. *Acta, Commentationes Biologicae; Commentationes Physico-Mathematicae.*
Societâtea de chimie din România *Buletinul*
Societatea de stiinte din Cluj. *Buletinul*
Societatea română de stiinte. *Buletinul de chimie pura si aplicata; Buletinul de stiinte fizice pure si aplicate.*
Société chimique de Belgique. *Bulletin*
Société chimique de France. *Bulletin*
Société de chimie biologique. *Bulletin*
Société de chimie industrielle. *Bulletin; Chimie & industrie.*
Société de l'industrie minérale *Bulletin; Revue.*
Société d'encouragement pour l'industrie nationale *Bulletin.*
Société de pharmacie de Bordeaux *Bulletin des travaux.*
Société des amis des sciences de Poznan. *Bulletin.*
Société des brasseurs pour l'enseignement professionel *Annales.*
Société des chimistes de Maurice *Bulletin.*
Société des chimistes russes à Brno *Recueil.*
Société des ingenieurs civils de France. *Mémoirs et compte rendu.*
Société française de minéralogie *Bulletin.*
Société française de photographie *Bulletin*
Société française de physique. *Journal de physique et le radium.*
Société industrielle de Mulhouse. *Bulletin*
Société industrielle de Rouen. *Bulletin*
Société royale de médecine de Gand. *Annales et bulletin.*
Société royale des sciences médicales et naturelles de Bruxelles *Annales et bulletin*
Société scientifique d'hygiène alimentaire et d'alimentation rationnelle de l'homme *Bulletin.*
Société suisse de chimie *Helvetica chimica acta.*
Society for Experimental Biology and Medicine *Proceedings*
Society for the Promotion of Engineering Education. *Engineering Education. Journal*
Society of Automotive Engineers. *Journal*
Society of Chemical Industry (Japan) *Journal* Society of Chemical Industry (London). *Journal.* Society of Chemical Industry (Victoria). *Proceedings.*
Society of Dyers and Colourists *Journal*
Society of Engineers (London) *Transactions.*
Society of Glass Technology *Journal*
Society of Motion Picture Engineers *Transactions.*
Society of Public Analysts and Other Analytical Chemists. *The Analyst*
South African Association for the Advancement of Science *Report* (published in the *South African Journal of Science*).
South African Chemical Institute. *Journal; Proceedings.*
South African Institution of Engineers. *Journal*
South African Sugar Association *Proceedings.*
South Dakota Academy of Sciences. *Proceedings.*
Staffordshire Iron and Steel Institute *Proceedings*
State Experimental Institute of Silicates (Moscow). *Transactions.*
Structural Materials Research Laboratory, Lewis Institute. *Bulletins; Circulars.*

Sveriges Kemiska Industrikontor. *Meddelanden*

Sydney Technical College Chemical Society. *Journal and Proceedings.*

Technical Association of the Pulp and Paper Industry *Technical Papers* (published in Paper Trade Journal and later issued separately).

Textile Institute (Manchester, Eng.). *Journal.*

Tôhoku Imperial University. *Science Reports; Technology Reports.*

Tokyo Imperial University. *Journal of the College of Agriculture; Journal of the College of Engineering; Journal of the College of Science; Journal of the Faculty of Engineering; Journal of the Faculty of Science; Report of the Aeronautical Research Institute.*

Université de Jassy. *Annales scientifiques.*

University of Durham Philosophical Society. *Proceedings.*

Verein der deutschen Zucker-Industrie *Zeitschrift.*

Verein deutscher Chemiker. *Zeitschrift für angewandte Chemie.*

Verein deutscher Ingenieure *Zeitschrift.*

Vermont Maple Sugar Makers' Association. *Proceedings*

Washington Academy of Sciences *Jonrual*

Western Society of Engineers. *Journal*

West of Scotland Iron and Steel Institute. *Journal*

Wisconsin Academy of Sciences, Arts and Letters *Transactions.*

Yale Mineralogical Society. *Proceedings*

APPENDIX 6

PERIODICALS OF CHEMICAL INTEREST

Of the following listed periodicals of more or less interest to chemists, 1263 were appearing at the beginning of 1927 and 626 had ceased publication, some of them many years ago. For current periodicals it is believed that the list can safely be regarded as pretty nearly complete; for these it takes in the periodicals of many branches of science, the papers in which are only in part a source of chemical information. Of the periodicals that have been discontinued for some time only strictly chemical ones have been listed, and these with less assurance as to completeness.

For each of the current periodicals information is given as to frequency of appearance (weekly, monthly, etc.), the number of volumes per year, 1926 volume number (the first if there is more than one per year), the first number of that volume if other than 1, the price and the name and address of the publisher. For the discontinued periodicals only the years during which they appeared and the city of publication are given. In a few instances all of the above information could not be ascertained.

The most commonly used abbreviations for periodical names are indicated by bold-face type. For the current periodicals these conform to the standard approved by the International Union of Pure and Applied Chemistry.

The information regarding current periodicals has been compiled by Mrs. Nellie G. Mahaffey, who did most of the work on the "List of Periodicals Abstracted by *Chemical Abstracts*"[1] and was in a position to draw on the same sources of information as for it. The *Chemical Abstracts* "List," with its library location data, is more useful than the following one for current periodicals; it contains only recent discontinued journals. For journals no longer appearing our main source of information has been the List of Technical Journals in Bolton's Bibliography of Chemistry.[2] A variety of lesser sources of information was also used.

For other lists of periodicals see the Bibliography of Lists of Periodicals, Appendix 4.

KEY

The **arrangement of periodicals** is alphabetical by their names as they appear on the covers. Abbreviations have not been allowed to influence the order. If

[1] See page 101 for a description.

[2] See also Reid, "Introduction to Organic Research," Van Nostrand (1924), pp. 82–90.

one wishes information regarding the publication or publications of a given society or institution and does not know the exact name or names, the list of Scientific and Technical Organizations, Appendix 5, will serve as a key.

Frequency of appearance has been indicated by the following symbols: *a* annual, *sa* semiannual, *q* quarterly, *bm* bimonthly, *m* monthly, *sm* semimonthly, *bw* biweekly, *w* weekly, *sw* semiweekly, *d* daily, *irr* irregular.

Volume. If more than one volume per year is published, the number is next given. The volume number of the first issue in 1926 (if 1926 data were not obtainable another year is given) is printed next in bold-face type.

Number. If the first issue is not number 1 of the volume, its number is given in parentheses next.

Series. If the volume number given belongs to a new series, this is shown by the series number being given in brackets placed before the volume number.

Price. The letter *d* following a price means "domestic" (the country of publication); *f* means foreign. Prices in parentheses are for single numbers; prices not so enclosed, unless otherwise stated, are for a year's subscription. Abbreviations for the coins used in the various countries are: A, As = anna, annas (India); d = penny; f = florin, F = franc; Gm = Goldmark; K = krone (Austria and Denmark) or krona (Sweden); L = lira, M = mark, P = peso; pfg. = pfennig; R = ruble; Re, Rs = rupee, rupees; Rm = Reichsmark; s = shilling; sch. = schilling (Austria); Y = yen.

An **asterisk** (*) in front of the name of a periodical signifies that the periodical has ceased publication or that, if still appearing, the name so marked is no longer used.

A **plus sign** (+) following a date means that the journal, now discontinued, appeared later than the date given. The exact date of discontinuance could not be ascertained in some instances.

Abhandlungen der mathematisch-Physischen Klasse der sächsischen Akademie der Wissenschaften zu Leipzig. *irr* **39**(5). Price varies *S Hirzel, Leipzig, Ger.*

Abrasive Industry. *m* **7**. $1.00 ($ 25)*d*. *Penton Publishing Co , Cleveland, Ohio*

***Abstracts of Bacteriology.** Merged in **Biological Abstracts** in 1926

Acetylene Journal. *m* **27**(7). $2*d* and *Can.*, $3.00*f*. *Acetylene Journal Publishing Co., 53 W. Jackson Blvd., Chicago, Ill.*

Acta Chirurgica Scandinavica (Nordiskt Medicinskt Arkiv, Avd. I). (Printed in English, French or German.) *irr* **59**(6). K20*d* per vol. *Stockholm, Sweden.*

Acta Medica Scandinavica (Nordiskt Medicinskt Arkiv, Avd. II). (Printed in English, French or German.) *irr* about 2 vols. **63**(3). K20*d* 25s*f* per vol. *Stockholm, Sweden.*

Acta Phytochimica (Japan). (Shokubutsu Kwagaku Zasshi.) (Printed in English, French or German.) *irr* **2**(3)(Au6, **1925**). *The Maruzen Co., 14 Tôri-Sanchome, Nihombashi-ku, Tokyo, Japan.*

Acta Scholae Medicinalis Universitatis Imperialis in Kioto. (Printed in English, German or Japanese.) *irr* **8**(3). Price of single copy varies. *Maruzen Co., Ltd., Tokyo, Osaka, Kyoto, Fukuoka and Sendai, Japan*

Acta Societatis Scientiarum Fennicae. *irr* **50**(9)(**1925**). *Druckerei der Junischen Literaturgesellschaft, Helsingfors, Finland*

***Actualités chimiques, Les.** *Paris.* 1896

***Afhandlingar i Fysik, Kemi och Mineralogi.** *Stockholm.* 1806–18.

***Agenda du chimiste.** *Paris.* 1877–92.

***Agricultural Bulletin of the Federated Malay States, The.** Name changed in 1922 to **The Malayan Agricultural Journal.**

Agricultural Experiment Stations (of the various states), Bulletins, Circulars and Technical Papers. *E. W. Allen, Office of Experiment Stations, U. S. Dept. of Agriculture, Washington, D. C.* or the *Directors of the individual stations.*

*Agricultural Gazette of Canada, The. Ceased publication in 1924.

Agricultural Gazette of New South Wales, The *m* 37. (6d)*d*. *Govt Printer, Phillip St, Sydney, N. S Wales*

Agricultural Journal of India, The *bm* 21. Rs6 or 9s 6d(Rs1–8 or 2s)*d* and *f* *Agricultural Adviser to the Govt of India, Pusa, Bihar, India.*

Agricultural Progress. *a* 3. 5s *Ernest Benn, Ltd, Bouverie House, 154 Fleet St, London, E C 4, Eng*

Agricultural Research Institute, Pusa, Bulletins, Indigo Publications (discontinued in 1923), Scientific Reports, etc *irr* *Manager, Govt of India, Central Publication Branch, 8 Hastings St, Calcutta, India.*

Aichi Journal of Experimental Medicine 4 times a yr. 1(3)(1924) (Printed in English, French or German) Y4 50 per vol. *Aichi Medical Univ, Nagoya, Japan*

*Alcool et le sucre. *Paris* 1892+

Allgemeine Brauer- und Hopfenzeitung *d*. 65(?)(1925). M33 (M2 75 per month)*d* *F Carl, Breite Gasse 58/60, Nürnberg, Ger.*

*Allgemeine Chemiker-Zeitung. *Cöthen* 1877–78. Continued as Chemiker-Zeitung.

*Allgemeine chemische Bibliothek des neunzehnten Jahrhunderts. *Erfurt* 1801–05.

Allgemeine Lederindustrie Zeitung. *w* *A Laidecke, Bremerstr 46, Berlin, N.W 21, Ger.*

Allgemeine Öl- u. Fettzeitung. *w* 22(?) (1925). *Allgemeine Industrie-Verlag, Neue Königstr 5, Berlin, N O 43, Ger*

Allgemeine österreichische Chemiker- und Techniker-Zeitung *sm* 44. *Hans Urban, Gersthoferstr. 70, Vienna, XVIII/2, Austria*

*Allgemeines Journal der Chemie *Leipzig.* 1798–1803. Continued as Neues allgemeines Journal der Chemie

*Allgemeine Zeitung fur die gesamte Spiritus-Industrie. *Berlin* 1890–91

*Almanacco di chimica agricola. *Milan.* 1873–78.

*Almanach de la chimie. *Rouen* and *Paris* 1854–61.

*American Analyst. *New York.* 1885–92+.

*American Chemical Journal. *Baltimore.* 1879–1913. Combined with Journal of the American Chemical Society in 1914.

*American Chemical Review and Journal for the Spirit, Vinegar and Sugar Industry. *Chicago.* 1882–91+ Continuation of Chemical Review and Journal for the Spirit, Vinegar and Sugar Industry

*American Chemist, The. *New York.* 1870–77

American Druggist. *m* 74. $2($ 25)*d*, $2 50($ 25)*f* *American Druggist Publishing Co, 53 Park Place, New York City.*

*American Druggist and Pharmaceutical Record Name changed to American Druggist.

*American Druggists' Circular and Chemical Gazette *New York.* 1857–65 Continued as Druggists' Circular and Chemical Gazette

American Dyestuff Reporter. (Including the Proceedings of the American Association of Textile Chemists and Colorists) *22 nos. a year* $5*d*, $6*f*, $5 50 *Can. Howes Publishing Co, 90 William St., New York City*

American Fertilizer, The. *sm* 2 vols 64. $3($ 25)*d*, $5($ 25)*f*, $4 *Can.* and *Mex Ware Bros Co, 1010 Arch St, Philadelphia, Pa*

American Food Journal, The *m* 21. $3($ 25)*d*, $5*f*, $4 *Can American Food Journal, Inc, Floral Park, New York City.*

*American Gas Association Abstracts. Name changed in 1919 to American Gas Association Bulletin of Abstracts.

American Gas Association Bulletin of Abstracts. *bm* 20. $5*d* *American Gas Assocn, Inc, 342 Madison Ave., New York City*

American Gas Association Monthly. *m* 8. $3*d* *American Gas Assocn, 342 Madison Ave, New York City*

*American Gas Engineering Journal Name changed in 1921 to American Gas Journal.

American Gas Journal. *w* 2 vols 124. $3($.10)*d*, $5*f*, $4 *Can. Am. Gas Light Journal, Inc, 53 Park Place, New York City.*

*American Gas Light Journal. Name changed in 1917 to American Gas Engineering Journal.

American Glass Review. *w* 45(27). $3*d*, $4 50*f*, $4 *Can. Commoner Publishing Co, Box 555, Pittsburgh, Pa*

American Ink-Maker, The. *m* 4. $2 00*d*. *MacNair-Dorland Co, 136 Liberty St, New York City.*

*Americanische Annalen der Arzneikunde, Chemie und Physik. *Bremen.* 1802–3.

American Journal of Botany. *m* except Aug. and Sept. 13. $6($ 75)*d*, $6.40*f*.

Brooklyn Botanic Garden, Prince and Lemon Sts., Lancaster, Pa.

American Journal of Diseases of Children. *m* 2 vols **31.** $4($ 50)*d*, $4 50*f*, $4 30 *Can. American Medical Assocn, 535 N. Dearborn St, Chicago, Ill.*

American Journal of Hygiene, The. *bm* **6.** $6($1 50)*d*, $6 50*f* *C. E Simon, 615 N. Wolfe St, Baltimore, Md.*

American Journal of Pathology, The. *bm* **2.** $5*d*, $6*f*, $5 50 *Can. Boston City Hospital, 818 Harrison Ave, Boston, Mass*

American Journal of Pharmacy *m* **98.** $3($ 30)*d*, $3 25*f* *Philadelphia College of Pharmacy and Science, 145 N 10th St, Philadelphia, Pa*

American Journal of Physiology, The. *m* Several vols a year. **75**(2). $5*d* and *Can.*, $5 25*f* per vol. *D. R. Hooker, 19 W. Chase St, Baltimore, Md.*

American Journal of Public Health *m* **16.** $5($ 50)*d*, $6*f*, $5 50 *Can American Public Health Assocn., 370 7th Ave, New York City*

***American Journal of Roentgenology.** Name changed in 1923 to **American Journal of Roentgenology and Radium Therapy.**

American Journal of Roentgenology and Radium Therapy. *m* 2 vols. **15.** $10($1 50)*d*, $12*f*, $11 *Can. Paul B. Hoeber, Inc., 67–9 E 59th St, New York City*

American Journal of Science, The *m* 2 vols. [5]**11**(61). $6($ 60)*d*, $6 40*f*, $6 25 *Can New Haven, Conn.*

American Journal of Syphilis, The *q* **10.** $10($2 50)*d*, $10 80*f*, $10 40 *Can C V Mosby Co, 3616 Washington Blvd, St. Louis, Mo*

American Journal of the Medical Sciences, The *m* 2 vols **171.** $6*d* *Lea & Febiger, Philadelphia and New York*

American Journal of Tropical Medicine, The *bm* **6.** $5*d* and *countries in Postal Union*, $5 50 *outside of Postal Union*, per vol *Williams & Wilkins Co, Mount Royal and Guilford Aves, Baltimore, Md.*

***American Laboratory,** The *Boston* 1875

American Medicine *m* [N S]**21.** $2*d*, $3*f*. *American Medical Publishing Co, 189 College St., Burlington, Vt.*

American Miller, The. *m* **54.** $2($ 25)*d*, *Can, Cuba* and *Mex*, $3*f*. *Mitchell Brothers Publishing Co, 431 S. Dearborn St., Chicago, Ill*

American Mineralogist, The *m* **11.** $3 ($ 30)*d* and *f* *Alexander H. Phillips, Princeton Univ, Princeton, N. J.*

American Paint and Varnish Manufacturers' Association, Scientific Section, Educational Bureau, **Circulars.** Price varies. Gratis to members. *H. A. Gardner, 2201 New York Ave., N. W., Washington, D C.*

American Paint Journal. *w* **10**(11). $3 ($.10)*d*, *Cuba* and *Mex*, $4*f*, $3 50 *Can. American Paint Journal Co, Inc., 2713 Washington Blvd, St Louis, Mo*

American Perfumer and Essential Oil Review, The *m* **20**(11) $3($ 30)*d*, $3 50 *Can., Cuba* and *Mex.*, $4 *countries in Postal Union Perfumer Publishing Co, 14 Cliff St, New York City*

American Petroleum Institute, Bulletin 8(?)(**1927**). *Postum Bldg, 250 Park Ave, New York City*

American Railway Engineering Association, Bulletin. *m* except May and June **27**(283) ($ 50); **Proceedings.** *a* $10. *American Railway Engineering Assocn, 431 S. Dearborn St, Chicago, Ill.*

American Review of Tuberculosis, The *m* 2 vols **13.** $8($1)*d*, $8 50*f*, $8 25 *Can National Tuberculosis Assocn, 370 7th Ave, New York City*

***American Society of Refrigerating Engineers Journal** Name changed in 1922 to **Refrigerating Engineering**

***American Sugar Industry** Name changed to **Sugar.**

***American Vinegar Industry** Name changed in 1922 to **American Vinegar Industry** and Fruit Products Journal

***American Vinegar Industry and Fruit Products Journal,** The. Name changed in 1923 to **Fruit Products** Journal and the **American Vinegar Industry.**

Analele minelor din România. *m* **9.** 1000 lei*d*, 1200 lei*f* *Str Lascar Catargiu, 17, Bucharest, Rumania.*

Anales de ingenieria *m* **33**(394). $2 50 ($ 20)*d*, $3*f* *Sociedad Colombiana de ingenieros, Apartado No 372, Bogotá, Colombia*

Anales de la asociación química Argentina. *bm* **14**(71). $6m/n($1m/n)*d*, $3o/s ($ 60o/s)*f* *Bartolomé Mitre 670, Buenos Aires, Argentine Republic*

Anales de la sociedad científica Argentina. *bm* 2 vols **101.** $12m/n($1m/n)*d*. *Cevallos 269, Buenos Aires, Argentine Republic*

Anales de la sociedad española de física y química *m* except Aug and Sept **24**(229) 20 pesetas *d*. *Manuel T. Gil Garcia, Corredera Baja de San Pablo, núm. 59, Madrid, Spain.*

***Anales de la sociedad química Argentina.**

Name changed in 1921 to **Anales** de la **asocación química Argentina.**

Analyst, The *m* **51**(598) 30s(3s). *W. Heffer and Sons, Ltd, 4 Petty Cury, Cambridge, Eng.*

***Analysts' Annual Note-Book,** The. *London.* 1875+.

Annalen der Chemie, Justus Liebigs. *irr* 2 to 4 vols of 3 nos each **446**(3). *Verlag Chemie, G m b. H, Bosestr. 2, Leipzig, Ger*

***Annalen** der **Chemie** und **Pharmacie.** *Heidelberg.* 1840–73 Continuation of **Annalen** der **Pharmacie** Continued as **Annalen** der **Chemie** und **Pharmacie,** Justus Liebigs.

***Annalen** der **Chemie** und **Pharmacie,** Justus Liebigs *Leipzig* and *Heidelberg.* 1873–74. Continuation of **Annalen** der **Chemie** und **Pharmacie.** Continued as **Annalen** der **Chemie,** Justus Liebigs.

***Annalen** der **chemischen Literatur.** *Berlin.* 1802. Continuation of **Bibliothek** der neuesten **physisch-chemischen, metallurgischen, technologischen** und **pharmaceutischen Literatur.**

***Annalen** der **Pharmacie.** *Lemgo* and *Heidelberg.* 1832–39 Continued as **Annalen** der **Chemie** und **Pharmacie.**

Annalen der **Physik.** *irr* 3 vols of 8 nos each. **79.** Rm 20 per vol. Postage Rm80*d*, Rm1 60*f*. *Johann Ambrosius Barth, Dörrienstr. 16, Leipzig, Ger.*

***Annalen** der **Physik (Halle).** *Halle* 1799–1818 Continuation of **Neues Journal** der **Physik.** Continued as **Annalen** der **Physik** und der **physikalischen Chemie.**

***Annalen** der **Physik** und **Chemie.** *Berlin.* 1824–77. *Leipzig* 1877–99. Continuation of **Annalen** der **Physik** und der **physikalischen Chemie** Continued as **Annalen** der **Physik.**

***Annalen** der **Physik** und der **physikalischen Chemie.** *Halle.* 1819–24. Continuation of **Annalen** der **Physik.** Continued as **Annalen** der **Physik** und **Chemie.**

Annales Academiae Scientiarum Fennicae. *irr* [A]**24.** *Suomalaisen Tiedeakatemian Kustantama, Helsingfors, Finland.*

Annales de **chimie** *bm* 2 vols [10] **5.** F45(F10)*d*, F50*f*, *in Postal Union. Masson et Cie, Libraires de l'académie de médecine, 120 Blvd. St-Germain, Paris (6e), France.*

Annales de **chimie analytique** et de **chimie appliquée** et revue de chimie analytique **réunies.** *m* [2]**8.** F22(F2.50)*d*, F28*f*. *C. Crinon, 20 Blvd. Richard-Lenoir, Paris (11e), France.*

***Annales** de **chimie analytique** et revue de chimie analytique Name changed to **Annales** de **chimie analytique** et de **chimie appliquée** et revue de chimie analytique réunies.

***Annales** de **chimie** et de **physique** *Paris* 1817–1914 Separated into two journals, **Annales** de **chimie** and **Annales** de **physique.**

Annales de la **science agronomique** française et étrangère. *bm* **42** (**1925**). F30(F5 25)*d*, F40*f* *Librairie Berger-Sevrault, 136, Blvd St-Germain, Paris (6e), France.*

***Annales** de la **société** des **brasseurs** pour l'enseignement professionel. Combined with **Bulletin** de l'**association** des **anciens élèves** de l'**institut supérieur** des **fermentations** de **Gand.**

Annales de la **société géologique** de **Belgique** *q* **48**(3) Price varies. *H Vaillant-Carmanne, Place Saint Michel 4, Liége, Belgium.*

Annales de l'**institut** d'**analyse physico-chimique, Leningrad** *irr* **3.** *L'institut d'analyse physico-chimique, Leningrad, Union of the Socialistic Soviet Republics*

Annales de l'**institut** de **platine** et des autres métaux précieux (Printed in Russian) *irr* No. **4.** *Institut de platine, Leningrad, Union of the Socialistic Soviet Republics*

Annales de l'**institut Pasteur.** *m* **40.** F60(F5)*d*, F70*f* *Masson et Cie, Libraires de l'académie de médecine, 120 Blvd. St-Germain, Paris (6e), France*

Annales de **médecine.** *m* 2 vols **19.** F65*f* *Masson et Cie., 120 Blvd. St-Germain, Paris (6e), France.*

Annales de **médecine légale** de **criminologie** et de **police scientifique.** *m* except Aug. and Sept. **6.** F32*d*, F60*f*, F48 *Belgium* and *Italy* *J B Baillière & fils, 19 rue Hautefeuille, Paris, France*

Annales de **physiologie** et de **physicochimie biologique.** *irr* **1**(**1925**). F40(F10)*d*, F45(F10)*f*. *Gaston Doin, Paris, France*

Annales de **physique** *bm* 2 vols. [10]**5.** F45(F10)*d*, F50*f*. *Masson et Cie, 120 Blvd St-Germain, Paris (6e), France*

Annales des **falsifications** et des fraudes, Les *m* **19**(205) F25*d*, F40*f*. *M Filaudeau, 42 bis, rue de Bourgogne, Paris (7e), France*

Annales des **mines de Roumanie.** See **Analele minelor din România.**

Annales des **mines** ou recueil de mémoires sur l'exploitation des mines et sur les sciences et les arts qui s'y rattachent. *m* 2 vols. [12]**9.** F72(F7 50)*d*, F82. or $4.30*f* *H. Dunod, 92 rue Bonaparte, Paris (6e), France.*

***Annales** d'**hygiène publique** et de **médecine**

légale. Name changed in 1923 to **Annales d'hygiène publique, industrielle et sociale.**

Annales d'hygiène publique, industrielle et sociale. *m*[N S.]**4.** F60*f. J. B Baillière et fils, 19 rue Hautefeuille, Paris, France.*

***Annales et bulletin de la société royale de médecine de Gand.**

Annales et bulletin de la société royale des sciences médicales et naturelles de Bruxelles. *srr* F20*d*, F22*f F Peeters-Bikx, 119 rue de Liedekerke, Brussels, Belgium.*

Annales scientifiques de l'université de Jassy. *q* **14.** Swiss F15 *I Borcea, Universitate, Strada Carol, Jassy, Rumania*

Annali della r accademia di agricoltura di Torino. *a* **67(1924).** *Tipografia Enrico Schioppo, Vicolo Benevello in via Giuseppe Verdi, Torino, Italy*

Annali della regia scuola d'ingegneria di Padova. 2. L50*d*, L 70*f Padua, Italy.*

Annali della regia scuola superiore di agricoltura in Portici. *a* [2]**20(1925)** *Stab. Tip Ernesto della Torre, Portici (Napoli), Italy*

Annali di chimica applicata. Name changed to **Giornale di chimica applicata,** in Feb , 1920, combined with **Giornale di chimica industriale** to form **Giornale di chimica industriale ed applicata,** in Mar , 1920; resumed publication under title, **Annali di chimica applicata** in Feb., 1923. *m* **16.** L100 (L15)*d*, L125(L20)*f. Via Quattro Novembre 154, Rome (1), Italy.*

***Annali di chimica applicata alla medicina,** cioè, alla **farmacia,** alla **tossicologia,** all'**igiene,** alla **fisiologia,** alla **patologia** ed alla **terapeutica.** *Milan* 1845–84+ Continuation of **Biblioteca di farmacia, chimica, fisica, medicina, chirurgia, terapeutica, storia naturale** Combined with **Rivista di chimica medica e farmaceutica** and continued as **Annali di chimica medico-farmaceutica e di farmacologia.**

***Annali di chimica e di farmacologia** *Milan.* 1886–90. Continuation of **Annali di chimica medico-farmaceutica e di farmacologia**

***Annali di chimica e storia naturale.** *Pavia.* 1790–1802

***Annali di chimica medico-farmaceutica e di farmacologia.** *Milan.* 1885. A combination of **Annali di chimica applicata alla medicina, cioè, alla farmacia, alla tossicologia, all'igiene, alla fisiologia, alla patologia ed alla terapeutica** and **Rivista di chimica medica e farmaceutica, tossicologia, farmacologia e terapia.** Continued as **Annali di chimica e di farmacologia.**

***Annali di fisica, chimica e matematiche** *Milan.* 1841–47 Continued as **Annali di fisica, chimica e scienze affini.**

***Annali di fisica, chimica e scienze affini.** *Turin* 1850. Continuation of **Annali di fisica, chimica e matematiche**

***Annali di fisica,** dell'Abbate **F. C. Zantedeschi** *Padua.* 1849–50 Continuation of **Raccolta fisico-chimica italiana**

Annali d'igiene. *m* **36.** L40(L5)*d*, L60 (L7 50)*f R. istituto d'igiene, Via Palermo 58, Rome, Italy*

Annals of Applied Biology About *q* **13.** £2(12s)*d*, $11 25($3 50)*f Cambridge Univ Press, Fetter Lane, London, E C 4, Eng.*

Annals of Botany. *q* **40**(157) 40s(15s)*d*, *Humphrey Milford, Oxford University Press, Amen Corner, Warwick Sq , London, E. C., Eng.*

***Annals of Chemical Medicine.** *London* 1879–81.

***Annals of Chemical Philosophy,** etc , The *London.* 1828–29

***Annals of Chemistry,** etc (Translated from the French) *London.* 1791

***Annals of Chymistry and Practical Pharmacy** *London* 1843.

Annals of Clinical Medicine. *m* **4**(7). $7*d*, *Can., Cuba* and *Mex* , $7 50*f* per vol *Williams & Wilkins Co , Mt. Royal & Guilford Aves , Baltimore, Md*

***Annals of Medicine.** Discontinued under this name but continued in new journal, **Annals of Clinical Medicine.**

***Annales of Pharmacy and Practical Chemistry.** *London* 1852–54.

***Annals of Philosophy** (or Magazine of Chemistry, Mineralogy, Mechanics, Natural History, Agriculture and the Arts) *London* 1813–20. New series, *London.* 1821–26 United in 1827 with **Philosophical Magazine and Journal.**

Annals of the Entomological Society of America *q* **19.** $4($1)*d* and *f. Prof. Herbert Osborn, Ohio State Univ , Columbus, O*

Annals of the Missouri Botanical Gardens. *q* **13.** $3($1)*d* and *f. Missouri Botanical Gardens, St Louis, Mo*

Annals of Tropical Medicine and Parasitology 4 nos per year. **20.** £1 2s6d per vol *University Press of Liverpool, Ltd., 177 Brownlow Hill, Liverpool, Eng.*

***Annuaire à l'usage du chimiste, du médecin, du pharmacien.** *Brussels.* 1843.

*Annuaire de chimie. *Paris.* 1845–51.

*Annuaire de la chimie industrielle et de l'électrochimie. *Paris* 1888–90+.

*Annuaire des eaux minérales de France. *Paris.* 1830–32

*Annuaire des fabricants de sucre, distillateurs et liquoristes. *Douai* 1862

*Annuaire des produits chimiques, de la droguerie et de l'épicerie en gros. *Paris* 1874–78

*Annuaire des sciences chimiques, ou Rapport sur les progrès des sciences naturelles, présenté à l'académie, Stokolm. *Paris* 1837.

*Annuario almanacco dei chimici, farmacisti e medici italiani. *Milan.* 1874–79.

*Annuario chimico italiano dell'anno 1845 *Modena.* 1846

*Annuario del laboratorio di chimica generale e technologica della r. accademia navale di Livorno. *Milan.* 1890–91

*Annuario delle scienze chimiche e naturali *Verona* 1840

*Annuario delle scienze chimiche, farmaceutiche e medico-legali. *Mantua* 1841–49. Continuation of Annuario delle scienze chimiche, farmaceutiche e medico-legali ad uso dei farmacisti e medici

*Annuario delle scienze chimiche, farmaceutiche e medico-legali ad uso dei farmacisti e medici *Mantua.* 1840 Continued as Annuario delle scienze chimiche, farmaceutiche e medico-legali.

*Annuario di chimica *Turin.* 1885–94

*Annuario di chimica scientifica e industriale (Monthly supplement to Enciclopedia di chimica) Discontinued Dec., 1921.

*Anuarul Laboratorului de chimie organica pe anul bugetar 1888–89 *Bucharest.* 1889.

Anzeiger der Akademie der Wissenschaften in Wien. Mathematisch-naturwissenschaftliche Klasse About 26 nos a year 62(1925) *Hölder-Pichler-Tempsky, A.-G., Vienna, Austria.*

*Anzeiger fur die chemische Industrie. *Charlottenburg.* 1893–94.

Apotheker Zeitung. *irr* 41. M3*d* per month. *Deutsche Apotheker Verein, Levetzowstr. 16B, Berlin, N. W. 87, Ger.*

Apparatebau, Der *bw* 38. Gm12*d*. *Verlag von W Klenke, Volkswirt, R D. V, Hannover, Ger.*

*Appendice alla gazzetta chimica italiana. *Rome* 1883–87

*Arbeiten aus dem kaiserlichen Gesundheitsamte. Name changed to Arbeiten aus dem Reichsgesundheitsamte

Arbeiten aus dem Reichsgesundheitsamte. *irr* 56(4). Price varies. *Julius Springer, Link-Str., 23–24, Berlin, W 9, Ger.*

Arbeiten aus dem Staatsinstitut für experimentelle Therapie und dem Georg Speyer-Hause zu Frankfurt A. M. *irr* 1926(18). Price varies. *Gustav Fischer, Jena, Ger.*

Archief voor de Rubbercultuur in Nederlandsch-Indië *m* 10. f17 50*d*, f25*f* *Rubberproefstation in Nederlandsch-Indië Buitenzorg, Java.*

Archief voor de Suikerindustrie in Nederlandsch-Indië. *w* 34. 36 guilder *d*, f36*f*. *Het Algemeen Syndicaat van Suikerfabrikanten in Nederlandsch-Indië, Soerabaja, Java*

Archief voor de Suikerindustrie in Nederlandsch-Indié, Mededeelingen van het Proefstation voor de Java Suikerindustrie. *irr Het Algemeen Syndicaat van Suikerfabrikanten in Nederlandsch-Indië, Soerabaja, Java.*

Archief voor de Suikerindustrie in Nederlandsch-Indië, Verslagen. *irr* 33rd yr Vol. 4, No 1 (1925) *Het Algemeen Syndicaat van Suikerfabrikanten in Nederlandsch-Indié, Soerabaja, Java.*

*Archiv der Agriculturchemie für denkende Landwirthe. *Berlin.* 1803–18.

*Archiv der Pharmazie Combined in 1924 with Berichte der deutschen pharmazeutischen Gesellschaft to form Archiv der Pharmazie und Berichte der deutsche pharmazeutischen Gesellschaft.

Archiv der Pharmazie und Berichte der deutschen pharmazeutischen Gesellschaft. *irr* 264. Rm12*d*, Rm14 50*f* *Verlag Chemie, G m b. H., Bosestr. 2, Leipzig, Ger.*

*Archiv des Apotheker-Vereines im nördlichen Teutschland. 1822 Continued as Annalen der Pharmacie.

Archives de biologie. About *q* 35(3–4) F90 per vol. *Masson et Cie, 120 Blvd. St-Germain, Paris (6e), France.*

Archives de physique biologique. About *tri-m* 5. F40*d* per vol *Vigot frères, 23 rue de l'École de médecine, Paris, France*

Archives des sciences physiques et naturelles. *bm* [5]3. F25(F6)*d*, F30*f* *in Postal Union. Institut de physique de l'université de Genève, Geneva, Switz.*

Archives internationales de médecine expérimentale. 4 nos a year. 2(2). Belgian F100*d*, French F100*f* *Masson et Cie, 120 Blvd. St.-Germain, Paris (6e), France.*

Atti della **società italiana di scienze naturali** e del museo civico di storia naturale in **Milano.** *irr* **64**(3/4) L40*d* *Giardini pubblici (Museo civico di storia naturale), Corso Venezia, Milan (13), Italy*

Atti del reale **istituto Veneto** di scienze, lettere ed arti *a* **84(1924–25)** Pt. 2 *Presso la segreteria del reale istituto, Palazzo Loredan Santo Stefano, Venice, Italy.*

Atti e memorie dell'**accademia** di agricoltura, scienze e lettere di **Verona.** About *a* [5]**1(1925).** *Accademia di agricoltura scienze e lettere di Verona, Verona, Italy*

Atti e memorie della reale **accademia virgiliana** di **Mantova.** *a* **1925**(17/18) L15*d.* *Reale accademia virgiliana di Mantova, Mantua, Italy.*

***Atti ufficiali** della **società italiana** dei **chimici analisti** *Pavia* 1893

***Australasian Chemist** and **Metallurgist,** The. Suspended publication in 1921. Resumed in 1922 under the name, The **Technical** Journal

***Australia, Advisory Council** of **Science** and **Industry, Bulletins,** etc Continued as **Australia, Institute** of **Science** and **Industry, Bulletins,** etc.

Australia, Institute of **Science** and **Industry, Bulletins,** etc *irr* Free on request *Institute of Science and Industry, 314 Albert St, East Melbourne, Australia*

Australian Journal of **Experimental Biology** and **Medical Science** *q* **3.** £1 1s *The Medical Sciences Club, Univ of Adelaide, Adelaide, S Australia*

Australian Science Abstracts. *q* **5.** 4s (1s)*d.* *A B Walkom, D. Sc, 16 College St, Sydney, Australia.*

***Auswahl** aller **eigenthümlichen Abhandlungen** und **Beobachtungen** in der **Chemie,** mit einigen Verbesserungen und Zusatzen *Leipzig.* 1786–87.

***Auswahl vorzüglicher Abhandlungen** aus den **sämmtlichen Bänden** der **französischen Annalen** der **Chemie** zur vollständigen Benutzen derselben durch Erganzung der von ihrem Anfange an den chemischen Annalen einverleibten Aufsatzen fur deutsche Scheidekunstler von Lorenz von Crell *Helmstedt* 1801.

Baking Technology *m* **5.** $5($5.50)*d. American Institute of Baking, 1135 Fullerton Ave, Chicago, Ill*

***Beama.** Name changed in 1924 to **World Power.**

***Beiblätter** zu den **Annalen** der **Physik.** *Leipzig.* 1877–1919 Merged in 1920 with **Physikalische Berichte.**

***Beiträge** zu den **chemischen Annalen** von Lorenz **Crell.** *Leipzig* and *Dessau* 1785–99

***Beitrage** zur **Chemie** in **Uebersetzung** oder **vollständigen Auszügen** neuer **Chemischer Abhandlungen,** sammt einigen neuen Aufsatzen *Vienna* 1791.

***Beitrage** zur **chemischen Physiologie** und **Pathologie** Merged in 1908 with **Biochemische Zeitschrift**

Beitrage zur **Klinik** der **Tuberkulose** und spezifischen Tuberkulose-Forschung *irr* several vols a year **63.** Price varies *Julius Springer, Link-Str. 23–24, Berlin, W 9, Ger*

Beitrage zur **Krystallographie** und **Mineralogie** *irr* **3.** About M20. *Carl Winters Universitätsbuchhandlung, Heidelberg, Ger*

Beitrage zur **pathologische Anatomie** und zur allgemeinen Pathologie. *irr* about 2 vols **75.** *Gustav Fischer, Jena, Ger*

Beitrage zur **Physiologie** *irr* **3(1925).** M15*d* per vol *Verlagsbuchhandlung Richard Schoetz, Wilhelmstr 10, Berlin, S. W. 48, Ger.*

***Beitrage** zur **physiologischen** und **pathologischen Chemie** und **Mikroskopie** in ihrer **Anwendung** auf die **praktische Medicin.** *Berlin.* 1843. Continued as **Archiv** fur **physiologische** und **pathologische Chemie** und **Mikroskopie** in ihrer **Anwendung** auf die **praktische Medicin**

Bell System Technical Journal. *q* **5.** $1 50($ 50)*d* *American Telephone and Telegraph Co, 195 Broadway, New York City.*

Berichte der **deutschen botanischen Gesellschaft** *m* except Aug and Sept **43**(10). Rm 20*d,* about $5 *U S Gebr. Borntraeger, Schöneberger Ufer 12a, Berlin, W. 35, Ger.*

Berichte der deutschen chemischen Gesellschaft *irr* about *m* **59.** Rm60(Rm7)*d,* Rm63(Rm7.30)*f* *Deutsche chemische Gesellschaft, Sigismundstr. 4, Berlin, W. 10, Ger*

***Berichte** der deutschen chemischen Gesellschaft zu Berlin *Berlin* 1868–77. Continued as **Berichte** der deutschen chemischen Gesellschaft.

Berichte der deutschen keramischen Gesellschaft *bm* **7.** M20*d.* *Ringbahnstr 10, Berlin-Halensee, Ger.*

***Berichte** der **deutschen pharmazeutischen Gesellschaft.** Combined with **Archiv der Pharmazie** in 1924 to form **Archiv der Pharmazie** und Berichte **der** deutschen pharmazeutischen Gesellschaft.

***Berichte** der **deutschen physikalischen**

Gesellschaft. Discontinued but followed by Zeitschrift fur **Physik.**

***Berichte der oesterreichischen Gesellschaft zur Förderung der chemischen Industrie** *Prague* ?–1896.

Berichte des Ōhara Instituts fur landwirtschaftliche Forschungen in Kurashiki, Provinz Okayama, Japan. *irr* **3.** Price varies *Verlag der Ōhara Schōnōkwai, Kurashiki, Provinz Okayama, Japan.*

***Berichte uber die gesamte Physiologie.** Name changed with Vol 3 to **Berichte über die gesamte Physiologie und experimentelle Pharmakologie**

Berichte uber die gesamte Physiologie und experimentelle Pharmakologie *sm* 4 vols **34.** M60*d* per vol. *Julius Springer, Link-Str. 23–24, Berlin, W. 9, Ger.*

***Berichte uber die neuesten Fortschritte in der chemischen und physikalischen Technik** *Carlsruhe* 1865

***Berichte uber die Verhandlungen der K. sächsischen Gesellschaft der Wissenschaften** Name changed to **Berichte uber die Verhandlungen der sächsischen Akademie der Wissenschaften zu Leipzig.**

Berichte uber die Verhandlungen der sächsischen Akademie der Wissenschaften zu Leipzig. Mathematisch-physische Klasse *irr* **78** Price varies. *S Hirzel, Leipzig, Ger*

***Berliner klinische Wochenschrift.** Combined with **Therapeutische Halbmonatshefte** in 1922 to form **Klinische Wochenschrift**

***Berlinisches Jahrbuch der Pharmacie.** *Berlin* 1795 Continued as **Berlinisches Jahrbuch fur die Pharmacie und fur die damit verbundenen Wissenschaften.**

***Berlinisches Jahrbuch fur die Pharmacie und fur die damit verbundenen Wissenschaften.** *Berlin* 1796–1840 Continuation of **Berlinisches Jahrbuch der Pharmacie**

Beton und Eisen. *bm* **25.** Ausgabe A Rm6(Rm1 50 plus postage)*d* post free per quarter, Rm26 40*f* per yr , Ausgabe B, with "Zeitschriftenschau fur das gesamte Bauingenieurwesen," Rm7*d* post free per quarter, Rm30.40*f* per yr. *Wilhelm Ernst & Sohn, Wilhelmstr. 90, Berlin, W. 66, Ger.*

***Betterave,** La. Apparently discontinued.

***Beyträge zur Physik, Oeconomie, Chemie, Technologie, Mineralogie und Statistik, besonders der russischen und angranzenden Länder.** *Berlin.* 1786–88.

***Bibliographia chimica** (Internationaler Literatur-Anzeiger fur Chemie, chemische Technologie und alle Grenzgebiete) Discontinued in 1926

***Biblioteca di farmacia, chimica, fisica, medicina, chirurgia, terapeutica, storia naturale.** *Milan* 1834–45 Continuation of **Giornale di farmacia, chimica e scienze accessorie.** Continued as **Annali di chimica applicata alla medicina, cioè, alla farmacia, alla tossicologia, all'igiene, alla fisiologia, alla patologia ed alla terapeutica**

***Bibliothek der neuesten physisch-chemischen, metallurgischen, technologischen und pharmaceutischen Literatur.** *Berlin.* 1788–95 Continued as **Annalen der chemischen Literatur.**

Biedermanns Zentralblatt *m* **55.** M24*d. Verlag Oskar Leiner, Leipzig, Ger.*

***Biochemical Bulletin**

Biochemical Journal, The About *bm* **20.** 35s*d*, $14 25 *U S. Cambridge University Press, Fetter Lane, London, E C. 4, Eng ; University of Chicago Press, Chicago, Ill.*

***Biochemisches Centralblatt.** 1902–09. Continued as **Zentralblatt fur Biochemie und Biophysik.**

Biochemische Zeitschrift *irr* 8 to 10 vols. **168.** M28*d* per vol. *Julius Springer, Link-Str 23–24, Berlin, W 9, Ger.*

Biochimica e terapia sperimentale. *m* **13.** L20(L3)*d*, L30*f*. *Via Podgora 5, Milan (114), Italy*

Biological Abstracts. *m* **1.** $15 per vol. *University of Pennsylvania, Philadelphia, Pa.*

Biological Bulletin of the Marine Biological Laboratory *m* 2 vols **50.** $9($1)*d* and *f. Biological Bulletin, Prince and Lemon Sts , Lancaster, Pa*

Biologisches Zentralblatt *m* **46.** M30*d. Georg Thieme, Leipzig, Ger.*

Black Hills Engineer *q* **14.** $1*d. The South Dakota State School of Mines, Rapid City, S Dakota.*

Blast Furnace and Steel Plant, The. *m* **14.** $2($.25)*d*, $3 50*f*, $2 50 *Can. The Andresen Co , Inc , Thaw Bldg., 108 Smithfield St , Pittsburgh, Pa*

***Blätter fur Zuckerrübenbau** Discontinued in 1923.

***Bleacher, Finisher and Textile Chemist.** Combined with **Color Trade Journal.**

Boletim da associaçao brasileira de pharmaceuticos. *bm* **6(1925).** 12$000(2$000)*d*, 18$000*f*. *Avenida Almirante Barroso 54, Caixa Postal 948, Rio de Janeiro, Brazil.*

***Boletin de industria, comercio y trabajo (Mexico).** Discontinued in 1920.

Boletin de la academia nacional de ciencias

Archives internationales de pharmacodynamie et de therapie. *irr* **31**(3 & 4). Belgian F100 per vol *Institut de pharmacodynamie, 3 Quai Baertsoen, Gand, Belgium.*

Archives internationales de physiologie *irr* about 2 vols **26.** F50*d* per vol *Octave Doin, Place de l'Odéon 8, Paris, France*

Archives italiennes de biologie *irr* **75 (1925)** *Administration des Archives italiennes de biologie, Pisa, Italy*

Archives néerlandaises de physiologie de l'homme et des animaux. (Series **III C** of **Archives néerlandaises des sciences** exactes et naturelles) *q* **10**(4) f15d per vol. *Martinus Nijhoff, Lange Voorhout 9, The Hague, Holland.*

Archives néerlandaises des sciences exactes et naturelles Series **III A** (Sciences exactes) *irr* **8**(2)**(1925)** Series **III B** (Sciences naturelles) *irr* **4**(2) f12 per vol. for either series *Martinus Nijhoff, Lange Voorhout 9, The Hague, Holland.*

Archives of Internal Medicine, The *m* 2 vols. **37.** $5($7.5)*d*, $5.75*f*, $5.10 *Can. American Medical Assocn, 535 N. Dearborn St, Chicago, Ill*

Archives of Pediatrics. *m* **43.** $5($7.50)*d*, $5.50*f*. *E B Treat & Co, 45 E. 17th St, New York City.*

Archives of Physical Therapy, X-Ray and Radium. *m* **7.** $5*d* and *Can*, $6.50*f Radiological Publishing Co, 511 City National Bank Bldg., Omaha, Neb*

Archiv for Mathematik og Naturvidenskab. About *q* **38**(4)**(1923)** (Not first no of yr) K8*d* per vol *M Sophus Torup, Faculté de médecine, L'institut physiologique de l'université Christiania, Oslo, Norway*

Archiv for Pharmaci og Chemi. *sm* **33.** *Ved Stranden 2 K, Copenhagen, Denmark.*

***Archiv fur Anatomie und Physiologie. Physiologische Abteilung** Merged with **Archiv fur die gesamte Physiologie des** Menschen und der Tiere **(Pflüger's)**

***Archiv fur Chemie und Mikroskopie** Discontinued in 1916(?).

Archiv fur Dermatologie und Syphilis *irr* **150.** Rm30 to 40*d* per vol. *Julius Springer, Link-Str. 23–24, Berlin, W. 9, Ger.*

Archiv fur die gesamte Physiologie des Menschen und der Tiere **(Pflügers).** *irr* about 5 vols, 6 nos. per vol. **211.** Rm50 to 60*d* per vol. *Julius Springer, Link-Str. 23–24, Berlin, W 9, Ger*

***Archiv fur die theoretische Chemie** *Jena* and *Berlin.* 1800–02.

***Archiv fur die thierische Chemie.** *Halle.* 1800–01.

Archiv fur experimentelle Pathologie und Pharmakologie, Naunyn-Schmiedebergs. *irr* several vols. a yr. **110**(5/6). Rm 24*d* per vol. *F. C. W Vogel, Leipzig, Ger.*

Archiv fur Gynaekologie *irr* several vols a yr. **127**(2–3) Rm 35 to 40*d* per vol. *Julius Springer, Link-Str 23–24, Berlin, W 9, Ger*

Archiv fur Hygiene *bm* **96**(7–8). About 1 1/2 vols Rm 25*d* per vol *R Oldenbourg, Glückstr 8, Munich, N. W 2, Ger*

Archiv fur Kinderheilkunde *irr* about 2 vols. **78.** M20*d* *Ferdinand Enke, Stuttgart, Ger*

***Archiv fur mikroskopische Anatomie und Entwicklungsmechanik** Discontinued under this name with Vol 104 but continued as **Zeitschrift fur Zellforschung und mikroskopische Anatomie,** which is **Abt. B** of **Zeitschrift fur wissenschaftliche Biologie.**

Archiv fur pathologische Anatomie und Physiologie und fur klinische Medizin **(Virchows)** *irr* 4 to 6 vols **259.** M260 to 280*d*, $60 to $70*f* *Julius Springer, Link-Str 23–24, Berlin, W 9, Ger*

***Archiv fur physiologische und pathologische Chemie und Mikroskopie in ihrer Anwendung auf die praktische Medicin.** *Vienna and Berlin.* 1844–47 Continuation of **Beiträge zur physiologischen und pathologischen Chemie und Mikroskopie in ihrer Anwendung auf die praktische Medicin.** Continued as **Archiv fur physiologische und pathologische Chemie und Mikroskopie mit besonderer Rücksicht auf die medicinische Diagnostik und Therapie**

***Archiv fur physiologische und pathologische Chemie und Mikroskopie mit besonderer Rucksicht auf die medicinische Diagnostik und Therapie** *Vienna* 1852–54. Continuation of **Archiv fur physiologische und pathologische Chemie und Mikroskopie in ihrer Anwendung auf die praktische Medicin.**

Archiv fur Schiffs- und Tropen-Hygiene, Pathologie und Therapie exotischer Krankheiten. *m* **30.** Rm24*d* *Johann Ambrosius Barth, Dörrienstr 16, Leipzig, Ger.*

***Archiv fur Wärmewirtschaft.** Name changed in 1926 to **Archiv fur Wärmewirtschaft** und Dampfkesselwesen.

Archiv fur Wärmewirtschaft und Dampfkesselwesen. *m* **7.** Rm16(Rm1 80)*d*,

Rm18*f* *V. D. I.-Verlag, Dorotheenstr 40, Berlin, N. W. 7, Ger.*

***Archiv fur Zellforschung** Ceased publication under this name in 1923 but continued as **Zeitschrift fur Zellen und Gewebelehre** which has since been changed to **Zeitschrift fur Zellforschung und mikroskopische Anatomie (Abt. B of the Zeitschrift fur wissenschaftliche Biologie).**

Archivio di farmacologia sperimentale e scienze affini. *sm* 2 vols. **41.** L50(L4)*d*, L70*f* *in Postal Union. Domenico Lo Monaco, 92, Via Depretis, Rome, Italy*

Archivio di fisiologia. *tri-m* **24.** L150 (L50)*d*, L170(L50 plus postage)*f* *Luigi Niccolai, Via Faenza 52, Florence, Italy*

Archivio di scienze biologiche (Italy) *irr* **7(1925).** L50*d*, L100*f* *21 S. Andrea delle Dame, Naples, Italy*

Archivio per le scienze mediche *bm* **48.** L50(L10)*d*, L65(L10)*f* *S. Lattes & Co., Corso Oporto, 30, Turin, Italy.*

Archivo de medicina legal. *irr* **2(1923).** 70$00 escudos per vol. *Instituto de medicina legal, Lisbonne, Portugal*

Arkhiv Biologicheskikh Nauk (Archives of Biological Sciences of the Institute of Experimental Medicine in Leningrad). (Printed in Russian with résumés in French) *irr* **26.** Gold R5 or $2 50 *Periodsektor, Vozdvizhenka, 10/2, Moscow, Union of the Socialistic Soviet Republics*

***Arkiv for Inre Medicin** Name changed in 1919 to **Acta Medica Scandinavica**

Arkiv for Kemi, Mineralogi och Geologi *irr* **9**(26) Price varies. *Almqvist & Wiksells Boktryckeri-A.-B, v. Ågatan 16, Uppsala, Sweden.*

Arkiv for Matematik, Astronomi och Fysik. A *irr* **19** (No 24 or 25), **B** *irr* **19**(6). Price varies. *Almqvist & Wiksells Boktryckeri-A.-B., v. Ågatan 16, Uppsala, Sweden.*

***Arms and Explosives.** Discontinued in 1920

Army Ordnance. *bm* **6**(34) $4 50($ 75)*d*, $5*f*. *Army Ordnance Assocn, 806 Mills Bldg, Washington, D. C*

***Årsberättelse om Framstegen i Kemi och Mineralogi.** *Stockholm.* 1841–48. Continuation of **Årsberättelse om Framstegen i Physik och Kemi.** Continued as **Årsberättelse om Framstegen i Kemi till Kongl. Vetenskaps-Akademien**

***Årsberättelse om Framstegen i Kemi till Kongl. Vetenskaps-Akademien.** *Stockholm.* 1849–51. Continuation of **Årsberättelse om Framstegen i Kemi och Mineralogi**

***Årsberättelse om Framstegen i Physik och Kemi.** *Stockholm* 1822–41 Continued as **Årsberättelse om Framstegen i Kemi och Mineralogi**

Asphalt und Teerindustrie Zeitung und Zeitschrift fur Strassenbau, Strassenunterhaltung sowie Tief- und Bruckenbau *w* **26.** Gm28 (75 gold pfg) **or $7 50***d*, Gm36*f*. *Allgemeiner Industrie Verlag, G m. b. H., Neue Königstr 5, Berlin, 43, Ger.*

***Association of Iron & Steel Electrical Engineers** Discontinued under this name at the end of 1923 but the Proceedings of this Association are published in **Iron and Steel Engineer,** which succeeded it.

Astrophysical Journal, The *m* except Feb and Aug. 2 vols **63.** $6($ 75)*d*, $6 50($ 80)*f* *in Postal Union*, $6 30($.78) *Can. University of Chicago Press, 5750 Ellis Ave, Chicago, Ill.*

Atelier des Photographen, Das. *m* **33.** Gm1 *Wilhelm Knapp, Muhlweg 19, Halle a. S, Ger*

Atlantic Medical Journal. *m* **29**(4) $3 ($ 35)*d* *230 State St, Harrisburg, Pa*

Atti del congresso nazionale di chimica industriale *irr* **(1924).** *Società di chimica industriale, Via S Paolo 10, Milan, Italy*

Atti del congresso nazionale di chimica pura ed applicata. *irr* **(1923).** *Associazione italiana di chimica generale ed applicata, Via 4 Novembre 154, Rome, Italy*

***Atti dell'accademia pontifica de Nuovi Lincei.** *Rome.* 1847–73. Continued as **Atti** della reale **accademia dei Lincei.**

Atti della reale **accademia dei fisiocritici in Siena.** *irr* [9]**15(1924).** *S Bernardino, Stab. Tipografia, Siena, Italy*

Atti della reale **accademia dei Georgofili.** *q* [5]**23.** *Tipografia di Mariano Ricci, Via San Gallo, n° 31, Florence, Italy*

***Atti** della reale **accademia dei Lincei.** Name changed to **Atti** della reale **accademia nazionale dei Lincei.**

Atti della reale **accademia delle scienze di Torino.** *irr* **61(1925–26).** *Libreria Fratelli Bocca, Via Carlo Alberto 3, Turin, Italy.*

Atti della reale **accademia nazionale dei Lincei** (Rendiconti classe di scienze fisiche, matematiche e naturali). About *sm* 2 vols. [6]**3.** *Dott. Giovanni Bardi, Tipografia della r. accademia nazionale dei Lincei, Rome, Italy.*

de la **República Argentina.** *irr.* **28** (3/4). *Academia nacional de ciencias, Córdoba, Argentine Republic*

Boletin de la **asociación Argentina** de **electrotécnicos.** *bm* **12.** *Asociación Argentina de Electrotécnicos, Paseo Colón 1851, Buenos Aires, Argentine Republic.*

Boletin de la **sociedad** de **fomento fabril.** *m* **43.** $50($5)*d*, $58*f*. *Sociedad imprenta y litografia universo, Augustinas 1250, Santiago, Chile*

***Boletin** del **ministerio** de **agricultura** de la **nacion (Argentine Republic)** Ceased publication in 1922

Boletin minero de la **sociedad nacional** de **mineria (Chile).** *m* [3]**37** (309) *Sociedad Imprenta y Litografia Universo, Augustinas 1250, Santiago, Chile*

Bollettino chimico-farmaceutico. *sm* **65.** L24(L2 50, to subscribers L2)*d*, F30(F3)*f* *Via Cappuccio 19, Milan (8), Italy*

Bollettino della **associazione italiana** dei **chimici tessili e coloristi** *m* **2.** L100(L10)*d*, L150(L15)*f*. *Dr Federico Sutti, Via S Paolo 10, Milan (3), Italy*

Bollettino della **società italiana** di **biologia sperimentale** *m* **1** L50*d*, L100*f* *Prof Fil Bottazzi, S Andrea delle Dame 21, Naples (52), Italy*

Bollettino dell'**associazione italiana** delle **industrie** dello **zucchero e** dell'**alcool.** *m* **19.** L30(L4)*d*, L35(L5)*f* *Via Guglielmo Oberdan 9°, p p, Bologna (5), Italy.*

Bollettino dell'**istituto sieroterapico milanese.** *bm* **5.** L30(L6)*d*, L50*f*. *Via Darwin 2, Milan (24), Italy.*

Bollettino dell'**istituto storico italiano** dell'arte **sanitaria** *bm* **6.** Issued with **La Rassegna** di **clinica, terapia** e **scienze affini**

Bollettino ufficiale della **r. stazione sperimentale** per l'**industria** delle **pelli e** delle **materie concianti** Napoli-Torino *m* **4.** *Via Poggioreale 39, Naples, Italy, Corso Cirié 7, Turin, Italy*

Bollettino ufficiale della **r stazione sperimentale** per l'**industria** delle **pelli e** delle **materie concianti** Napoli-Torino **Supplemento tecnico** *m* **1.** *Via Poggioreale 39, Naples, Italy; Corso Cirié 7, Turin, Italy.*

***Boston Journal of Chemistry.** *Boston* 1866–80. Continued as **Boston Journal of Chemistry** and **Popular Science Review.**

***Boston Journal of Chemistry and Popular Science Review.** *Boston.* 1881–82 Continuation of **Boston Journal of Chemistry** Continued as **Popular Science News** and **Boston Journal of Chemistry**

Boston Medical and Surgical Journal. *w* 2 vols. **194.** $6($25)*d*. *126 Massachusetts Ave, Boston, Mass.*

***Botanical Abstracts.** Merged in **Biological Abstracts** at end of Vol. 15.

Botanical Gazette, The. *m* except Jan, Feb, July and Aug, 2 vols. **81.** $9 ($1 25)*d*, $9 60($1 33)*f*, $9 30($1 29) *Can Univ. of Chicago Press, 5750 Ellis Ave, Chicago, Ill*

Botanisches Centralblatt. *srr* [N. S.]**4** or **146**(16). M28*d* per vol. *Gustav Fischer, Jena, Ger.*

Brain. *q* **48**(Pt. 4). 24s(6s)*d*. *MacMillan & Co, Ltd, St Martin's St, London, W. C, Eng.* or *The MacMillan Co, New York City.*

Brasserie et malterie. *sm* **15**(20) F33*d*, F10*f* *Rue de la commanderie, 69, Nancy, France*

Brass World and Platers' Guide. *m* **22.** $1($ 15)*d*, $2*f*, $1 50 *Can. Brass World Publishing Co, 153 Waverly Place, New York City.*

Bratislavské Lekárske Listy. (Bratislava Medical Journal.) (Résumés in English and French) About *m* **4**(4)(**1925**). Kč 45. *The Society of Czechoslovakian Physicians, Bratislava, Czechoslovakia*

Braunkohle. *w* **24**(40) Gm24*d* *Wilhelm Knapp, Muhlweg 19, Hall a S, Ger.*

Brennerei-Zeitung. *w* **43**(1695) M24(50 pfg)*d*, M32*f* *Verein d. Kornbrennereibesitzer und Presshefefabrikanten Deutschlands E V., Eichhornstr. 10, Berlin, W 9, Ger*

Brennstoff-Chemie *sm* **7.** Rm24 (Rm1 50)*d*. *Verlag von W. Girardet, Essen, Ger.*

Brennstoff- und **Wärmewirtschaft.** *sm* **8.** Gm16*d*. *Wilhelm Knapp, Muhlweg 19, Halle (Saale), Ger*

Brick and **Clay Record.** *bw* 2 vols. **68.** $3($.25)*d*, $4*f* *Industrial Publications, Inc, 407 S Dearborn St, Chicago, Ill.*

***Brick** and **Pottery Trades Journal,** The Name changed to **Master Builder** and Association Journal.

British Association for the **Advancement** of **Science, Reports.** *a* *Burlington House, Piccadilly, London, W 1, Eng.*

British Chemical Abstracts. A (Pure Chemistry). *m* £2 12s to members of Soc. Chem. Ind. **B** (Applied Chemistry). *bw* £2 2s to members of the Chem. Soc. Sections A and B. £3 10s. *Central House, 46 Finsbury Square, London E. C. 2, Eng.*

British Clayworker, The. *m* 34(405) 14s (1s3d)*d*. *43 Essex St, Strand, London, W. C. 2, Eng.*

British Food Journal and Hygienic Review, The. *m* **28**(326). 10s6d(10½d post free)*d*. *Harold E Carr, 22 Northumberland Ave., London, W. C. 2, Eng; P. Blakiston's Son & Co., 10–12 Walnut St, Philadelphia, Pa.*

British Journal of **Experimental Biology** *q* **3**(2). 40s(12s6d)*d*. *Oliver and Boyd, Edinburgh, Scotland,* or *33 Paternoster Row, London, Eng.*

British Journal of **Experimental Pathology,** The. *bm* **7**. £2(7s6d)*d*. *H. K Lewis & Co, Ltd, 136 Gower St, London, W C. 1, Eng.*

British Journal of **Photography,** The. *w* **73**(3426) *Henry Greenwood & Co, Ltd, 24 Wellington St., Strand, London, W. C, 2, Eng.*

British Journal of **Radiology, British Institute** of **Radiology Section** *m* **31**(306) £2 2s(4s2d)*d* *William Heinemann, Ltd, 20 Bedford St, London, W C. 2, Eng.*

British Journal of **Radiology, Roentgen Society Section.** *q* **22**(86). 20s(5s). *Percy Lund, Humphries & Co, Ltd, 3 Amen Corner, London, E C 4, Eng*

British Journal of **Tuberculosis,** The. *q* **20**. 10s(2s6d)*d*, $2 50($ 80) *U. S Messrs. Baillière, Tindall and Cox, 8 Henrietta St, Covent Garden, London, W C. 2, Eng.*

British Medical Journal, The. *w* 2 vols. **1926. I**(3392). £3 13s(1s3d)*d* *British Medical Assocn. House, Tavistock Square, London, W C 1, Eng*

British Portland Cement Research Association, Bulletins and **Pamphlets.** *irr* *British Portland Cement Research Assocn., 6 Lloyds Ave., London, E C 3, Eng.*

Brooklyn Botanic Garden Record. *q* **15**. $1($ 25)*d* and *f*. *The Brooklyn Botanic Garden, Brooklyn, N Y.*

***Bruinkool.**

Buletinul de chimie pură şi aplicată, **Societatea română** de **stiinte.** *irr* **28 (1925).** 1001e*id*, F60*f* *N. Dănăilă, Calea Mosilor 142, Bucharest, Rumania*

Buletinul de stiinte fizice pure si aplicate, **Societatea română** de **stiinte.** *irr* **26(1923)** 1001e*id*, F60*f* *N Dănăilă, Calea Mosilor 142, Bucharest, Rumania*

Buletinul societatei de chimie din România. *irr* **7(1925).** 100lei *Secrétaire général de la société, Splaiul G-ral Magheru 2, Bucharest, Rumania.*

Buletinul societătii de stiinte din Cluj. *irr* **3.** *Institutul de arte grafice "Ardealul," Strada Memorandului 22, Cluj, Rumania.*

***Buletinul societătii române de stiinte.** Discontinued under this name in 1922 Resumed publication as **Buletinul de chimie** pură si aplicată, **Societatea română de stiinte** and **Buletinul de stiinte fizice** pure si aplicate, **Societatea română de stiinte.**

Bulletin agricole du Congo Belge. *q* **16(1925).** F25*d*, F35*f* *Imprimerie industrielle et financière, 4 rue de Berlaimont, Brussels, Belgium.*

Bulletin American Foundrymen's Association. *C. E Hoyt, Secy.-Treas, 140 S. Dearborn St, Chicago, Ill*

Bulletin biologique de la France et de la **Belgique.** *q* **60.** F100*d* *M. Caullery, Laboratoire d'évolution, 105 Blvd. Raspail, Paris (6e), France.*

Bulletin de l'académie de médecine. *w* 2 vols [3]**95** (90th year) F50(F3)*d*, F65*f* *Masson et Cie., 120 Blvd St.-Germain, Paris (6e), France.*

Bulletin de l'académie des sciences de l'union des républiques soviétiques socialistes. (Printed in Russian) [6] **20.** *Academy of Science, Universitetskaya nab 5, Leningrad, V O, Union of the Socialistic Soviet Republics.*

***Bulletin de l'académie des sciences de Russie** Name changed in 1925 to **Bulletin de l'académie des sciences de l'union des républiques soviétiques socialistes**

***Bulletin de l'académie des sciences (Petrograd).** Name changed in 1917 to **Bulletin de l'académie des sciences de Russie.**

Bulletin de l'académie royale de médecine de Belgique. *m* except Aug. [5]**6.** Belgian F45*d*, Belgian F50*f*. *Goemaere imprimeur du roi, rue de la Limite 21, Brussels, Belgium.*

Bulletin de la classe des sciences, académie royale de Belgique *irr* [5]**12.** F12*d* *Maurice Lamertin, 58–62 rue Coudenberg, Brussels, Belgium.*

Bulletin de la commission géologique de Finlande. *irr* **No. 76.** *Commission géologique de Finlande, Boulevardsgatan 29, Helsingfors, Finland.*

Bulletin de la fédération des industries chimiques de Belgique. Published under same cover with **Bulletin de la société chimique de Belgique.** *m* **5.** F40*d*, F45*f*. *Fédération des industries chimiques de Belgique, rue du canal 65, Brussels, Belgium*

Bulletin de la section scientifique de l'académie roumaine. *irr* **10.** *Cultura nationala, Bucharest, Rumania*

Bulletin de la société botanique de France. *irr* [5]**1(1925).** *Charles Broyer, 51 rue du Sahel, Paris (12e), France.*

Bulletin de la société chimique de Belgique *m* **35.** *83 rue Souveraine, Brussels, Belgium.*

Bulletin de la société chimique de France *m* 2 vols issued simultaneously [4]**39** and **40.** *44 rue de Rennes, Paris (6e), France*

Bulletin de la société de chimie biologique *m* **8.** F50(F6)*d*, F65*f* *Masson et Cie, 120 Blvd. St.-Germain, Paris (6e), France*

Bulletin de la société de chimie industrielle *q* *49 rue des Mathurins, Paris, France.*

***Bulletin de la société de l'industrie minérale** Name changed in 1921 to **Revue de la société de l'industrie minérale.**

Bulletin de la société d'encouragement pour l'industrie nationale. *m* **138**(125th year). *44 rue de Rennes, Paris (6e) France*

Bulletin de la société des agriculteurs de France. *m* F40*d* *Hotel de la société, 8 rue d' Athènes, Paris (9e), France*

Bulletin de la société des amis des sciences de Poznań. Series B Sciences mathématiques et naturelles **(1925), No. 1** *Secy-General of the Society, Stanislas Dobrzycki, Ulica Seweryna Mielzynskiego 26/27, Posen, Poland.*

***Bulletin de la société des chimistes de Maurice.** Discontinued in 1921 but succeeded by **Revue agricole de l'île Maurice,** La.

Bulletin de la société française de minéralogie. *m* **49.** *M L Bourgeois, 1 Blvd Henri IV, Paris (4e), France*

Bulletin de la société française de photographie *m* [3]**13.** F25(F2 50 plus postage)*d*, F40*f*. *rue de Clichy 51, Paris (9e), France.*

Bulletin de la société géologique de France. *irr* [4]**25**(4/5). F60*d*,' F70*f*. *Société géologique de France, 28 rue Serpente, Paris (6e), France*

***Bulletin de la société industrielle d'Amiens.**

Bulletin de la société industrielle de Mulhouse. *m* **92.** *Imprimerie Bader & Cie., Mulhouse, France.*

Bulletin de la société industrielle de Rouen. *bm* **54.** *Place de la Cathédrale & 2 rue du Petit-Salut, Rouen, France.*

Bulletin de la société scientifique d'hygiène alimentaire et d'alimentation rationnelle de l'homme. *m* except Aug. and Sept **14.** F28(F3)*d*, $1.40 *U. S. Masson et Cie., 120 Blvd. St-Germain, Paris (6e), France.*

***Bulletin de l'association belge des chimistes.** *Brussels.* 1886+.

Bulletin de l'association des anciens élèves de l'institut supérieur des fermentations de Gand, including Annales de la société des brasseurs pour l'enseignement professionel. *m* **27.** F18(F3)*d*. *Maison d'éditions et d'impressions, rue du Calvaire 21–23, Gand, Belgium*

Bulletin de l'association des chimistes de sucrerie et de distillerie de France et des colonies. *m* **43**(7) F45(F4)*d*, F50*f* *Secrétariat général, 156 Blvd. Magenta, Paris (10e), France*

Bulletin de l'institut d'Égypte. *a* **7(1925).** *Imprimerie de l'institut française d'archéologie orientale, Cairo, Egypt.*

Bulletin de l'institut Pasteur (Revue et analyses des travaux de bactériologie, médecine, biologie générale, physiologie, chimie biologique dans leurs rapports avec la microbiologie). *sm* **24.** F60 (F4)*d*, F75*f*. *Masson et Cie, 120 Blvd. St-Germain, Paris (6e), France*

Bulletin de l'institut polytechnique à Ivanovo-Vosnesensk. (Printed in Russian) *irr* **8(1924).** *Prof. N. P Peskov, Ivanovo-Vosnesensk Politekhnicheskago Instituta, Ivanovo-Vosnesensk, Union of the Socialistic Soviet Republics.*

***Bulletin de l'institut provincial d'hygiène et de bactériologie du Hainaut à Mons.**

***Bulletin de pharmacie** 1809–1904 Continued as **Bulletin de pharmacie et des sciences accessoires.**

***Bulletin de pharmacie et des sciences accessoires.** *Paris.* 1814–15 Continued as **Journal de pharmacie et des sciences accessoires.**

***Bulletin des caoutchoucs de l'institut colonial de Marseille.** Apparently discontinued.

Bulletin des céréales et plantes à fécule de l'institut colonial de Marseille. *irr Institut colonial, Parc Amable-Chanot, Marseille, France.*

Bulletin des matières grasses de l'institut colonial de Marseille. *m Institut colonial, Parc Amable-Chanot, Marseille, France*

***Bulletin des sciences mathématiques, astronomiques, physiques et chimiques.** *Paris.* 1824–31.

Bulletin des sciences pharmacologiques. *m* **33.** F40(F4)*d*, F50 and 60*f*. *MM. Vigot frères, 23 rue de l'École-de-médecine, Paris (6e), France.*

***Bulletin des sciences physiques et naturelles**

en **Néerlande.** *Leyden, Rotterdam* and *Utrecht.* 1838–40.

Bulletin des travaux de la **société** de **pharmacie de Bordeaux.** *q* **64.** F10*d*, F12*f* *M. Pery, Trésorier, allées de Tourney 40, Bordeaux, France.*

Bulletin des travaux de l'**institut pharmaceutique** de l'état. (Printed in Polish) 4–6 nos. a yr. *Panstwowy Instytut Farmaceutyczny, Ul. Chocimska 2b, Warsaw, Poland.*

***Bulletin** du **laboratoire de chimie** du **Caire.** *Cairo.* 1882.

***Bulletin** du **syndicat** des **fabricants de papier** et de **carton** de France. Discontinued at end of 1920.

Bulletin institut international du froid. (Monthly Bulletin of Information on Refrigeration, English Edition) *m* **7.** F50(F5) *in countries affiliated with the Institut,* F65(F6 50) *in other countries. Institut international du froid, 9 avenue Carnot, Paris (17e), France; U. S Agent, J. F. Nickerson, 431 S. Dearborn St, Chicago, Ill.*

***Bulletin internationale** de l'**académie** des **sciences** de **Cracovie.** Name changed to **Bulletin internationale** de l'**académie polonaise** des sciences et des lettres

Bulletin internationale de l'**académie polonaise** des sciences et des lettres. (Classe des sciences mathématiques et naturelles.) Series **A,** Sciences mathématiques; Series **B,** Sciences naturelles. *irr Gebethner et Wolff, Rynek Gl, Cracow, Poland.*

Bulletin mensuel office international d'**hygiène publique.** *m* **18.** F20(F2.75)*d. 195 Blvd. St-Germain, Paris (6e), France.*

***Bulletin** of **Agricultural Intelligence** and Plant Diseases, Monthly. Discontinued under this title and continued as **International Review** of the **Science** and **Practice** of **Agriculture.**

Bulletin of **American Zinc Institute,** Inc. *m* **9.** *American Zinc Inst, 27 Cedar St, New York City.*

Bulletin of **Entomological Research.** 4 times a yr **16**(Pt 3) 15s(3s)*d* per vol. *Ass't Director, Imperial Bureau of Entomology, 41 Queen's Gate, London, S W. 7, Eng.*

***Bulletin officiel** de la **direction des recherches scientifiques** et **industrielles** et des **inventions.** Name changed in 1923 to **Recherches** et **inventions.**

Bulletin of Information on Refrigeration. Monthly. See **Bulletin institut international du froid.**

Bulletin of **Pharmacy,** The. *m* **40.** $2 ($.20)*d. The Swift Publishing Co., P. O. Box 484, Detroit, Mich.*

Bulletin of the **American Association** of **Petroleum Geologists.** *m* **10.** $15 ($1.50)*d,* $15 70*f in Postal Union,* $15 40 *Can. Chas. E. Decker, Secy., 508 Chautauqua Ave., Norman, Oklahoma.*

Bulletin of the **American Ceramic Society.** *m* **5.** Issued as part of the Journal of the **American Ceramic Society.**

Bulletin of the **American Institute** of **Chemical Engineers** *irr* **No. 33.** *Secy, American Institute of Chemical Engineers, Polytechnic Institute, Brooklyn, N. Y.*

***Bulletin** of the **American Institute** of **Mining Engineers** Name changed with No. 148(1919) to **Bulletin** of the **American Institute** of **Mining** and **Metallurgical Engineers** and with No. 154(1919) to **Mining** and **Metallurgy.**

***Bulletin** of the **American Society** for **Testing Materials.** 1898–1902. Continued as **Proceedings** of the **American Society** for **Testing Materials.**

Bulletin of the **Ayer Clinical Laboratory** of the **Pennsylvania Hospital** *irr* **No. 10.** *Secy of the Ayer Clinical Lab, Pennsylvania Hospital, 8th and Spruce Sts, Philadelphia, Pa*

Bulletin of the **British Cast Iron Research Association.** *q* **No. 11.** *Central House, 75 New St., Birmingham, Eng.*

Bulletin of the **British Non-Ferrous Metals Research Association.** *irr* **No. 17.** *Athenaeum Chambers, 71 Temple Row, Birmingham, Eng.*

Bulletin of the **Buffalo General Hospital.** *irr* **3**(No. 3, Dec, **1925**). *Buffalo General Hospital, Buffalo, N. Y.*

***Bulletin** of the **Bureau** of **Bio-technology.** Apparently discontinued

***Bulletin** of the **Canadian Institute** of **Mining** and **Metallurgy,** Monthly Name changed in Feb., 1927 to **Canadian Mining** and **Metallurgical Bulletin.**

***Bulletin** of the **Canadian Mining Institute,** Monthly. Name changed to **Bulletin** of the **Canadian Institute** of **Mining** and **Metallurgy,** Monthly.

Bulletin of the **Chemical Society** of **Japan.** (Printed in English, French or German) *m* **1.** Y4(Y0 40)*d Maruzen Co, Ltd., 14 Nihonbashi, Tori-Sanchome, Tokyo, Japan.*

***Bulletin** of the **Chemical Society** of **Washington.** *Washington, D. C.* 1886–93+.

Bulletin of the **Cleveland Scientific** and **Technical Institution.** *m* **5**(4) 10s6d*d.*

Corporation Road, Middlesbrough, Eng.

***Bulletin** of the **Cleveland Technical Institute.** Name changed in 1923 to **Bulletin** of the **Cleveland Scientific** and **Technical Institution.**

Bulletin of the **Copper** and **Brass Research Association.** *bm* **No. 35.** *25 Broadway, New York City.*

Bulletin of the **Department** of **Agriculture, Trinidad** and **Tobago.** *irr* **21**(Pt. I) (**1925**) 2s(6d)*d. Dept. of Agriculture, St Clair Expt Sta, Trinidad.*

Bulletin of the **Geological Institution** of the **University** of **Upsala.** (Printed in English, French or German) *irr* **17**(**1925**). *Almqvist & Wiksells Boktryckeri-A.-B, v. Ågatan 16, Uppsala, Sweden.*

Bulletin of the **Geological Society** of **America** *q* **37.** $10*d*, $10 40*f Secy., Geological Society of America, Columbia Univ, New York City.*

Bulletin of the **Geological Survey** of **Western Australia.** *irr* **No. 89**(**1924**). *Fred W Simpson, Govt Printer, Perth, W. Australia.*

Bulletin of the **Imperial Institute** *q* **24.** (3s6d)*d The Imperial Institute, S Kensington, London, S W 7, Eng*

Bulletin of the **Imperial Sericultural Experiment Station, Japan. 2**(2)(**1925**). *Imperial Sericultural Expt. Station, Tokyo, Japan*

Bulletin of the **Institute** of **Physical** and **Chemical Research (Tokyo).** (Rikwagaku Kenkyujo Iho) *m* **5.** Y6 (Y0 70)*d Iwanami Shoten, 16 Minami-Jimbocho, Kanda-Ku, Tokyo, Japan.*

Bulletin of the **Institution** of **Mining** and **Metallurgy.** *m* **No. 256.** £5 5s members, £3 3s associates, £1 11s6d students over 25, £1 1s students under 25 yrs of age. *C. McDermid, Secy, Cleveland House, 225 City Road, London, E C. 1, Eng.*

Bulletin of the **Johns Hopkins Hospital,** The. *m* 2 vols **38.** $3($ 75)*d* and *countries in Postal Union,* $3 50 *other countries* per vol *Williams & Wilkins Co., Mt Royal and Guilford Aves, Baltimore, Md.*

Bulletin of the **National Research Council.** *irr* $5 per vol. of approx. 500 pp. Sold separately at varying prices *National Research Council, B and 21st Sts, Washington, D. C.*

Bulletin of the **Rubber Growers' Association,** The. *m* **8.** Not for sale. Issued to members of the Association and others interested. *Rubber Growers' Assocn., Inc., 2, 3 & 4 Idol Lane, Eastcheap, London, E. C. 3, Eng.*

Bulletin of the **Society** for the **Promotion** of **Engineering Education.** See **Engineering Education.**

Bulletin of the **Torrey Botanical Club.** *m* except July, Aug and Sept. **53.** $4 ($ 45) *Ralph C Benedict, Brooklyn Botanic Garden, Brooklyn, N. Y*

Bulletin of the **United States National Museum.** *irr* **No. 133.** Free to colleges, libraries, schools, scientific establishments, universities and certain individuals. *U. S. National Museum, Washington, D. C.*

***Bulletin scientifique** de la **France** et de la **Belgique.** Name changed in 1917 to **Bulletin biologique** de la **France** et de la **Belgique.**

***Bulletins** et **mémoires** de la **société de chirurgie de Paris.** Name changed to **Bulletins et mémoires** de la **société nationale de chirurgie.**

Bulletins et mémoires de la **société médicale des hôpitaux de Paris.** *w* except during vacation. [3]**50**(42nd year) F80 (F4)*d*, F90 or 100*f. Masson et Cie, 120 Blvd St.-Germain, Paris (6e), France.*

Bulletins et mémoires de la **société nationale de chirurgie.** *w* **52.** F100(F4)*d*, F110 (F4)*f. Masson et Cie, 120 Blvd. St.-Germain, Paris (6e), France.*

***Bulletins** of **Indian Industries & Labour.** Discontinued in 1923

Bulletin trimestriel de l'**association** des anciens **élèves** de l'**école supérieure** de **brasserie** de l'**université** de **Louvain.** *q* **26.** F10*d*, F10 *plus postage f A Uystpruyst, 10 rue de la Monnaie, Louvain, Belgium.*

Bumazhnaya Promuishlennost (Paper Industry). (Printed in Russian) *m* [5]**5.** $2($ 25). *Varvarka 5, Moscow, Union of the Socialistic Soviet Republics.*

Bureau of **Mines, Bulletins, Circulars, Mineral Resources, Reports of Investigations** and **Technical Papers.** Limited edition free. *Superintendent of Documents, Govt. Printing Office, Washington, D C.*

Bureau of **Standards, Bulletins, Circulars Scientific** and **Technologic Papers,** etc. Price varies. Scientific and Technologic Papers, $1.25 per vol *Superintendent of Documents, Govt Printing Office, Washington, D. C.*

Cairo Public Health Laboratories, Reports and **Notes.** *irr* **1924**(6). Price per no varies. *Govt. Publications Office, Ministry of Finance, Dawâwîn P. O, Cairo, Egypt.*

Cairo Scientific Journal, The. About 4 times a yr. **13**(116)(**1925**) P T. 80 or 16s. *Agent for Europe & America, Wheldon & Wesley, Ltd , 2, 3 & 4 Arthur St., New Oxford St., London, W. C. 2, Eng.*

Caliche. *m* **7**(10). *Casilla 2730, Santiago, Chile.*

Camera (Luzern). *m* **4**(7). F12(F1 50)*d*, F16*f*. *C. G. Bucher, A.-G , Luzern, Switz.*

Camera (Philadelphia), The. *m* 2 vols **32.** $2($ 20)*d*, *Can., Cuba, Mex , Philippine Is and Porto Rico*, $2 50*f*. *Frank V Chambers, Camera Bldg., 636 Franklin Sq , Philadelphia, Pa.*

Canada Department of Mines, Geological Survey, Bulletins, Memoirs, Museum Bulletins and Reports, *Canada Dept of Mines, Ottawa, Can.* **Mines Branch, Bulletins, Memorandum Series** and **Reports,** *Mines Branch, Sussex St , Ottawa, Can*

Canada, Dominion Water Power and Reclamation Service Reports and **Water Resources Papers.** *irr Director of the Dominion Water Power and Reclamation Service, Ottawa, Can.*

Canada, Forestry Branch, Bulletins, Circulars, Reports, etc *irr Director of Forestry, Ottawa, Can*

Canada, The Honorary **Advisory Council** for **Scientific** and **Industrial Research, Bulletins,** etc. *irr Honorary Advisory Council for Scientific and Industrial Research, Ottawa, Can.*

***Canadian Chemical** Journal Name changed in 1921 to **Canadian Chemistry** and **Metallurgy.**

Canadian Chemistry and **Metallurgy** *m* **10.** $3($ 40)*d* and *f. Westman Press, Ltd , 57 Queen St , West, Toronto, 2, Can.*

Canadian Colorist and **Textile Processor.** *m* **6.** $2*d* and *f. Westman Press, Ltd , 57 Queen St , West, Toronto 2, Can*

***Canadian Dyer & Color User.** Name changed in 1922 to **Canadian Colorist** and **Textile Processor.**

Canadian Engineer, The *w* 2 vols. **50.** $3($ 10)*d*, $4($ 15) *U S* , $5($ 20)*f*. *The Monetary Times Printing Co. of Canada, Ltd , 62 Church St , Toronto, Can.*

Canadian Medical Association Journal, The *m* **16.** $10*d* including membership in Assocn , $6($ 60)*f*. *836 University St., Montreal, Can.*

Canadian Mining and Metallurgical Bulletin. *m* **28** (165). $10($1)*d*. *604 Drummond Bldg., Montreal, Can.*

Canadian Mining Journal. *w* **47.** $5 ($ 15)*d*, *U. S.* and *Great Britain*, $5 *plus postage f. The Industrial & Educational Publishing Co , Ltd , Garden City Press, Gardenvale, P. Q , Can.*

Canadian Patent Office Record and Register of Copyrights and Trade Marks, The. *w* **54.** $10($.25)*d* and *U. S. Patent Office, Ottawa, Can.*

Canning Age. *m* from Mar to Jan., *sm* in Feb. **7.** $3*d*, $3 50*f Russel Palmer, 27 Pearl St., New York City.*

Caoutchouc & la gutta-percha, Le. *m* **23**(263). F40*d*, F60*f in Postal Union A. D. Cillard, 40 rue des Vinaigriers, Paris, France.*

Carnegie Institute of Technology, Bulletins, Coal Mining Investigations and **Mining** and **Metallurgical Investigations.** *irr* Price varies. *Carnegie Institute of Technology, Pittsburgh, Pa*

Carnegie Institution of Washington Publications. *irr* Price varies. *Carnegie Inst of Washington, Washington, D C.*

Časopis Československého Lékárnictva. *m Lékárna "na Zátorách" 631, Prague VII, Czechoslovakia*

***Časopis chemiků Českých** *Prague.* 1869 Continued as **Časopis chemiků Českých.** Spolu organ spolku cukrovárniků východních Čech.

***Časopis chemiků Českých.** Spolu organ spolku cukrovárniků východnich Čech *Prague.* 1870–74 Continuation of **Časopis chemiků Českých.**

***Časopis cukrovarnický.** *Prague.* 1872–74

***Časopis pro Prumysl Chemický.** *Prague.* 1891+.

Catalyst, The. *m* except July and Aug **11.** $1*d*. *J. Howard Graham, 7 Cliveden Ave., Glenside, Pa.*

Celluloid-Industrie, Die. *bw* **26**(8) Supplement to **Gummi-Zeitung.**

Cellulosechemie. *m* **7.** Supplement to Der **Papier-Fabrikant.**

Cellulose Industry (Journal of the Cellulose Institute, Tokyo). (Printed in Japanese, with English or German , summaries) *m* **2.** Y6(Y0 60)*d*. % *Research Lab , Mitsubishi Paper Mills, Ltd , 29 Kamifujimae, Hongo-Ku, Tokyo, Japan.*

***Cement.** Combined with **Brick** and **Pottery Trades Journal,** The.

***Cement and Engineering News.** Incorporated in 1924 in **Rock Products.**

***Central-Anzeiger (Augsburg).** *Augs-*

burg. 1891–93 Continuation of **Centr**alblatt der **ges**ammten **chem**ischen **Grossind**ustrie. Continued as **Chem**ische **Mitt**heilungen.

***Central-Anzeiger** (**Leipzig**). *Leipzig.* 1884–87 Continued as **Centr**alblatt der **ges**ammten **chem**ischen **Grossind**ustrie.

***Centr**alblatt der **ges**ammten **chem**ischen **Grossind**ustrie. *Augsburg.* 1888–90. Continuation of **Central-Anzeiger** (**Leipzig**). Continued as **Central-Anzeiger** (**Augsburg**).

***Centr**alblatt fur **Agricultur-chemie** und nationellen Wirthschaftsbetrieb *Leipzig.* 1872–80. Continued as **Biedermann's Centr**alblatt.

Centralblatt fur **allgemeine Patho**logie und pathologische Anatomie *sm* **37.** *Gustav Fischer, Jena, Ger*

Centralblatt fur **Bakt**eriologie, **Parasiten**kunde und Infektionskrankheiten. **I Abt**eilung (a) **Ref**erate, about *bw* 2 or 3 vols. **80**(25/26); (b) **Orig**inale. *irr* 2 or 3 vols. **97**(2/3); **II Abt**eilung *irr* 2 or 3 vols. **66**(8/14) *Gustav Fischer, Jena, Ger.*

Centralblatt fur die **Zuckerind**ustrie. *w* **34.** M24(M1)*d*, M 24 plus postage *f* *Schliessfach 35, Magdeburg, Ger*

***Centr**alblatt fur **innere Medi**zin. Name changed to **Zentr**alblatt fur **innere Medizin**

Centralblatt fur **Mineral**ogie, **Geol**ogie und Paläontologie. Abt. **A.** Mineralogie und Petrographie *sm* Abt. **B.** Geologie und Palaontologie, *m E. Schweizerbart'sche Verlagsbuchhandlung, (Erwin Nägele) G m. b. H., Johannesstr. 3a, Stuttgart, Ger*

***Centr**alblatt fur **Nahr**ungs- und **Genuss**mittel **Chem**ie, sowie **Hyg**iene *Gorlitz* 1895–.

Ceramic **Abstracts.** *m* **5** Issued as part of **J**ournal of the **A**merican **Ceram**ic **Soc**iety.

Ceramic **Ind**ustry. *m* 2 vols. **6.** $3($ 25)*d*, $1*f* *Industrial Publications, Inc., 407 S Dearborn St, Chicago, Ill.*

Céramique, La. *m* **29**(455). *84 rue d' Hauteville, Paris (10e), France.*

Ceramist, The (**New Jersey**). *m* **7**(10) $3($ 50)*d*, $4*f*. *The Ceramics Publishing Co., Inc, 189 S Broad St, Trenton, N. J.*

Cereal Chemistry *bm* **3.** $3*d*, $3 50*f*. *University Farm, St Paul, Minn.*

Chaleur et industrie *m* **7**(69). F50(F5)*d*, F60*f*. *5 rue Michel-Ange, Paris, France.*

Cnemia (Argentine Republic). (Revista del centro estudiantes del doctorado en química.) *irr* **3**(15)(Nov.–Dec., **1923**) $2 per no. *Carlos A. Abeledo, Perú 222, Buenos Aires, Argentine Republic.*

Chemical **Age,** The (**London**). *w* 2 vols. **14**(342) 21s(6d)*d*, 26s*f* *Benn Brothers, Ltd, Bouverie House, 154 Fleet St, London, E C. 4, Eng.*

***Chem**ical **Age** (New York). Combined with The **Chem**ical, **Color & Oil Record** to form **Chem**ical **Record-Age** beginning with Vol. 23, No. 12 (Mar, 1925)

Chemical **Bulletin,** The (**Chicago**). *m* **13.** $1($ 10) *556 W Jackson Blvd., Chicago, Ill*

***Chem**ical, **Color & Oil Daily.** Name changed to **Chem**ical, **Color & Oil Record.**

***Chem**ical **Engineer,** The. Consolidated in 1920 with **Chem**ical **Age** (New York).

Chemical **Engineering** and **Mining Review.** *m* **18**(208). 8s(9d, postage extra)*d and New Zealand,* 10s *British Empire,* 12s6d*f*. *Tait Publishing Co, Pty, Ltd, 39 Queen St, Melbourne, Australia*

Chemical **Engineering** and the **Works Chemist.** **14**(147)(**1924**). 15s(1s6d) post free *d* and *f* *S S. Dyson, 144 Snargate St, Dover, Eng.*

***Chem**ical **Gazette,** The, or Journal of Practical Chemistry in All Its Applications to Pharmacy, Arts and Manufactures *London.* 1843–59 Followed by **Chem**ical **News,** The

***Chem**ical **Journal.** *St. Petersburg.* 1859–60.

Chemical **Markets.** *w* **19**(?). $1($ 15)*d* *Drug & Chemical Markets, Inc, 25 Spruce St, New York City.*

Chemical & **Met**allurgical **Engineering** *m* **33.** $3($ 35) *in America,* $5 or 21s*f* *McGraw-Hill Co., Inc, 10th Ave at 36th St, New York City.*

Chemical **News** and Journal of Industrial Science, The. *w* 2 vols. **132**(3429) £1 10s(6d, post free 6½d)*d* and *f* *Merton House, Salisbury Sq, London, E. C 4, Eng.*

***Chem**ical **News** and Journal of Physical Science, The. Name changed in 1921 to The **Chem**ical **News** and Journal of Industrial Science.

***Chem**ical **Record-Age.** Merged in 1925, in **Chemicals.**

***Chem**ical **Review,** The. *London* 1871–92.

***Chem**ical **Review** and Journal for the **Spirit, Vinegar** and **Sugar Industry** *Chicago.* 1881. Continued as **American Chem**ical **Review** and Journal for the **Spirit, Vinegar** and **Sugar Ind**ustry.

Chemical **Reviews.** *q* **2**(4). $5 per vol. *d*,

Can, and *foreign countries accepting mail at American domestic rates, $5.50f. The Williams and Wilkins Co, Mt. Royal and Guilford Aves, Baltimore, Md.*

Chemicals (A consolidation of Chemical, Color & Oil Record, Chemical Age and Chemical Engineer, and Color Trade Journal and Textile Chemist) *w* 2 vols. **25.** $5($25)*d*, $7*f* and *Can.* Monthly issues (Dyestuffs and Tech Editions) $3*d*, $4*f* and *Can. 51 Vesey St, New York City*

Chemical Technology, The (Japan). (Kwagaku-Kogei) (Printed in Japanese) *m* **10.** Y6.94*d. Kagaku-Koge-Sha, Kiriu, Japan.*

Chemical Trade Journal and Chemical Engineer, The *w* 2 vols. **78**(2015) 19s6d(6d plus postage)*d*, 24s *British Possessions* and *f Davis Bros, 265 Strand, London, W C. 2, Eng*

***Chemical Trades Journal.** *Manchester* 1887–90+.

Chemical Warfare. *m* **12.** *Chemical Warfare School, Edgewood Arsenal, Edgewood, Md*

***Chemical World.**

Chemické Listy pro vědu a prumysl. *m* except Sept. and Oct **20.** *Ed Beauforta, Jungmannova ul. 21, Prague II, Czechoslovakia.*

Chemie der Erde. *irr* **2**(2) *Gustav Fischer, Jena, Ger.*

Chemie der Zelle und Gewebe (Zeitschrift fur die Probleme der Gärung, Atmung u. Vitaminforschung). *irr* **12**(4)(Dec., **1925**). (Gm6) *Gebr. Borntraeger, Schöneberger Ufer 12a, Berlin, W. 35, Ger.*

Chemiker Zeitung. 3 times a week **50.** M8*d*, M12*f* per quarter. *Walter Roth, Cöthen, Ger*

***Chemik Polski.** Suspended during the World War. Resumed publication in 1921 under the name **Roczniki Chemji.**

***Chemische Ackersmann,** Der. *Leipzig.* 1855–75

***Chemische Annalen fur die Freunde der Naturlehre.** *Helmstädt* and *Leipzig.* 1784–1803.

Chemische Apparatur *sm* **13.** Gm4*d* per quarter. *Otto Spamer, Heinrichstr. 9, Leipzig, C 1, Ger*

***Chemische en physische oefeningen voor de beminnaars der schei- en Natuurkunde.** *Amsterdam* and *Leyden.* 1788. Followed by **Nieuwe chemische en physische oefeningen.**

Chemische Industrie, Die. Combined in Jan, 1921, with Zeitschrift fur **angewandte Chemie,** but separated in Apr, 1923. *w* **49.** M28(M.80)*d*, M33 (M1)*f. Verlag Chemie, G m b. H., Bosestr. 2, Leipzig, Ger.*

***Chemische Mittheilungen.** *Augsburg.* 1894–. Continuation of **Central-Anzeiger (Augsburg).**

***Chemische Revue** uber die **Fett-** und **Harz-Industrie.** Name changed to **Chemische Umschau** auf dem Gebiete der **Fette, Oele, Wachse und Harze.**

Chemische Rundschau fur Mitteleuropa und den **Balkan.** *sm* **3.** K240,000*d*, M15 *Germany,* $4 *U. S. Eskü-ter 5, Budapest IV, Hungary.*

***Chemisches Archiv.** *Leipzig.* 1783. Continued as **Neues chemisches Archiv.**

***Chemisches Centralblatt.** Name changed to **Chemisches Zentralblatt** in 1897.

***Chemisches Journal fur die Freunde der Naturlehre, Arzneygelahrtheit, Haushaltungskunst und Manufakturen.** *Lemgo* 1778–81. Continued as **Entdeckungen** in der **Chemie,** Die neuesten

Chemisches Zentralblatt. *w* 1 vol of 3 parts **97**(I) Rm100(Rm2.50)*d*, Rm 105(Rm2.80)*f Deutsche chemische Gesellschaft, Sigismundstr. 4, Berlin, W. 10, Ger.*

Chemische Umschau auf dem Gebiete der **Fette, Oele, Wachse und Harze.** *bw* **33.** Gm2.50(Gm1.60)*d* per month. *Verlag der Wissenschaftlichen Verlagsgesellschaft m. b. H., Postfach 40, Stuttgart, Ger*

***Chemisch - pharmaceutisch Archief.** *Schoonhoven.* 1840–41.

***Chemisch-pharmaceutisches Centralblatt.** *Leipzig.* 1850–55 Continuation of **Pharmaceutisches Centralblatt.** Continued as **Chemisches Centralblatt**

***Chemisch-technischen Mittheilungen der neuesten Zeit,** Die *Berlin, Halle.* 1849–86.

***Chemisch-technischer Central-Anzeiger.** *Leipzig.* 1883–92+.

***Chemisch-technisches Correspondenzblatt.** *Vienna.* 1894.

***Chemisch-technisches Repertorium.** *Berlin.* 1863–95.

Chemisch-technische Uebersicht. Supplement to **Chemiker-Zeitung.**

***Chemisch-technische Zeitung.** *Leipzig.* 1883–88.

Chemisch Weekblad. *w* **23.** f13(f0.25)*d*, f15*f. D. B. Centen, O Z Voorburgwal 115, Amsterdam, Holland.*

***Chemisk-technisk Fag- og Handels-Tidende.** *Copenhagen.* 1881–82.

***Chemist,** The. *London.* 1824–25, 1840–58.

Chemist-Analyst, The. *irr* **No. 46.** Gratis. *J. T. Baker Chemical Co., Phillipsburg, N. J.*

Chemist and **Druggist,** The. *w* 2 vols **104**(2397). 20s(9d)*d* and *f. 42 Cannon St., London, E. C. 4, Eng*

***Chemist** (The) and **Meteorological Journal.** *Amherst, Mass.* 1826.

Chemistry and **Industry** (Published under same cover with Journal of the Society of Chemical Industry). *w* [N. S.]**45.** £1 1s*d*, £1 5s*f Central House, 46–47 Finsbury Sq , London, E C 2, Eng.*

***Chemists'** Journal, The. *London.* 1880–82.

***Chicago Chemical Bulletin.** Name changed in 1919 to The **Chemical Bulletin** (**Chicago**).

Chimica e industria. *m* **1**(5)(Feb , **1926**) *Rua Maria Antonia 79, Sao Paulo, Brazil.*

***Chimica industriale,** La 1899–1902 Continued as **L'industria chimica.**

Chimie & industrie. *m* 2 vols **15.** *Société de chimie industrielle, 49 rue de Malhurins, Paris, France.*

***Chimiste,** Le *Brussels.* 1865–1914.

***China Clay Trade Review.** Discontinued as separate journal but is now a monthly supplement to The **Chemical Age** (**London**).

China Journal of Science and **Arts.** *m* **4.** Mex. $10(Mex. $1)*d*, $6 U S currency *f The Secy., 8 Museum Road, Shanghai, China.*

China Medical Journal, The. *m* **40.** Mex. $10(Mex. $1)*d. J. L. Maxwell, 23 Yuen-Ming-Yuen Road, Shanghai, China.*

Ciment, Le. *m* **31.** F24*d*, F35*f. Société anonyme de publications industrielles, 20 rue Turgot, Paris (9e), France.*

Clay-Worker, The *m* 2 vols. **85.** $2*d*, $2 65*f. T. A. Randall & Co , Inc., 211 Hudson St., Indianapolis, Ind.*

***Cleveland Medical Journal.**

Clinical Medicine. *m* **33.** $3($.30)*d*, *Can.* and *Mex., $4f American Journal of Clinical Medicine, Inc., N. Chicago, Ill.*

Collected Papers from the **Medical Research Laboratory** of **Parke, Davis & Co.** *a.* Sent free to a selected list of scientific men and libraries. *Parke, Davis & Co., Detroit, Mich.*

Collegium. *m* **No. 669.** Rm28 plus postage *d*, $7 *U. S. R. Würtenberger, Ober-Ramstadt b. Darmstadt, Ger.*

Colliery Engineering. *m* **3**(23). 12s(1s)*d* and *f. 33 Tothill St., Westminster, London, S W. 1, Eng.*

Colliery Guardian and Journal of the Coal and Iron Trades. *w* 2 vols. **131**(3392). 31s6d(8d)*d*, 35s*f* and *colonial*, 32s6d *Can. 30–31 Furnival St., Holborn, London, E C 4, Eng.*

***Color Trade Journal** Named changed in 1923 to **Color Trade** Journal and **Textile Chemist.**

***Color Trade Journal** and **Textile Chemist.** Merged in 1925 in **Chemicals.**

Coltivatore, Il 3 times a month. **72.** L30*d*, L45*f. Tito Poggi, Casale Monferrato, Italy.*

Combustion. *m* **14.** $2($ 35)*d*, $2.25, 10s6d or F45(1s6d)*f. Combustion Publishing Co , 11 Broadway, New York City.*

Commonwealth Engineer, The. *m* **13**(6). 8s(9d plus postage)*d* and *New Zealand*, 10s *Brit. Empire*, 10s6d*f. Tait Publishing Co , Pty., Ltd , 39 Queen St , Melbourne, Australia; British & Colonial Press, Inc., 163 E Erie St , Chicago, Ill.*

Communications from the **Physical Laboratory** at the **University** of **Leiden.** *irr. University of Leyden, Leyden, Holland.*

Comptes-rendus des séances de l'**académie** d'**agriculture** de **France.** *w* except in Aug and Sept. **12.** F35(F1)*d*, F40(F1)*f. Henri Huter, 19 rue de Saints-Pères, Paris, France.*

Comptes-rendus des séances de la **société belge de biologie.** Reprints of the Belgian contributions to **Comptes rendus** des séances de la **société de biologie.**

Comptes rendus des séances de la **société de biologie.** *w* 2 vols. **94.** F80*d*, F90 and 100*f. Masson et Cie, 120 Blvd. Saint-Germain, Paris (6e), France.*

Comptes-rendus des **travaux** du **laboratoire Carlsberg.** *irr* **16**(5). Price varies. *H Hagerup, Copenhagen, Denmark.*

Comptes rendus hebdomadaires des séances de l'académie des sciences. *w* 2 vols. **132.** *Gauthier-Villars et Cie, 55 Quai des Grands-Augustins, Paris (6e), France.*

***Comptes-rendus** mensuels des **travaux chimiques** de l'**étranger** ainsi que les **laboratoires de Bordeaux** et de **Montpellier.** *Montpellier.* 1845–51.

Conceria, La. *w* **34**(898). L40*d*, L75*f.* Edizione Tecnico-economica (monthly) and Edizione commerciale (weekly) published together. *Via Caffaro 2, Genoa, Italy.*

Concrete (Cement Mill Edition). *m* 2 vols.

28. $3($.30)*d*, *U S. Possessions* and *Mex.*, $4*f*, $3 50 *Can. Concrete Publishing Co , 139 N. Clark St., Chicago, Ill*

***Concrete Age,** The. Merged in **Concrete** in 1920.

Concrete and **Constructional Engineering.** *m* **21.** 18s(1s6d)*d* *20 Dartmouth St., Westminster, London, S. W 1, Eng*

***Concrete-Cement Age.** Name changed to **Concrete.**

Continental Metallurgical & Chemical Engineering. *m* **1.** M20, £1 or $5 post free. *Joachim Stern Verlag, Lutzowstr. 84, Berlin, W 35, Ger*

Contract Record and **Engineering Review.** *w* **40.** $3($ 15)*d*, $5*f*, $4 *U. S. Hugh C. MacLean Publications, Ltd , 347 Adelaide St. West, Toronto 2, Ontario, Can.*

***Coriarium.** Suspended in 1924.

***Correspondenzblatt** des **Vereines analytischer Chemiker.** *Magdeburg* 1878–80.

Corriere dei ceramisti *m* **7.** L30*d*, L40*f* *Via Mazzini 6, Perugia, Italy.*

Cotton Oil Press, The. *m* **9**(9). $2 50 ($ 25)*d*. *Interstate Oil Press, Inc , 402 Cotton Exchange Bldg , Memphis, Tenn*

***Crell's Chemical Journal.** (English edition of Chemische Annalen fur die Freunde der Naturlehre) *London.* 1791–93.

Cross Tie Bulletin *m* **6**(11). $2($ 25)*d*. *Roy M Edmonds, Editor-Mgr , Syndicate Trust Bldg , St. Louis, Mo.*

***Cuir,** Le Edition technique. Name changed in 1923 to **Cuir Technique,** Le.

Cuir technique, Le *m* **15**(18th yr). F65(F5)*d*, F80*f* *and countries in the Postal Union*, F95 *in other countries U. J Thuau, 54 rue de Bondy, Paris, France.*

Dansk Tidsskrift for Farmaci. *m* **1.** K10*d*, K15*f*. *Den Farmaceutiske Laereanstalt, Stockholmsgade 27–9, Copenhagen Ø, Denmark.*

***Delaware State Medical Journal.** Merged in **Atlantic Medical Journal.**

Dental Cosmos, The *m* **68** $1.50($.25)*d*, *U. S. Possessions, Cuba* and *Mex.*, $2.25*f*, $4 *Australia*, $1 90 *Can. S S White Dental Mfg. Co., 211 S. 12th St., Philadelphia, Pa.*

Dental Items of Interest. *m* **48.** $2 ($.25)*d*, *U S. Possessions, Cuba, Mex.* and *Panama*, $2 75*f*, $2.40 *Can. Dental Items of Interest Publishing Co., 2921 Atlantic Ave., Brooklyn, N. Y.*

***Dental Review.** Suspended publication in 1918.

Department of Agriculture, Bengal, Report. *a.* (Rs3–8). *S. K. Lahiri and Co., College St , Calcutta, India.*

Department of Agriculture, Bombay Presidency, Bulletin. *irr* *Director of Agriculture, Poona, India.*

Department of Agriculture, Ceylon, Bulletins. *irr* (Re 1 or $ 25)*d*, (Rs2 50 or $.40)*f*. *Manager, Publication Depot, Peradeniya, Ceylon.*

Department of Industries, Bombay Presidency, Bulletin. *irr* Price varies. *Superintendent of Government Printing, Poona, India.*

Department of Scientific and Industrial Research (British Government), Reports. *irr* Price varies. *H. M. Stationery Office, Adastral House, Kingsway, London, W. C. 2, Eng.*

Desinfektion. *m* **11.** M1.50*d* per quarter. *Medizinisch-Technische Verlagsanstalt, Dr. Morenhoven, Berlin, S. W. 68, Ger.*

Detonator, The. *m* **6.** Gratis. *California Cap Co., 1540 San Pablo Ave., Oakland, Calif.*

***Deutsche Chemiker-Zeitung.** *Berlin.* 1886–92+

Deutsche Essigindustrie, Die. *w* **30.** M3(Rm1)*d* and *f* per month. *Paul Parey, Hedemannstr. 10–11, Berlin, S. W. 11, Ger.*

Deutsche Färber-Zeitung. *w* **62.** Rm6 (Rm1) plus postage *d*, Rm7.50 plus postage *f*, without sample cards; Rm7.50 (Rm1) plus postage *d*, Rm9 plus postage *f*, with sample cards. *Wittenberg (Bez. Halle), Ger.*

***Deutsche Faserstoffe und Spinnpflanzen.** Name changed in 1923 to **Faserstoffe und Spinnpflanzen.**

Deutsche medizinische Wochenschrift. *w* **52.** Rm6 40(Rm 80)*d* per quarter. *Georg Thieme, Antonstr. 15, Leipzig, Ger.*

***Deutsche Metallwaren-Industrie.** Name changed in 1925 to **Metallwaren-Industrie und Galvano-Technik.**

Deutsche Parfümeriezeitung. *m* **12.** Rm18 (Rm1.50)*d*, Rm24(Rm2)*f*. *Vereinigte Fachzeitschriften Verlagsgesellschaft, 66 Bulowstr., Berlin, W 57, Ger.*

***Deutscher Töpfer und Ziegler Zeitung.** Name changed in 1918 to **Ziegelwelt.**

Deutsches Archiv für klinische Medizin. *irr* About 4 vols **150.** Rm20 per vol. *F. C. W. Vogel, Dresdenstr. 3, Leipzig, Ger.*

Deutsches Handels-Archiv. *bw* Rm108*d*. *E. S. Mittler & Sohn, Kochstr. 68–71, Berlin, S. W. 68, Ger.*

Deutsche Zeitschrift für die gesamte gerichtliche Medizin. About *bm* **7.**

Price varies. *Julius Springer, Link-Str. 23–24, Berlin, W 9, Ger*

Deutsche Zuckerindustrie, Die. *w* **51.** Gm24*d*, Gm32*f* *Dessauer Str. 18, Berlin, S. W. 11, Ger*

Diamant, Glas-Industrie-Zeitung Every 10 days **48.** Gm1*d* per month, $1 *U S* per quarter. *A. Duncker, Keilstr. 1, Leipzig, Ger*

Dinglers polytechnisches Journal 26 nos. a year **341.** Gm2 50*d* per quarter *Richard Dietze, Regensburgerstr 12a, Berlin, W. 50, Ger*

***Drug and Chemical Markets.** Separated in 1926 into two journals, **Chemical Markets** and **Drug Markets.**

***Druggist and Chemist,** The. *Philadelphia.* 1878–79.

Druggists' Circular, The. *m* **70.** $2 50 ($.25)*d*, $3.50*f*, $3 *Can. 12 Gold St, New York City.*

***Druggists' Circular and Chemical Gazette** *New York.* 1866–92+. Continuation of **American Druggists' Circular** and **Chemical Gazette.**

Drugs, Oils and Paints. *m* **41**(8) $2 ($.20)*d*, 8s6d(1s)*f*. *G B. Heckel, Philadelphia, Pa.*

***Dublin Journal of Medical and Chemical Science.** *Dublin.* 1832–45 Continued as **Dublin Quarterly Journal of Medical Science** [exclusively medical].

Dyer, Calico Printer, Bleacher, Finisher and Textile Review. *sm* 2 vols. **55**(647). 10s6d(9d)*d*, 12s6d*f*. *Heywood & Co., Ltd, 24 Holborn, London, E C. 1, Eng.*

Dyestuffs. *m* **27.** *National Aniline and Chemical Co, Inc, 40 Rector St, New York City.*

Eastman Kodak Company, Monthly **Abstract Bulletin.** *m* **12.** *Eastman Kodak Co., Research Lab, Rochester, N Y.*

Eau, L'. *m* **19.** F6(F1.25)*d* and *French colonies,* F20(F1 75)*f* *in Postal Union. 3 rue St-Augustin, Asnières (Seine), France*

Ecology (continuing The Plant World). *q* **7.** $4($1 25)*d*, $4 20*f*, $4 10 *Can. Prince and Lemon Sts, Lancaster, Pa*

Economic Geology. *sq* **21.** $5($ 7.5)*d*, *Cuba* and *Mex.*, $5.50*f*, $5.25 *Can The Economic Geology Publishing Co, Prince and Lemon Sts, Lancaster, Pa.*

Economic Proceedings of the Royal Dublin Society. *irr* **2**(16). Price varies *Royal Dublin Society, Ballsbridge, Dublin Ireland* or *Williams and Norgate, 14 Henrietta St., Covent Garden, London, W C, Eng.*

***Edel-Erden und Erze.** Ceased publication in 1923.

***Edinburgh Journal of Science,** The *Edinburgh.* 1824–32.

Edinburgh Medical Journal *m* [N. S.]**33.** 40s(4s)*d* *Oliver & Boyd, Tweeddale Court, Edinburgh, Scotland*

***Eis- und Kälte-Industrie** Name changed to **Wärme & Kälte Technik**

Electrical Review, The **(London).** *w* 2 vols. **98**(2510) £1 14s8d(6d)*d*, £2 1s6d*f* and *colonies*, £1 12s6d *Can. Electrical Review, Ltd, 4 Ludgate Hill, London, E C. 4, Eng; D Van Nostrand Co, 8 Warren St., New York City.*

Electrical West. *m* **58(1927).** $2($ 25)*d*, $3*f*. *McGraw-Hill Co. of California, 883 Mission St., San Francisco, Calif.*

Electrical World. *w* 2 vols. **87.** $5($ 25)*d*, $9 or 38*sf*. *McGraw-Hill Book Co, Inc, 10th Ave at 36th St, New York City.*

Electrician, The. *w* 2 vols. **96**(2485). 25s(6d or 7½d by post)*d*. *Bouverie House, 154 Fleet St, London, E. C. 4, Eng.*

Electricien, L'. *sm* [2]**57**(1387). F42 (F2 50)*d*, F57*f* *Dunod 9, 92 rue Bonaparte, Paris (6e), France.*

Electric Journal, The. *m* **23.** $2($ 25)*d* and *Mex.*, $2 50*f*, $2 25 *Can Westinghouse Co., 1205 Keenan Bldg, East Pittsburgh, Pa.*

***Electrochemical Industry** 1902–04 Continued as **Electrochemical & Metallurgical Industry**

***Electrochemical & Metallurgical Industry.** Continuation of **Electrochemical Industry** Continued as **Metallurgical and Chemical Engineering.**

***Électrochimie, L'.** *Paris.* 1895+.

Elektrische Nachrichten-Technik. *m* **3.** Rm36*d*. *Dr F. Moench, Schliessfach 85, Berlin, W 9, Ger*

***Elektrochemische Zeitschrift** *Berlin.* 1893–1922

Elektrotechnik und Maschinenbau. *w* **44.** $6. *Theobaldgasse 12, Wien VI, Austria*

Elektrotechnische Zeitschrift *w* **47.** Rm 7 50(Rm0 80 plus postage)*d* and *f* per quarter *Julius Springer, Link-Str. 23–24, Berlin, W. 9, Ger.*

Endocrinology (The Bulletin of the Association for the Study of Internal Secretions). *bm* **10.** $6($1 25)*d*. *Assocn. for the Study of Internal Secretions, 1045–47 Title Insurance Bldg, Los Angeles, Calif.*

Engineer, The. *w* 2 vols. **141**(3653). £3 5s(1s, by post 1s3d)*d* Thin paper

£3 3s*f*, £2 18s6d *Can* Thick paper £3 7s6d*f*, £3 3s *Can 33 Norfolk St., Strand, London, W. C. 2, Eng*

Engineering. *w* 2 vols **121**(3131) £3 5s(1s)*d* Thin paper £3 3s(1s3½d)*f*, £2 18s6d *Can* Thick paper £3 7s6d*f*, £3 3s *Can. 35–36 Bedford St., Strand, London, W. C 2, Eng*

***Engineering & Cement World.** Name changed to **Engineering World.**

Engineering and Contracting. Divided into 5 magazines as follows: **Buildings; Equipment Review; General Contracting; Roads and Streets; Water Works.**

Engineering and Mining Journal Combined in 1922 with **Mining and Scientific Press** to form **Engineering and Mining Journal-Press.** Name changed back to **Engineering and Mining Journal** in 1926 *w* **2** vols. **122.** $5($ 25)*d*, $8 or 34s*f McGraw-Hill Co., Inc., 10th Ave. at 36th St, New York City.*

***Engineering and Mining Journal-Press.** Name changed in 1926 to **Engineering** and **Mining** Journal

***Engineering Education.** Bulletin of the Society. Name changed in 1924 to The Journal of **Engineering Education.**

Engineering Journal, The. (Journal of the Engineering Institute of Canada.) *m* **9.** $2 to members. *The Engineering Institute of Canada, 176 Mansfield St, Montreal, Que, Can*

***Engineering News.** Incorporated with **Engineering Record** under the name **Engineering News-Record.**

Engineering News-Record. *w* 2 vols **96.** $5($ 25)*d*, $9 or 38s*f McGraw-Hill Co, Inc, 10th Ave at 36th St, New York City*

***Engineering Record.** Incorporated with **Engineering News** under the name **Engineering News-Record.**

Engineering World. *m* 2 vols **28.** $2 ($ 20)*d*, $3*f*, $2 50 *Can International Trade Press, Inc, 542–55 Monadnock Bldg, Chicago, Ill*

***Engineers' Chemical Journal (Japan)** (Kôjin Kwagaku Zasshi) Discontinued in 1924

***Entdeckungen in der Chemie,** Die neuesten *Leipzig* 1781–86 Continuation of **Chemisches Journal fur die Freunde der Naturlehre, Arzneygelahrtheit, Haushaltungskunst und Manufakturen.**

Entomological News. *m* except Aug. and Sept **37.** $3($ 35)*d* and *U. S Possessions,* $3.25*f*, $3.15 *Can., Central and S. America. 1900 Race St, Philadelphia Pa*

Erdöl und Teer *w* **2.** Rm6*d*, Rm8*f* per quarter. *Krausenstr. 35–36, Berlin, S. W 19, Ger.*

Ergebnisse der Physiologie *irr* **25.** *J F. Bergmann, Munich, Ger.*

Ernährung der Pflanze. *sm* **22.** M2*d Deutschen Kalisyndikat, G. m. b H., Berlin, S. W. 11, Ger.*

E T Z. See **Elektrotechnische Zeitschrift.**

Experiment Station Record. *srr* 2 vols. **54.** $.75 per vol. ($ 10) *Supt of Documents, Govt. Printing Office, Washington, D C*

Explosives Engineer. *m* **4.** $1($.15)*d* for 3 yrs, $2($.15)*f* for 3 yrs. *Hercules Powder Co, Wilmington, Del.*

***Fach-Zeitschrift fur die chemische Seite der Textil-Industrie.** *Vienna.* 1883.

Facts About Sugar. *w* **21.** $3($.25)*d*, $4($ 35)*f Domestic Sugar Producers, Inc., 135 Front St, New York City.*

Farben-Zeitung. *w* **31**(14). M5*d*, M7*f*, M6 30 *Austria,* per quarter. *Union Deutsche Verlagsgesellschaft, Krausenstr 35–36, Berlin, S. W 19, Ger.*

Färber-Zeitung (Zeitschrift für Färberei Zeugdruck und den gesamten Farbenverbrauch). Discontinued in 1920. Succeeded by **Textilberichte über Wissenschaft, Industrie und Handel.**

Farbe und Lack. *w* Gm5*d* per quarter *Baringstr. 4, Hannover, Ger.*

Far Eastern Review, The. *m* **22.** $10 00 Mex.($1.00Mex.)*d*, $5.00 *U. S. George Bronson Rea, 16 Jinkee Road, Shanghai, China*

Faserforschung. *q* 5(2). (Rm5)*d* and *f. S Hirzel, Königstr 2, Leipzig, Ger.*

***Faserstoff und Spinnpflanzen.** Name changed in 1925 to Die **Kunstseide.**

Fermentforschung. *irr* 2 vols [N. S]1 (4). *Urban and Schwarzenberg, Friedrichstr 105B, Berlin, N 24, Ger*

***Ferrum.** Discontinued in 1916

Fertiliser, Feeding Stuffs and Farm Supplies Journal, The *bw* **11.** 10s (4d)*d. MacLaren and Sons, Ltd, 38 Shoe Lane, London, E. C 4, Eng*

Fertilizer Green Book, The. *m* **7.** $2 ($.25)*d Complete Service Publishing Co, Rand-McNally Bldg, Chicago, Ill.*

Feuerfest. *m* **2.** Gm11 20*d Otto Spamer, Heinrichstr 9, Leipzig, C 1, Ger*

Feuerungstechnik. *sm* **14**(7) Gm4*d* per quarter. *Otto Spamer, Heinrichstr 9, Leipzig, C 1, Ger.*

Finska Kemistsamfundets Meddelanden.

4 nos. a yr. **34(1925)**. *Helsingfors, Finland.*

Flora, oder allgemeine botanische Zeitung. *irr* [N.S.]**20** or **120**(3). *Gustav Fischer, Jena, Ger.*

Földtani Közlöny. (Zeitschrift der ungarischen geologischen Gesellschaft zugleich amtliches Organ der konigl. ungar. geologischen Anstalt.) *irr* **55** (1 to 12)(**1925**). *Magyarhoni Földtani Társulat, Múzewm-körút 4, Budapest VIII, Hungary.*

***Folia clinica,** chimica et microscopica. Suspended publication during the World War. Afterwards merged in **Biochimica e terapia sperimentale.**

Folia Haematologica. *irr* **I Abt**eilung, Archiv, **32**(2); **II Abt**eilung, Zentral-Organ, **23**(2). *Dr Werner, Klinkhardt, Leipzig, Ger*

Fonderie moderne, La. *m* **20.** F30(F4)*d*. *15 rue Bleue, Paris (9), France.*

Forest Research Institute (India), Bulletins, etc Price varies *Govt. of India, Central Publication Branch, Calcutta, India.*

Forging, Stamping and **Heat Treating.** *m* **12.** $2($ 25)*d*, $3 50*f*. *The Andresen Co., Inc., 108 Smithfield St., Pittsburgh, Pa.*

***Forno elettrico,** Il. Discontinued in 1921.

***Fortschritte** auf dem **Gebiete** der **technischen Chemie,** Die. *Leipzig.* 1877.

***Fortschritte** auf dem **Gebiete** der **theoretischen Chemie,** Die. *Leipzig.* 1874.

***Fortschritte** der **Chemie.** *Cologne.* 1879–85.

Fortschritte der **Chemie, Physik** und **physikalischen Chemie.** *irr* [A and B] **18**(10). *Gebr Borntraeger, Schöneberger Ufer 12a, Berlin, W. 35, Ger.*

Fortschritte der **Landwirtschaft** *sm* 2 vols. **1.** M9 60*d* per quarter. *Otto Harrassowitz, Querstr. 14, Leipzig, Ger.*

Fortschritte der **Medizin.** *w* **44.** Gm6*d* per quarter. *Hans Pusch, Friedrichstr. 231, Berlin, S. W. 48, Ger.*

Fortschritte der **Mineralogie, Krystallographie** und **Petrographie.** *a* **10(1925).** *Deutsche mineralogische Gesellschaft, Berlin, W. 35, Ger.*

***Forstchritte** der **Physik.** Merged in **Physikalische Berichte.**

Foundry, The. *sm* **54.** $3($ 25)*d*, and *Mex.*, £1*f*, $4 *Can. The Penton Publishing Co., Cleveland, Ohio*

Frankfurter Zeitschrift fur **Pathologie.** *irr* About 3 vols. **33**(3). Price varies. *J. F. Bergmann, Munich, Ger.*

***Franklin** Journal, The. *Philadelphia.* 1826–28. Continued as Journal of the **Franklin Institute.**

Fruit Products Journal and **American Vinegar Industry,** The. *m* **5**(5). $2.50 ($ 25)*d*, *Cuba* and *Mex.*, $3 50*f*, $3 *Can. The Avi Publishing Co., Inc., 31 Union Square, New York City.*

Fuel Economy Review. *a* (formerly *q*) **5.** (2s6d)*d*. *Fuel Economy Dept., Federation of British Industries, 39 St. James's St., London, S. W. 1, Eng.*

Fuel in Science and **Practice.** (Formerly a supplement to Colliery Guardian.) *m* **4(1925).** 10s6d(1s) *Colliery Guardian Co., Ltd., 30 & 31 Furnival St., Holborn, London, E. C. 4, Eng.*

***Fuel Oil Journal.** Name changed in 1916 to **Oil Trade Journal.**

Fuels and **Furnaces.** *m* **4.** $1*d*, $2*f*. *F. C. Andresen and Associates, Inc., House Bldg., Pittsburgh, Pa*

***Fühlings Landwirtschaftliche Zeitung.** Discontinued in 1922

Fysisk Tidsskrift. 6 nos. a year. **24.** K12*d* *Boghandler Jul Gjellerup, Sölogade, 87, Copenhagen, Denmark.*

Gas, Het. *sm* **46.** f21(f1 25)*d*, f23 50 (f1 25)*f*. *Vereeniging van Gasfabrikanten in Nederland, Javastraat 51a, The Hague.*

***Gas Age,** The. Combined in 1921 with The **Gas Record** to form **Gas Age-Record.**

Gas Age-Record. *w* 2 vols. **57.** $3 ($ 25)*d*, *U. S. Possessions* and *Mex.*, $5*f*, $4 *Can. Robbins Publishing Co., Inc., 9 E. 38th St., New York City.*

Gas-Industrie, Die *m* **18.** Gm12(Gm1)*d*. *Carl Marhold, Mühlweg 26, Halle a. d Saale, Ger.*

Gas Industry. Manufactured Gas Edition; Natural Gas Edition. *Periodicals Publishing Co., Buffalo, N. Y.*

***Gas Institute News.**

Gas Journal. *w* 4 vols **173**(3269) 35s (1s)*d*, *Colonies, Dominions* and *U. S.*, 40s*f* in *Postal Union Walter King, Ltd., 11 Bolt Court, Fleet St., London, E. C. 4, Eng.*

***Gas Record,** The Combined in 1921 with **The Gas Age** to form **Gas Age-Record.**

Gas und Wasserfach, Das. *w* **69.** Rm20*d*, Rm26*f*. *R. Oldenbourg, Glückstr. 8, Munich, Ger.*

Gas World, The. *w* 2 vols. **84**(2163). 28s(8d)*d*, 32s*f*. *Bouverie House, 154 Fleet St., London, E. C. 4, Eng.*

Gazzetta chimica italiana. *m* **56.** L150 (L20)*d*, L200*f*. *Via Quattro Novembre 154, Rome (1), Italy.*

Gazzetta degli **ospedali** e delle **cliniche.** *w* **47.** L35(L1)*d*, L60*f*. *Dr. Francesco Vallardi, Via Ausonio 22, Milan, Italy.*

***Gazzetta** di **farmacia** e di **chimica** che da prima publicavasi in **Este.** *Venice.* 1855–57.

***Gazzetta** **eclettica** di **chimica, farmaceutica, medica, tecnologica** e di respettiva letteratura e commentario della conversazione chimico-farmaceutica. *Verona* 1835–39.

***Gazzetta** **eclettica** di **chimica tecnologica.** *Verona.* 1833–34. Combined with **Gazzetta eclettica** di **farmacia** e **chimica medica** and continued as **Gazzetta eclettica** di **chimica, farmaceutica, medica, tecnologica** e di respettiva letteratura e commentario della conversazione chimico-farmaceutica.

***Gazzetta** **eclettica** di **farmacia** e **chimica medica** *Verona.* 1831–34. Combined with **Gazzetta eclettica** di **chimico tecnologica** and continued as **Gazzetta eclettica** di **chimica, farmaceutica, medica, tecnologica** e di respettiva letteratura e commentario della conversazione chimico-farmaceutica.

Geneeskundig Tijdschrift voor **Nederlandsch-Indië.** *bm* **66.** f21(f3 50)*d* and *f. Javasche Boekhandel & Drukkerij, Rijswijk, Weltevreden, Dutch East Indies.*

General Electric Review. *m* **29.** $3 ($ 30)*d* and *Mex*, $3.50*f*, $3 25 *Can. General Electric Co., Schenectady, N. Y.*

General Science Quarterly. Pub in Nov, Jan, Mar. and May. **10**(2) ·$1.50 ($ 40)*d* *W G. Whitman, Salem, Mass.*

Génie civil, Le. *w* 2 vols. **88.** F90 (F2 50)*d*, F125*f*. *6 rue de la Chaussée d'Antin, Paris (9e), France.*

Geological Magazine, The (or Monthly Journal of Geology). *m* **63**(739). 30s (2s6d)*d* and *f. Dulau & Co, Ltd., 34–36 Margaret St., Cavendish Square, London, W. 1, Eng*

Geological Survey of **Great Britain, Memoirs, Special Reports** on the **Mineral Resources** of **Great Britain,** etc. *irr* Price varies. *H. M. Stationery Office, Adastral House, Kingsway, London, W. C. 2, Eng.*

Geologiska Föreningens i Stockholm Förhandlingar. 7 nos. a year, Jan. to May, Nov. and Dec. **48.** *P. A. Norstedt & Söner, Kungl. Boktryckeriet, Stockholm, Sweden.*

Gerber, Der. *sm* **52**(1223). Kč91 80*d*, *Austria, Poland* and *Jugoslavia*, Kč122.40*f*, Kč112.20 *Bulgaria, France, Germany, Greece, Hungary, Rumania* and *Soviet Union. Verlag Technischer Zeitschriften G. m. b. H, Clarystr. 4, Teplitz-Schönau, Czechoslovakia.*

Gesammelte Abhandlungen zur **Kenntnis** der **Kohle.** *a* **7**(**1922–3**, published **1925**). M20. *Gebr. Borntraeger, Schöneberger Ufer 12a, Berlin, W. 35, Ger.*

Gesundheits-Ingenieur. *w* **49.** Rm16*d*, Rm22*f*. *R. Oldenbourg, Glückstr. 8, Munich, Ger.*

Gewerbefleiss. *m* **105.** (Gm1 70)*d*. *R. Boll, Schiffbauerdamm, 19, Berlin, N. W. 6, Germany.*

Giesserei Zeitschrift fur die Wirtschaft und Technik des Giessereiwesens. *w* **13.** *R. Oldenbourg, Gluckstr 8, Munich, Ger.*

Giesserei-Zeitung. (Wochenschrift für das gesamte Giessereiwesen) *sm* **23.** Gm42 (Gm1 75)*d*, $6 50*f* *Rudolf Mosse, Jerusalemer Str. 46–49, Berlin, S. W. 19, Ger*

Giornale della reale **accademia** di **medicina** di **Torino.** *irr* **89.** L40(L4)*d*. *Tipografia Capella, Via Garibaldi N 1, Cirié, Turin, Italy.*

Giornale di **bibliografia tecnica internazionale** *m* **2.** L30(L3)*d*, L50*f*. *Società generale delle messaggerie italiane, Via Milazzo, N 16, Bologna, Italy.*

Giornale di **biologia** e **medicina sperimentale 3.** L50*d*, L65*f*. *Prof. Carlo Foà-Istituto di fisiologia, Città degli studi, Milan, Italy.*

***Giornale** di **chimica applicata.** Combined in 1920 with **Giornale** di **chimica industriale** to form **Giornale** di **chimica industriale** ed **applicata.**

***Giornale** di **chimica industriale** *Milan.* 1919–20. Combined in 1920 with **Giornale** di **chimica applicata** to form **Giornale** di **chimica industriale** ed **applicata.**

Giornale di **chimica industriale** ed **applicata.** *m* **8.** L75(L7.50)*d*, L100 (L10)*f*. *Via S Paolo 10, Milan (3), Italy.*

***Giornale** di **farmacia, chimica** e **materia medica applicata** anche alla **veterinaria** *Ancona.* 1861–62.

***Giornale** di **farmacia, chimica** e **scienze accessorie.** *Milan.* 1824–34. Continued as **Biblioteca** di **farmacia, chimica, fisica, medicina, chirurgia, terapeutica, storia naturale.**

Giornale di **farmacia,** di **chimica** e di scienze affini. *m* **75.** L15 25(L1.50)*d*, L18(L2)*f*. *"Mutua farmaceutica italiana," Via Cernaia 14, angolo Via S. Dalmazzo, Turin (3), Italy.*

***Giornale** di **fisica, chimica** ed **arti.** *Milan.* 1839.

***Giornale di fisica, chimica e storia naturale.** *Pavia.* 1808–17 Continued as **Giornale di fisica, chimica, storia naturale, medicina ed arti.**

***Giornale di fisica, chimica, storia naturale, medicina ed arti.** *Pavia* 1818–27 Continuation of **Giornale di fisica, chimica e storia naturale.**

Giornale di risicoltura, Il *m* **16.** L7*d*, L10*f*. *Novello Novelli, Via Bazzi 8, Vercelli, Italy.*

***Giornale fisico-chimica italiano.** *Venice* 1846–48 [–51(?)].

Glasgow Medical Journal, The. *m* 2 vols. [N. S.]**23** or **105.** 30s(3s). *Alex MacDougall, 70 Mitchell St, Glasgow, Scotland; H. K. Lewis & Co, Ltd, 136 Gower St, London, W C, Eng*

Glashütte, Die (Zeitschrift fur die gesamte Glasindustrie, Emailleindustrie u verwandte Zweige). *w* **56.** Gm3*d*, Gm4*f* per quarter. *Verlag "Die Glashutte," Strehlener Str. 20, Dresden-A, 24, Ger.*

***Glashütte und Keramik.** *Dresden und Leipzig.* 1871–86.

***Glas-Industrie,** Die Discontinued at end of 1922.

Glass. *m* **3**(2) 10s6d(1s)*d*. *Glass Publications, Ltd, Talbot House, Arundel St, Strand, London, W C. 2, Eng.*

Glass Industry, The *m* **7.** $2($ 20)*d* and *f Glass Industry Publishing Co, Inc., 50 Church St., New York City*

***Glass Worker.** *w* **45** (14). Name changed in 1926 to **American Glass Review**

Glastechnische Berichte. *m* **3**(9). *Deutsche glastechnische Gesellschaft, Frankfurt am Main, Ger.*

Glückauf, Berg- und Huttenmännische Zeitschrift. *w* **62.** M8.50*d*, M10*f* per quarter. *W. Beeckmann, Verlag Glückauf m. b. H., Essen, Ger.*

Gummi-Zeitung. *w* **40**(14) M5*d*, M7*f*, M6.30 *Austria* per quarter. *Krausenstr. 35–36, Berlin, S. W. 19, Ger.*

Gürtler, Bijouterie und Metallwaren Industrie, Die. Name changed to **Metallwaren-Industrie und Galvano-Technik**

G W F. See Das **Gas- und Wasserfach.**

Hahnemannian Monthly, The. *m* **61.** $3($.30). *Homeopathic Medical Society of Pennsylvania, 1435 Spruce St., Philadelphia, Pa.*

***Halbmonatliches Literatur-verzeichnis.** Merged in **Physikalische Berichte.**

Halle aux cuirs, La. **Supplément technique** mensuel. *m 36 rue Debelleyme, Paris (3e), France.*

Harefuah. **2**(1)(Oct.–Nov, **1926**). 12s(2s). *The Jewish Medical Organisation in Palestine, Jerusalem, Palestine*

Hawaiian Sugar Planters' Association Bulletins, etc. Limited edition, not issued to public. *Experiment Station of the Hawaiian Sugar Planters' Assocn, P. O Box 411, Honolulu, T H, Hawaii.*

Heating and **Ventilating Magazine,** The. *m* **23.** $2($ 20)*d*, $2 50*f*, $2 25 *Can. Heating and Ventilating Magazine Co, 1123 Broadway, New York City*

Heil- und Gewürz-Pflanzen. *irr* 12 nos a year. **7**(?)(**1925**) M5*d* *F P. Datterer u, Ges., Freising-München, Ger*

Helvetica Chimica Acta. 6 to 8 numbers a year. **9.** F30 plus F1 10 postage(F4 plus postage)*d*, F30 plus F3.60 postage *f. Georg & Co., Basel, Switz.*

Hercules Mixer. *m* **8.** Gratis. *Hercules Powder Co, Wilmington, Del.*

Hide and **Leather.** *w* 2 vols. **71.** $5 ($ 25)*d*, $7*f*, $6 *Can. The Jacobsen Publishing Co, 136 W. Lake St, Chicago, Ill.*

Hilgardia (A Journal of Agricultural Science). *irr* **2**(2)(**1927**). Gratis. *Publications Secy., Agr. Expt. Sta., Berkeley, Calif.*

Hoppe-Seylers Zeitschrift für physiologische Chemie. See **Zeitschrift fur physiologische Chemie** (Hoppe-Seylers).

***Hygiene de la viande et du lait,** L'.

***Hygienische Rundschau.** Discontinued in 1922. Later continued in **Zentralblatt fur die gesamte Hygiene und ihre Grenzgebiete**

Ice and **Refrigeration.** *m* 2 vols **70.** $3($ 35)*d*, *Cuba* and *Mex.*, $4*f* *Nickerson & Collins Co., 5707 W Lake St., Chicago, Ill*

Ice Cream Trade Journal, The. *m* **22.** $2($ 25)*d* and *Can.*, $2 50*f*. *Thomas D. Cutler, 171 Madison Ave., New York City.*

Illinois State Geological Survey, Bulletins, Reports, etc. *irr Illinois State Geological Survey, University of Illinois, Urbana, Ill*

Illinois State Water Survey, Bulletins, etc *irr University of Illinois, Urbana, Ill.*

Illuminating Engineer, The. *m* **19.** 10s6d (9d)*d*, 15s*f*. *32 Victoria St., London, S. W. 1, Eng.*

Illustrated Official Journal, The (British Patents.) *w* **1926**(1929). £5(2s) *The Patent Office, 25 Southampton Bldgs, Chancery Lane, London, W. C. 2, Eng.*

Indian and **Eastern Engineer,** The. *m* 2 vols. [N. S.]**58.** Rs12*d*, 20s *Gt. Britain* and *continent. 6 Mangoe Lane, Calcutta,*

India or *British and Colonial Press, Inc., Room 1001, 145 W. 45th St., New York City.*

Indian Forest Bulletins. *irr Govt of India, Central Publications Branch, 8 Hastings St, Calcutta, India.*

Indian Forest Records, The. *irr* **12.** Price varies. *Govt. of India, Central Publications Branch, 8 Hastings St, Calcutta, India*

Indian Journal of **Medical Research,** The *q* **13**(3). (Rs.5)*d Thacker, Spink & Co, 3 Esplanade, Calcutta, India.*

Indian Journal of **Physics. 1(1926).** 4 parts a year. Rs12*d*, 16s *Europe*, $4 *America* per vol. *Honorary Secy, Indian Association for the Cultivation of Science, 210 Bow-Bazar St., Calcutta, India*

Indian Medical Gazette, The. *m* **61.** Rs16*d*, Rs18*f*. *Thacker, Spink & Co, 3 Esplanade, Calcutta, India.*

India Rubber and **Tire Review** *m* **26.** $1($ 25)*d*, $2*f*. Two yr. rate $1 75*d*, $3 50*f* *Indian Rubber Review Co, 409–11 United Bldg., Akron, Ohio*

India Rubber Journal, The. *w* 2 vols **71.** 20s(4d)*d* and *f. 37–8 Shoe Lane, Fleet St., London, E C, Eng.*

***India Rubber Review.** Name changed in 1925 to **India Rubber** and **Tire Review**

India Rubber World. *m* 2 vols **73**(4). $3($ 35)*d*, $3.50*f*. *India Rubber Publishing Co, 25 W. 45th St., New York City.*

Industria, L'Rivista tecnico-scientifica ed economica *bw* **40.** L60(L5)*d*, L100(L9)*f*. *Società editrice unitas, Viale Piave 12, Milan, Italy.*

***Industria chimica,** L' 1903–14 Continuation of La **chimica industriale.** Continued as **Industria chimica mineraria** e **metallurgica**

***Industria chimica, mineraria e metallurgica,** L' *Torino* 1914–19. Incorporated in 1919 with **Giornale di chimica industriale.**

Industria degli olii e dei **grassi,** L'. *m* **6.** L40(L5)*d*, L80(L5)*f*. *R. laboratorio olii e grassi, Via Marina 5, Milan (13), Italy*

Industria della carta e delle **arti grafiche,** L' *sm* **29.** L36(L2)*d*, L60(L6)*f*. *Via Zebedia 3, Milan, Italy*

Industrial and **Engineering Chemistry** *m* **18.** $7 50($ 75)*d* and *Can.*, $7 50 plus $1 postage *f* except to countries accepting mail at American domestic rates *Charles L Parsons, Mills Bldg., Washington, D C.*

Industrial Chemist and Chemical Manufacturer, The. *m* **2**(12). 12s(1s)*d* and *f. 33 Tothill St., Westminster, London, S. W. 1, Eng.*

Industria saponiera, L'. *sm* **25**(24). L25 (L2)*d* and *colonies*, L35(L3)*f*. *Corso Roma 56, Milan, Italy.*

Industrie chimique, L'. *m* **13**(144). F60*d*, F80*f*. *H. Mounier, 8 rue de Miromesnil, Paris (8e), France.*

Industrie papetière, L'. *m* **5**(52). F25 (F3 50)*d*. *10 rue Aimé-Berey, Grenoble, France*

***Industries du cuir,** Les. *m* Supplement to **Halle aux cuirs,** La. The name of this supplement was changed in 1922 to **Halle aux cuirs,** La, **Supplément technique** mensuel.

Industritidningen Norden. *w* **55.** K12 (K0.30)*d*, K20*f*. *C. Sylwan, Hollaendareg 20, Stockholm, Sweden.*

Informacion agricola, La (**Madrid**). *sm* **16**(354). 10 Pesetas(50 centimos)*d*, 14 Pesetas *f. Juan Gavilán, Barquillo 21, Madrid, Spain.*

Institute of **Margarine Manufacturers, Bulletin** *irr* **No. 8(1925).** *Institute of Margarine Manufacturers, 1049 Munsey Bldg, Washington, D C.*

International Association for Rubber Cultivation in the **Netherland Indies, Communications.** Translation of **Mededeelingen** van den **Rijksvoorlichtingsdienst** ten **behoeve** van den **Rubberhandel** en de **Rubbernijverheid** te **Delft.**

International Association of Dairy and **Milk Inspectors, Annual Report.** *a* **16.** $2. *Ivan C. Weld, Pennsylvania Ave. at 26th St, Washington, D. C.*

***Internationale Mitteilungen für Bodenkunde** Discontinued under this name in 1925. Continued as **Mitteilungen** der **internationalen bodenkundlichen Gesellschaft,** which is the German edition of the **Proceedings** of the **International Society of Soil Science.**

***Internationales Centralblatt fur die gesamte Tuberkulose-Forschung.** Name changed to **Zentralblatt fur die gesamte Tuberkuloseforschung.**

Internationale Zeitschrift fur Bohrtechnik, Erdölbergbau und **Geologie.** *sm* **34.** Supplement to **Allgemeine österreichische Chemiker- und Techniker-Zeitung.**

***Internationale Zeitschrift fur Metallographie** 1911–19. Continued as **Zeitschrift fur Metallkunde.**

***Internationale Zeitschrift für physikalische-chemische Biologie.** Discontinued in 1917.

***Internationale Zeitschrift fur Tuberkulose-Forschung.** Combined with **Interna-**

tionales **Centr**alblatt fur die **ges**amte **Tuberkulose-Forsch**ung.

***Internationale Zeitschrift fur Wasser-Versorgung.** Merged in **Wasser und Gas.**

***International Journal of Public Health.** Suspended in 1921. Followed by **Bulletin of the League of Red Cross Societies** This Bulletin was in turn succeeded by **World's Health.**

International Review of the Science and Practice of Agriculture. *q* [N S] **4(1926).** Published in Italian, French, English, Spanish and German editions 15s or $3(4s or $1) for the English edition *International Institute of Agriculture, Villa Umberto 1, Rome (10), Italy.*

International Sugar Journal, The *m* **28**(325). 21s(1s9d or 2s post free)*d* *2 St Dunstan's Hill, London, E C 3, Eng.*

Iowa State College Journal of Science. *q* **1.** $3($1)*d*, $3 50*f*, $3 25 *Can. P E Brown, Business Mgr , Room 25, Hall of Agriculture, Iowa State College, Ames, Iowa*

Iron Age, The *w* 2 vols. **117.** $6($2 5)*d*, *U S. Possessions, Cuba and Mex* $12*f*, $8 50 *Can Iron Age Publishing Co , 239 W 39th St , New York City*

Iron and Coal Trades Review *w* 2 vols **113**(3020). 40s(11d)*d* *49 Wellington St , Strand, London, W. C. 2, Eng*

Iron and Steel Engineer. *m* **3.** $5($ 50) *Assocn. of Iron and Steel Electrical Engineers, 706 Empire Bldg , Pittsburgh, Pa.*

Iron and Steel Institute (London), Carnegie Scholarship Memoirs 15. *Iron and Steel Institute, 28 Victoria St , London, S. W 1, Eng*

Iron Foundry, The Supplement to **Metal Industry (London).**

***Iron & Steel Magazine.** Merged in 1906 with **Electrochemical and Metallurgical Industry.**

Iron & Steel of Canada. *m* **9.** $2($ 25)*d*, *U. S.* and *Brit. Empire*, $2 plus postage*f* *Industrial and Educational Publishing Co., Ltd., Garden City Press, Gardenvale, P Q , Can.*

Iron Trade Review, The *w* 2 vols **78.** $6($ 25)*d*, *Cuba* and *Mex* , £2*f*, $8 50 *Can. The Penton Publishing Co , Cleveland, Ohio*

Izvestiya Akademii Nauk Soyuza Sovetskikh Sotzialisticheskikh Respublik. See **Bulletin de l'académie des sciences de l'union des républiques soviétiques socialistes.**

Izvestiya Ivanovo-Voznesenskii Politekhnicheskii Instituta See **Bulletin de l'institut polytechnique à Ivanovo-Vosniesensk.**

***Jahrbuch der Radioaktivitat und Elektronik.** Discontinued under this name in Mar , 1924, but combined (Jan., 1924) with **Physikalische Zeitschrift**

Jahrbucher fur wissenschaftliche Botanik. *irr* **65.** *Gebr. Borntraeger, Schöneberger Ufer 12a, Berlin, W 35, Ger.*

Jahrbuch fur Kinderheilkunde und physische Erziehung *m* 3 or 4 vols [3]**62** or **112.** Rm18 per vol *S. Karger, Karlstr 15, Berlin, N W 6, Ger.*

***Jahrbuch fur Mineralogie, Geognosie, Geologie und Petrefaktenkunde** 1830–33? Continuation of **Zeitschrift für Mineralogie.** Continued as **Neues Jahrbuch fur Mineralogie, Geognosie, Geologie und Petrefaktenkunde**

Jahresbericht der Pharmazie. *irr* **58 (1925).** $4 80*f*. *Vandenboeck and Ruprecht, Gottingen, Ger.*

***Jahresbericht uber die Fortschritte der Chemie und Mineralogie** *Tubingen.* 1842–51. Continuation of **Jahresbericht uber die Fortschritte der physischen Wissenschaften**

***Jahresbericht uber die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften** *Giessen* (from 1886 *Braunschweig*) 1858– Continuation of **Jahresbericht uber die Fortschritte der reinen, pharmaceutischen und technischen Chemie, Physik, Mineralogie und Geologie**

***Jahresbericht uber die Fortschritte der physischen Wissenschaften** *Tubingen* 1822–41 Continued as **Jahresbericht uber die Fortschritte der Chemie und Mineralogie.**

***Jahresbericht uber die Fortschritte der reinen, pharmaceutischen und technischen Chemie, Physik, Mineralogie und Geologie** *Giessen.* 1849–57 Continued as **Jahresbericht uber die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften**

***Jahres-Rundschau.** *Leipzig.* 1894

Japanese Journal of Astronomy and Geophysics (Printed in English, French or German) *irr* **3**(3) *Secy , National Research Council, Dept of Education, Tokyo, Japan*

Japanese Journal of Botany. (Printed in English, French or German) *irr* **2**(4) (last no. of **1925**) *Secy , National Research Council of Japan, Dept of Education, Tokyo, Japan.*

Japanese Journal of Chemistry. (Printed in English, French or German.) *irr* **2**(2)(**1925**) *Secy, National Research Council of Japan, Dept of Education, Tokyo, Japan*

Japanese Journal of Engineering. (Printed in English, French or German) *irr Secy, National Research Council of Japan, Dept. of Education, Tokyo, Japan.*

Japanese Journal of Geology and Geography (Printed in English, French or German.) *q. Secy., National Research Council of Japan, Dept of Education, Tokyo, Japan*

Japanese Journal of Medical Sciences. (Printed in English, French or German.) *irr Secy, National Research Council of Japan, Dept. of Education, Tokyo, Japan.*

Japanese Journal of Physics. (Printed in English, French or German) 10 nos. a year. **4**(**1925**) *Secy, National Research Council of Japan, Dept of Education, Tokyo, Japan*

***Japanese Medical Literature.** Discontinued in 1921

Japan Medical World, The (Nippon No Ikai) *m* **6.** Y12(Y1 00)*d*, $6($ 50) *U. S The Nippon-No-Ikai Sha, 14 Itchome, Mikawacho, Kanda, Tokyo, Japan*

Jenaische Zeitschrift fur Naturwissenschaft *irr* **62**(2) Price varies *Gustav Fischer, Jena, Ger*

Jernkontorets Annaler *m* **110.** K15 (K1 50)*d Nordiska Bokhandeln, Stockholm, Sweden*

Journal and Proceedings of the Asiatic Society of Bengal. *irr* [N S]**21**(2) (**1925**) (Issued Nov., 1925) Rs24 per vol *Asiatic Society, 1 Park St, Calcutta, India.*

Journal and Proceedings of the Royal Society of New South Wales. *a* **59** (**1925**) £1 1s per vol *5 Elizabeth St, Sydney, N S Wales*

***Journal and Proceedings of the Royal Society of Western Australia.** Name changed to **Journal of the Royal Society of Western Australia.**

Journal and Proceedings of the Sydney Technical College Chemical Society *irr* **2**(**1923–24**)(issued in **1926**) *Sydney Technical College Chemical Society, Sydney, Australia.*

Journal and Transactions of the Russian Chinese Polytechnic Institute of Harbin. *a* **4**(**1925**) *Russian-Chinese Polytechnic Institute, Harbin, Manchuria, China*

Journal chimique de l'Ukraine. See **Ukrainskii Khemichnii Zhurnal.**

Journal d'agriculture pratique et journal de l'agriculture. *w* 2 vols. [N. S.]**45.** F50(F1.25)*d*, F60*f* *26 rue Jacob, Paris, France*

***Journal d'agriculture tropicale.** Discontinued in 1919. Followed in 1921 by **Revue de botanique appliquée et d'agriculture coloniale.**

***Journal de chimie et de physique.** *Brussels.* 1801–04.

***Journal de chimie médicale, de pharmacie, de toxicologie et revue des nouvelles scientifiques nationales et étrangères.** *Paris* 1845–76. Continuation of **Journal de chimie médicale, de pharmacie et de toxicologie** Combined in 1876 with **Répertoire de pharmacie** and continued as **Répertoire de pharmacie et Journal de chimie médicale réunis.**

***Journal de chimie médicale, de pharmacie et de toxicologie.** *Paris.* 1825–44 Continued as **Journal de chimie médicale, de pharmacie, de toxicologie et revue des nouvelles scientifiques nationales et étrangères**

Journal de chimie physique *m* **23.** F125 in *Postal Union. Les Presses Universitaires de France, 49 Blvd. St-Michel, Paris (5e), France.*

***Journal de chimie pour servir de complement aux Annales de chimie et d'autres ouvrages périodiques français de cette science.** *Brussels.* 1792–1804.

Journal de l'agriculture expérimentale See **Zhurnal Opuitnoi Agronomii.**

Journal de l'école polytechnique. *a* [2]**25** (**1925**). Price varies. *Gauthier-Villars et Cie, Quai des Grands-Augustins 55, Paris (6e), France*

Journal de pharmacie d'Alsace et de Lorraine. *m* **53.** F27 50(F3.50)*d Cercle pharmaceutique du Haut-Rhin, Mulhouse, France.*

Journal de pharmacie de Belgique. *w* **8.** F50(F1 50)*d*, F65(F2)*f*, F60 *France, Grand-Duché* and *Congo Belge. J. Breugelmans, 24 ave. de Cortenberg, Brussels, Belgium.*

Journal de pharmacie et de chimie. *sm* 2 vols [8]**3.** F38(F2 25)*d*, F48 or F52*f*. *G. Doin et Cie, 8 place de l'Odéon, Paris (6e) France*

***Journal de pharmacie et des sciences accessoires.** *Paris.* 1815–41. Continuation of **Bulletin de pharmacie et des sciences accessoires.** Continued as **Journal de pharmacie et de chimie.**

***Journal de pharmacie, organe de la société de pharmacie d'Anvers.** Discontinued

under this name and combined with **Journal de pharmacie de Belgique.**

Journal de physiologie et de pathologie générale. About *q* **24.** F70*d*, F90*f* *Masson et Cie, 120 Blvd. St-Germain, Paris (6e), France.*

***Journal de physique, de chimie, d'histoire naturelle et des arts.** *Paris* 1794–1822

Journal de physique et le radium, Le. *m* [6]**7.** F100(F12)*d*, F140 and F150*f*. *L'administrateur, 12 place de Laborde, Paris (8e), France.*

***Journal de physique pure et appliquée.** *Paris* 1872– Continued as **Journal de physique, théorique et appliquée**

***Journal de physique, théorique et appliquée.** Combined in 1920 with **Le radium** to form **Journal de physique et le radium.**

***Journal der Physik.** *Halle* and *Leipzig.* 1790–94 Continued as **Neues Journal der Physik.**

Journal des fabricants de sucre. *w* **67.** F180*d* and *colonies*, F200*f* in *Postal Union Société de publications industrielles et agricoles, 3 rue de Richelieu, Paris, I, France.*

Journal des usines à gaz. *sm* **50.** F45 (F3 50)*d*, F50 or 60 in *Postal Union. 12 rue de Clichy, Paris (9e), France*

Journal du four électrique et des industries électrochimiques. *sm* **35.** F36*d*. *7 rue d'Offémont, Paris (17e), France.*

***Journal du pétrole, des graissesm inérales, des hydrocarbures, etc** Publication discontinued and merged with **La Chronique industriale et commerciale.**

***Journal fur Chemie und Physik.** *Nuremberg.* 1811–33 Continuation of **Journal für die Chemie, Physik und Mineralogie**

***Journal fur die Chemie, Physik und Mineralogie** *Berlin* 1806–10 Continuation of **Neues allgemeines Journal der Chemie** Continued as **Journal fur Chemie und Physik.**

***Journal fur Gasbeleuchtung und verwandte Beleuchtungsarten sowie fur Wasserversorgung** Name changed in 1922 to **Das Gas- und Wasserfach.**

Journal fur Landwirtschaft 4 times a year. **74.** *Paul Parey, Hedemannstr 10 u. 11, Berlin, S W 11, Ger*

***Journal fur Physik und physikalische Chemie des Auslandes.** *Berlin* 1851.

Journal fur praktische Chemie. *irr* 2 vols. [N. S.]**112.** Rm15 per vol. Postage Rm0 50*d*, Rm1*f* *J A. Barth, Salomonstr. 18b, Leipzig, Ger.*

***Journal fur technische und ökonomische Chemie.** *Leipzig* 1828–33. Continued as **Journal fur praktische Chemie.**

Journal of Agricultural Research. *sm* 2 vols. **32.** $4($20)*d*, $5 25($.25)*f*. *Supt. of Documents, Govt. Printing Office, Washington, D. C.*

Journal of Agricultural Science, The *q* **16.** 30s(10s)*d*, $7($2 50) *U. S.* and *Can. Cambridge University Press, Fetter Lane, London, E C 4, Eng.*

***Journal of Analytical and Applied Chemistry, The** *Easton, Pa* 1891–93 Continuation of **The Journal of Analytical Chemistry.** Incorporated with **Journal of the American Chemical Society** in 1893.

***Journal of Analytical Chemistry, The.** *Easton, Pa.* 1887–90 Continued as **The Journal of Analytical and Applied Chemistry.**

***Journal of Applied Chemistry, The.** *New York, Philadelphia* and *Boston.* 1866–75

Journal of Bacteriology. *m* **11.** $5*d*, *Can., Cuba* and *Mex*, $5 50*f*, per vol *William & Wilkins Co, Mount Royal and Guilford Aves, Baltimore, Md.*

Journal of Biochemistry (Japan). (Printed in English, French or German) *q* **6.** Y10*d*, $5 50*f* per vol *11 Itchome Kagacho, Ushigome, Tokyo, Japan*

Journal of Biological Chemistry, The *m* About 4 vols **67.** $5*d* and *Can*, $5.25*f* per vol *Mt Royal and Guilford Aves., Baltimore, Md*

Journal of Biophysics (Japan). *irr* 1(2) **(1924).** Y10*d*, Y11*f* *Physiological Inst., Tokyo Imperial University, Tokyo, Japan*

Journal of Cancer Research. *q* **10.** *The Institute for Cancer Research of Columbia Univ, 1145 Amsterdam Ave, New York City.*

Journal of Chemical Education. *m* **3.** $2($ 35)*d*, $2 50*f*, $2 25 *Can Erle M. Billings, Kodak Park, Rochester, N Y.*

***Journal of Chemical Industry (Japan).** Name changed to **Journal of the Society of Chemical Industry (Japan).**

Journal of Chemical Industry (Russia). (Printed in Russian.) *m* **2**(4–5)(Dec., **1925**–Jan., **1926**). R18(R2). *B Lubyanka, 6, Moscow, Union of the Socialistic Soviet Republics.*

Journal of Clinical Investigation. *bm* **2**(3). $5($1)*d* and *Can*, $5 50($1)*f* per vol *The Williams and Wilkins Co, Mt Royal and Guilford Aves., Baltimore, Md*

***Journal of Clinical Medicine.** Name changed in 1924 to **Clinical Medicine.**

Journal of Comparative Neurology. *bm* About 1½ vols. **40.** $7.50*d*, $8*f* per vol.

Wistar Institute of Anatomy and Biology, 36th St. and Woodland Ave., Philadelphia, Pa.

Journal of **Comparative Pathology** and **Therapeutics** *q* **39.** 14s(3s6d) *W. & A. K. Johnston, Ltd, Edinburgh, Scotland*

Journal of **Dairy Science** *bm* **9.** $5($1)*d* and *countries in Postal Union*, $5 50 *outside of Postal Union Williams & Wilkins Co, Mt Royal and Guilford Aves, Baltimore, Md.*

Journal of **Dental Research,** The. *q* **6.** (dated **1924**) $5*d Mt. Royal and Guilford Aves, Baltimore, Md*

*Journal of **Economic Biology.** Name changed to Journal of **Zoölogical Research.**

Journal of **Economic Entomology** *bm* **19.** $3.50($ 75)*d*, *Can., Cuba* and *Mex*, $*1f C W Collins, Melrose Highlands, Mass*

Journal of **Electrical Power** and **Gas.** Name changed to Journal of **Electricity,** then to Journal of **Electricity** and **Western Industry** and back again to Journal of **Electricity**

*Journal of **Electricity.** Incorporated in **Electrical West** in 1927.

Journal of **Engineering Education.** *m* except July and Aug. [N S]**16**(5). $3($ 50)*d. Prince and Lemon Sts., Lancaster, Pa.*

Journal of **Experimental Medicine,** The. *m* 2 vols. **43.** $10($1)*d Mt Royal and Guilford Aves, Baltimore, Md.*

Journal of **Experimental Zoölogy,** The. 8 times a year 2 vols **43**(2) $7 50*d*, $8*f* per vol. *Wistar Institute of Anatomy and Biology, 36th St and Woodland Ave., Philadelphia, Pa.*

Journal of **Forestry.** 8 times a year. **24.** $4($ 65)*d Secy, American Society of Forestry, Atlantic Bldg, 930 F St, N. W., Washington, D. C.*

*Journal of **Gas Lighting** and Water Supply. Name changed to **Gas** Journal.

Journal of **General Physiology,** The. *bm* **9**(3) Vol. **8(1925–6),** the Jacques Loeb Memorial Volume, issued during same period as Vol. **9.** $5($1)*d. Mt. Royal and Guilford Aves., Baltimore, Md.*

Journal of **Geology,** The. *sq* **34.** $6($ 85)*d*, $6.50*f* in *Postal Union*, $6.25 *Can. University of Chicago Press, 5750 Ellis Ave., Chicago, Ill.*

Journal of **Home Economics,** The. *m* **18.** $2.50($.25)*d*, $2.85*f*, $2 70 *Can. 1211 Cathedral St, Baltimore, Md.*

Journal of **Hygiene,** The. *q* **25.** £2 2s (12s6d)*d*, $10($3) *U. S. Cambridge Univ. Press, Fetter Lane, London, E. C. 4, Eng.; Univ. of Chicago Press, Chicago, Ill.*

Journal of **Immunology.** *m* 2 vols. **11.** $10*d*, $11*f. Williams & Wilkins Co, Mt Royal and Guilford Aves, Baltimore, Md*

*Journal of **Indian Industries and Labour.** Discontinued in 1923

*Journal of **Industrial and Engineering Chemistry,** The. Name changed in 1923 to **Industrial and Engineering Chemistry**

Journal of **Industrial Hygiene.** *m* **8.** $6 ($ 75)*d*, *Can.* and *f*, 25s(3s) *Gt. Britain. 55 Van Dyke St, Boston, Mass.*

Journal of **Infectious Diseases.** *m* 2 vols. **38.** $5($.75)*d*, $5.80*f 637 S Wood St., Chicago, Ill.*

Journal of **Laboratory and Clinical Medicine,** The. *m* **11**(4). $8.50($ 75)*d*, *U. S. Possessions, Canal Zone, Cuba* and *Mex.*, $8 90*f. C. V. Mosby Co., 3616 Washington Blvd, St Louis, Mo.*

Journal of **Mathematics and Physics, Massachusetts Institute of Technology.** 4 times a year **5**(2). $3*d* per vol. *Prof C L E. Moore, Dept of Mathematics, Mass. Inst of Technology, Cambridge, Mass*

*Journal of **Medical Research,** The. Name changed in 1925 to **American Journal of Pathology,** The.

*Journal of **Medicinal Chemistry and Pharmacy (St. Petersburg).** *St Petersburg.* 1892–94.

Journal of **Metabolic Research,** The. *irr* **5**(4, 5 & 6)(Apr., May, June, **1924**) (Issued in Feb., **1927**). $10($1). *The Physiatric Institute, Morristown, N. J.*

*Journal of **Morphology.** Name changed in 1924 to Journal of **Morphology and Physiology**

Journal of **Morphology and Physiology.** *q* 1 or 2 vols. **41**(2) $12*d*, $12 50*f* per vol *Wistar Institute of Anatomy and Biology, 36th St. and Woodland Ave., Philadelphia, Pa.*

*Journal of **Natural Philosophy, Chemistry and the Arts,** A. *London.* 1797–1813. Combined in 1814 with **The Philosophical Magazine.**

Journal of **Nervous and Mental Diseases.** *m* 2 vols. **63.** $10($1)*d*, $11*f. Dr. Smith Ely Jelliffe, 64 W. 65th St., New York City.*

Journal of **Obstetrics and Gynaecology of the British Empire.** *q* **33.** 42s*d*, 44s*f* and *colonies. Sherratt and Hughes, 34 Cross St., Manchester, Eng.*

Journal of **Pathology and Bacteriology,** The.

q **29.** £2(12s6d)*d. Oliver & Boyd, Tweeddale Court, Edinburgh, Scotland*

Journal of **Pharmacology** and Experimental Therapeutics *m* 2 vols **26**(6). $6($1.25)*d* and *countries in Postal Union*, $6.50 per vol *outside Postal Union Williams & Wilkins Co, Mt Royal and Guilford Aves, Baltimore, Md.*

Journal of **Physical Chemistry**, The. *m* **30.** $10*d Baker Laboratory, Ithaca, N. Y.*

Journal of **Physiology**, The. *irr* About 2 vols. **61.** Price per vol. varies. *Cambridge Univ Press, Fetter Lane, London, E C 4, Eng*

Journal of **Pomology** and **Horticultural Science** *q* **5**(2) 15s(5s)*d. Headley Bros, 18 Devonshire St, Bishopsgate, London, E C 2, Eng.*

***Journal of Radiology**, The. Name changed in 1926 to **Archives of Physical Therapy, X-Ray and Radium.**

Journal of **Scientific Instruments**. *m* **3**(4) 30s(2s6d) *Cambridge University Press, Fetter Lane, London, E C 4, Eng*

Journal of **State Medicine**, The *m* **34.** (2s) *37 Russell Square, London, W C 1, Eng.*

***Journal of the Allied Dental Societies**

Journal of the **American Association** for **Promoting Hygiene** and **Public Baths.** *a* **8.** $1. *405 Chestnut St, Roselle Park, N J*

***Journal of the American Association of Cereal Chemists** Name changed in 1924 to **Cereal Chemistry.**

Journal of the **American Ceramic Society** *m* **9.** $12($1)*d*, $12 plus $ 50 postage *f 2525 N. High St, Columbus, Ohio.*

Journal of the **American Chemical Society**, The. *m* **48.** $7 50($ 75)*d* and *Can*, $8 50*f Charles L Parsons, Secy., Mills Bldg, Washington, D C*

***Journal of the American Concrete Institute** Discontinued in 1915.

Journal of the **American Dental Association** *m* **13.** $2.50 ($ 35)*d*, $3 25*f*, $4 *Australia*, $3 *Can. 58 E Washington St, Chicago, Ill.*

Journal of the **American Institute of Electrical Engineers** *m* **45.** $10($1)*d, U S. Possessions, Cuba* and *Mex*, $11*f*, $10 50 *Can. 33 W 39th St, New York City*

Journal of the **American Institute of Homeopathy.** *m* **19.** $3($ 30)*d*, $3 50*f 829 Marshall Field Bldg, Chicago, Ill.*

***Journal of the American Institute of Metals.** Discontinued in 1918 and incorporated with **Bulletin of the American Institute of Mining Engineers**

Journal of the **American Leather Chemists' Association**, The *m* **21.** $12*d Secy. of the American Leather Chemists' Assocn, 22 E 16th St, New York City*

Journal of the **American Medical Association**, The *w* 2 vols **86.** $5($ 20)*d American Medical Assocn, 535 N. Dearborn St, Chicago, Ill*

Journal of the **American Peat Society**. 4 times a year **19.** $6*d 321 10th St, Toledo, Ohio*

Journal of the **American Pharmaceutical Association**. *m* **15.** $1($ 35)*d. 10 W Chase St, Baltimore, Md*

Journal of the **American Society of Agronomy**. *m* **18.** $5*d* and *f American Society of Agronomy, Geneva, N Y*

Journal of the **American Society of Heating and Ventilating Engineers** *m* **32.** $3($ 35)*d*, $3 50*f*, $3 25 *Can 20th and Northampton Sts, Easton, Pa*

***Journal of the American Society of Mechanical Engineers** Name changed to **Mechanical Engineering**

***Journal of the American Steel Treaters' Society** Discontinued in 1920 Merged in **Transactions of the American Society for Steel Treating.**

Journal of the **American Water Works Association** *m* 2 vols. **15.** $7*d 170 Broadway, New York City*

Journal of the **Association of Chinese and American Engineers** *m* **7.** $5 Mex. ($ 50 Mex.) *Assocn of Chinese and American Engineers, Nan Chih Tze, Peking, China*

***Journal of the Association of Engineering Societies** Discontinued in 1915

Journal of the **Association of Official Agricultural Chemists** *q* **9.** $5*d, U S Possessions* and *N America*, $5 50*f* per vol *Box 290, Pennsylvania Ave Sta, Washington, D C*

***Journal of the Board of Agriculture**, The Name changed in 1920 to **Journal of the Ministry of Agriculture**

Journal of the **Cellulose Institute, Tokyo**. See **Cellulose Industry**

Journal of the **Chemical, Metallurgical and Mining Society of South Africa.** *m* **26**(7) £2 2s(3s6d)*d H A G Jeffreys, P O Box 1183, Scientific and Technical Club, 100 Fox St, Johannesburg, S Africa*

Journal of the **Chemical Society** (London) *m* £3*d* and *f Burlington House, London, W 1, Eng*

Journal of the **Chemical Society of Japan**

(Nippon Kwagaku Kwai Shi) (Printed in Japanese.) *m* **47.** Y7 20(Y0 60)*d*. *Maruzen Co., Ltd, 14 Nihombashi-Ku, Tori-Sanchome, Tokyo, Japan*

Journal of the **China Society of Chemical Industry** *sa* **4.** $1Mex.($ 50Mex) *The Secy, China Society of Chemical Industry, 1 Nan-Ho-Yew, Peking, China.*

*Journal of the **Cleveland Engineering Society** Discontinued in 1919.

Journal of the **College of Agriculture, Hokkaido Imperial University.** (Printed in English or German) *irr* *Director of the College of Agriculture, Hokkaido Imperial University, Sapporo, Japan*

Journal of the **College of Agriculture, Imperial University of Tokyo.** *irr* Price varies. *Director of the College of Agriculture, Imperial University of Tokyo, Tokyo, Japan, Maruzen Co, Ltd, Tori Sanchome, Nihonbashi, Tokyo, Japan.*

*Journal of the **College of Agriculture, Tôhoku Imperial University** Name changed in 1918 to Journal of the **College of Agriculture, Hokkaido Imperial University.**

*Journal of the **College of Engineering, Tokyo Imperial University** Name changed to Journal of the **Faculty of Engineering, Tokyo Imperial University**

*Journal of the **College of Science, Imperial University of Tokyo.** Discontinued in 1925 Followed by Journal of the **Faculty of Science, Imperial University of Tokyo**

Journal of the **Department of Agriculture of South Australia.** *m* **29**(6) 1s*d*, 2s6d*f*. *Victoria Square, Adelaide, S Australia.*

Journal of the **Department of Agriculture of Victoria,** Australia, The *m* **24.** 3s(3d)*d*, 5s*f*. *Director of Agriculture, Melbourne, Australia*

*Journal of the **Department of Agriculture, Union of South Africa.** Discontinued in 1926.

Journal of the **Department of Lands and Agriculture, Ireland.** *q* **25**(3) 5s4d (1s4d)*d*. *Eason and Son, Ltd, 40–41 Lower O'Connell St, Dublin, Ireland.*

Journal of the **Elisha Mitchell Scientific Society** *q* Issued in double nos **41**(3/4) $3($1 50 double nos). *Elisha Mitchell Scientific Society, Univ of North Carolina, Chapel Hill, N. C.*

*Journal of the **Engineering Institute of Canada.** See **Engineering** Journal, The

Journal of the **Faculty of Engineering, Tokyo Imperial University** (Printed in English) *irr* *Maruzen Co, Ltd., Nihonbashi, Tori Sanchome, Tokyo, Japan*

Journal of the **Faculty of Science, Imperial University of Tokyo.** Section **I.** Mathematics, Astronomy, Physics, Chemistry *irr* **1**(Pt 4); Section **II.** Geology, Mineralogy, Geography, Seismology. *irr* **1**(Pt. 4) Section **III.** Botany; Section **IV.** Zoology, Section **V.** Anthropology (Printed mostly in English, occasionally in German or French) Price per number varies. *Maruzen Co., Ltd, 11–16 Nihonbashi, Tori Sanchome, Tokyo, Japan.*

Journal of the **Franklin Institute.** *m* 2 vols **201.** $6($ 60)*d*, $6 plus postage *f*. *Franklin Institute, Philadelphia, Pa.*

Journal of the **Indian Institute of Science A** and **B.** *irr* **9.** Price varies. *Indian Institute of Science, Bangalore, India*

Journal of the **Institute of Brewing.** *m* [N S] **23** or **32.** *Harrison and Sons, Ltd, 44 St Martin's Lane, London, W C. 2, Eng*

Journal of the **Institute of Metals.** *sa* 2 vols **35.** Membership dues £3 3s, for students £1 1s *36 Victoria St, London, S W 1, Eng.*

Journal of the **Institution of Electrical Engineers, The (London).** *m* **64**(349). $1.5(10s6d)*d* *Victoria Embankment, London, W C. 2, Eng*

Journal of the **Institution of Petroleum Technologists** and Record of Transactions About *bm* **12**(54). (7s6d) *Aldine House, Bedford St, Strand, London, W. C. 2, Eng.*

Journal of the **International Society of Leather Trades' Chemists** *m* **10.** *W R Atkin, University, Leeds, Eng.*

Journal of the **Iron and Steel Institute (London).** *sa* 2 vols **111(1925).** *28 Victoria St, London, S. W 1, Eng*

Journal of the **Japanese Ceramic Society** *Tajiro Kurahashi, Secy, 20 Omotecho, 2 Chome, Akasakaku, Tokyo, Japan.*

Journal of the **Marine Biological Association of the United Kingdom.** About *sa* [N S] **14.** 1 guinea *d*(includes membership in the Assocn.). *Dulau and Co., Ltd., 34–36 Margaret St., Cavendish Sq, London, W. 1, Eng.*

Journal of the **Ministry of Agriculture, The.** *m* **32**(10) (6*d*) *10 Whitehall Place, London, S. W 1, Eng.*

*Journal of the **National Dental Association.** Name changed in 1922 to Journal of the **American Dental Association.**

Journal of the **New England Water Works**

Association. *q* **40.** $4($1.25)*d. 715 Tremont Temple, Boston, Mass.*

Journal of the **Oil** and **Colour Chemists' Association** *m* **9**(67) 25s(2s6d)*d Secy. of the Oil and Colour Chemists' Assocn, 30 Russell Sq, London, W C 1, Eng.*

*Journal of the **Oil** and **Fat Industries.** Name changed to **Oil** and **Fat Industries** in 1927.

*Journal of the **Optical Society of America.** Name changed in 1922 to Journal of the **Optical Society of America** and Review of Scientific Instruments.

Journal of the **Optical Society of America** and Review of Scientific Instruments *m* 2 vols. **12.** $5($ 60)*d F K Richtmyer, Manager, Cornell Univ, Ithaca, N. Y.*

Journal of the **Pharmaceutical Society of Japan** (Yakugakuzasshi) (Printed in Japanese, usually with German summaries) *m* **No. 527.** *Nippon Yakugakkai, 8 Shimo-Miyabichō-Ushigomeku, Tokyo, Japan.*

Journal of the **Philippine Islands Medical Association.** *bm* **3(1923)** P5 00(P1 00)*d*, P6.00*f. 547 Herran, Manila, P I.*

*Journal of the **Röntgen Society**, The. Discontinued under this name but continued as the **Roentgen Society Section** of the **British** Journal of **Radiology.**

Journal of the **Royal Agricultural Society of England.** *a* **85(1924)** £1(includes membership). *John Murray, Albemarle St, London, Eng.*

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Journal of the **Royal Society of Arts.** *w* **74**(3815) (1s)*d. G. Bell & Sons, Ltd., York House, Portugal St, London, W. C. 2, Eng.*

Journal of the **Royal Society of Western Australia.** *a* **11(1924–25).** £1 1s. *The Royal Society of Western Australia, The Museum, Perth, Australia.*

Journal of the **Royal Technical College (Glasgow).** *a* **No. 2**(Dec, **1925**). (10s6d)*f. The Journal Committee, Royal Technical College, Glasgow, C. 1, Scotland.*

Journal of the **Russian Metallurgical Society.** (Printed in Russian.) About *q* R20*d. Treasurer of the Russian Metallurgical Society, Mezhdunarodnii 19, Glavnaya Palata Mer i vesov, Chimucheskaya Laboratoria, Leningrad, Union of the Socialistic Soviet Republics.*

Journal of the **Russian Physical-Chemical Society.** (Printed in Russian)· **Chemical Pt.** 9 nos a yr. **57**(6/9) R11*d*, $5 50 *U. S*; **Physical Pt.** About *q* **56**(4)**(1925).** R13*d*, $6.50 *U. S. Periodosector, Vozdvizhenka 10/2, Moscow, Union of the Socialistic Soviet Republics.*

Journal of the **Science Association, Maharajah's College**, Vizianagaram. *q* **2**(4). Rs4 or 8s. *Science Assocn., Maharajah's College, Vizianagaram, S. India.*

Journal of the **Scientific Agricultural Society (Japan)** (Nōgaku Kwai Hō) *m* **No. 278.** *The Scientific Agricultural Society, Komaba, Tokyo, Japan.*

Journal of the **Society of Automotive Engineers.** *m* 2 vols **18.** $10($1)*d*, $12($1)*f. Society of Automotive Engineers, Inc, 29 W 39th St, New York City*

Journal of the **Society of Chemical Industry (Japan).** (Kōgyō Kwagaku Zasshi) (Printed in Japanese, usually with English summaries) *m* **29.** (Y 70)*d Kōgyō Kwagakukwai, % Dept of Applied Chemistry, Faculty of Engineering, Tokyo Imperial University, Hongo-Ku, Tokyo, Japan*

Journal of the **Society of Chemical Industry** (London). *w* [**N. S.**]**45.** £4 4s(1s9d plus postage). *Central House, 46 & 47 Finsbury Sq, London, E. C 2, Eng*

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Journal of the **Society of Glass Technology.** *q* **10**(37). £2(10s6d)*d*, $9($2 50) *U S.* per vol. *Secy, Darnall Road, Sheffield, Eng*

*Journal of the **Society of Leather Trades' Chemists.** Name changed in 1925 to Journal of the **International Society of Leather Trades' Chemists.**

*Journal of the **South African Association of Analytical Chemists.** Name changed in 1922 to Journal of the **South African Chemical Institute.**

Journal of the **South African Chemical Institute.** *sa* **9.** Price varies. *Honorary Secy., Box 3361, Johannesburg, S. Africa.*

Journal of the **South African Institution of Engineers.** *m* **24**(6). (2s). *Editorial Committee, P. O. Box 4609, Johannesburg, S. Africa.*

Journal of the **Textile Institute**, The. *m* **17.** Free to members. Dues 2 guineas

yearly. *16 St. Mary's Parsonage, Manchester, Eng.*

***Journal of the Tokyo Chemical Society.** *Tokyo.* 1880–1921 (Tokyo Kwagaku Kwai Shi.) Continued as **Journal of the Chemical Society of Japan.**

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Journal of the Western Society of Engineers. *m* **31.** $3($ 50)*d*, $4*f*. *723 Lake St., Oak Park, Ill.*

Journal of the West of Scotland Iron and Steel Institute Published from Oct. to April. **33**(3). 1 guinea for ordinary members, 7s6d for associate members. *Douglas A. MacCallum, 93 Hope St., Glasgow, Scotland.*

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Kitasato Archives of Experimental Medicine, The. *irr* **6**(3)(June, **1925**) (Y1.20)*d*. *Maruzen Co., Ltd., Tokyo, Japan.*

***Kleine physikalisch-chemische Abhandlungen.** *Leipzig.* 1785–97

Klinische Beitrage zur Klinik der Tuberkulose. See **Beitrage zur Klinik der Tuberkulose.**

Klinische Wochenschrift. *w* **5.** Rm30 (Rm0 90)*d* and *f*. *Hirschwaldsche Buchhandlung, Unter den Linden 68, Berlin, N. W. 7, Ger.*

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Kōjin Kwagaku Zasshi. See **Engineers' Chemical Journal (Japan).**

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***Kritische Zeitschrift fur Chemie, Physik, Mathematik und die verwandten Wissenschaften und Disciplinen.** *Erlangen* 1859 Continuation of **Kritische Zeitschrift fur Chemie, Physik und Mathematik** Continued as **Zeitschrift fur Chemie und Pharmacie.**

***Kritische Zeitschrift fur Chemie, Physik und Mathematik** *Erlangen.* 1858. Continued as **Kritische Zeitschrift fur Chemie, Physik, Mathematik und die verwandten Wissenschaften und Disciplinen.**

Kruppsche Monatshefte. *m* **7.** Rm12 (Rm1)*d* and *f*. *Fried. Krupp Aktiengesellschaft, Kruppstr. 50, Essen, Ger.*

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***Laboratorium,** Das *Weimar* 1825–40.

***Laboratory (Boston),** The. (A monthly journal of the progress of chemistry, pharmacy, medicine, recreative science and useful arts) *Boston.* 1874–76.

***Laboratory (London),** The. Apr to Oct , 1867.

***Laboratory Yearbook,** The *Providence* 1883–92.

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***Leipziger Färber-Zeitung.** discontinued during the World War. Resumed publication as **Deutsche Färber-Zeitung.**

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***Magazin fur Apotheker, Chemisten und Materialisten** *Nuremberg.* 1785–87. Continued as **Repertorium für Chemie, Pharmacie und Arzneimittelkunde.**

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Magyar Chemikusok Lapja. 12(1921). K180 *Dr István Weiser, II, Kitaibel Pálutca 4, Budapest, Hungary*

Magyar Orvosi Archivum (Printed in Hungarian with English and German summaries) *bm* **27.** *Üllöi-út 26, Budapest VIII, Hungary*

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***Manufacturing Chemist,** The. *London* 1892–94.

Maryland Academy of Sciences Bulletin *q* **6.** $ 50*d* *Maryland Academy of Sciences, 105 W. Franklin St , Baltimore, Md.* See also **Transactions of the Maryland Academy of Sciences**

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rr **7**(6)(**1925**) Price varies *Maruzen Co , Ltd , Tokyo, Japan*

***Memoirs of the Columbian Chemical Society of Philadelphia.** *Philadelphia* 1813.

Memoirs of the Department of Agriculture in India. Chemical Series. *irr* **7**(7) (**1925**). *Office of Agr. Adviser to the Govt. of India, Pusa, Bihar, India,* or *Govt. of India, Central Publication Branch, 8 Hastings St., Calcutta, India.*

Memoirs of the Faculty of Engineering, Hokkaido Imperial University. (Printed in English, French or German) **.1.** *Maruzen Co., Ltd , Tori Sanchome, Nihonbashi, Tokyo, Japan.*

Mémorial des poudres. About *sa* **21 (1924–25).** F30*d* per vol. *Gauthier-Villars et Cie., 55 Quai des Grands-Augustins, Paris (6e), France.*

***Mémorial des poudres et salpetres.** Name changed to **Mémorial des poudres.**

***Mémorial pratique de chimie manufacturière.** *Paris.* 1824.

Memorias de la real academia de ciencias y artes de Barcelona. *Academia de ciencias y artes de Barcelona, Barcelona, Spain.*

Memorias y revista de la sociedad cientifica "Antonio Alzate." *irr* **45.** *Sociedad cientifica "Antonio Alzate," México, D F , México.*

Memorie della reale accademia di scienze, lettere ed arti in Modena. *a* [3]**14**(**1922**). *Società tipografica, Modena, Italy.*

Memorie della reale accademia nazionale dei Lincei. *irr* [6]**1**(7). Price varies *Ulrico Hoepli, Galleria de Cristoforis, Milan (4), Italy.*

Merck's Report *q* **35** Free on request *Merck & Co , 45–7 Park Place, New York City.*

Messager technico-économique (Russia). See **Technical** and **Economic Magazine (Russia).**

Metal Industry, The (London). *w* 2 vols **28.** £1(6d, 7d post free) *United Kingdom,* £1 2s6*d*. *22 Henrietta St , Strand, London, W. C. 2, Eng.*

Metal Industry, The (New York). *m* **24.** $1($.10)*d* and *Can.*, $2*f*. *The Metal Industry Publishing Co., 99 John St., New York City*

***Metal Industry and the Iron Foundry, The (London).** Name changed in 1927 to **Metal Industry, The (London).**

Metallbörse, Die (Chemisch-Metallurgische Zeitschrift). 2 or 3 times a week. **14 (1924).** *Dr. Joachim Stern, Berlin, W. 35, Ger.*

Metall und Erz (Zeitschrift für Metallhüttenwesen und Erzbergbau einschl Aufbereitung). *sm* **23.** Gm9*d*, $2 15 *U. S.* per quarter. *Wilhelm Knapp, Mühlweg 19, Halle a S , Ger*

Metallurgica italiana, La *m* **17**(**1925**). L30(L3)*d*, L40*f*. *Via Tomaso Grossi 2, Milan, Italy.*

***Metallurgical and Chemical Engineering.** Name changed in 1918 to **Chemical and Metallurgical Engineering**

***Metallurgie.** Divided into two journals, **Ferrum and Metal und Erz.**

Metallurgist, The. *m* Supplement to **Engineer,** The

Metallwaren-Industrie und Galvano-Technik (Formerly Gurtler, Bijouterie u Metallwaren Industrie, Die. Name later changed to present title. Beginning Dec 1, 1923 it was called Deutsche Metallwaren Industrie, Die. Again changed to present title Mar. 1, 1925) *bm* **23**(**1925**). Gm10*d*, $3 50*f* *F. Ernst Steiger, Strassburger-Str. 4, Leipzig-Gohlis, Ger*

***Metal Record and Electroplater.** Name changed to **Raw Material.**

Mikrochemie (Zeitschrift fur das Gesamtgebiet der Mikrochemie und Mikrophysik) *irr* **4.** 10sch (1sch)*d*, $2($ 20)*f*. *Erotcagasse 19, Wien (19²), Austria.*

Mikrokosmos (Zeitschrift fur angewandte Mikroskopie, Mikrobiologie, Mikrochemie und Mikroskopische Technik) *m* **19**(4) Rm2 (Rm0 75)*d*, Swiss F2 50 or Austrian sch. 3 30*f* per quarter. *Franckh'sche Verlagshandlung, Stuttgart, Ger.*

Milchwirtschaftliche Forschungen. 4 nos. a year. **3.** *Julius Springer, Link-Str 23–24, Berlin, W. 9, Ger.*

Milchwirtschaftliches Zentralblatt (Zeitschrift fur wissenschaftliche und praktische Milchkunde) *m* **55.** Gm2.25*d*, Gm3*f* per quarter. *M & H. Schaper, Hannover, Ger.*

Milchwirtschaftliche Zeitung. *sm* **33.** Price varies *Carl Fromme, Nikolsdorfergasse 7, 9 and 11, Wien V, Austria.*

***Milch-Zeitung.** Now **Milchwirtschaftliches Zentralblatt.**

Mineral Industry, The. *a* **34.** $12. *McGraw-Hill Book Co., 370 7th Ave , New York City.*

Mineralogical Abstracts. *q* **3.** Supplement to **Mineralogical Magazine** and Journal of the Mineralogical Society.

Mineralogical Magazine and Journal of the Mineralogical Society. *q* **21**(112). 20s (6s)*d*. *Humphrey Milford, Oxford Univ.*

Press, Amen House, Warwick Sq, London, E. C. 4, Eng.

***Mines and Minerals.** Name changed to **Colliery Engineer.**

Miniera italiana, La. *m* **10.** L60*d*, L100*f* *Via Buonarroti 51, Rome (23), Italy*

***Mining and Engineering Record.** Name changed in 1926 to **Mining and Industrial Record.**

Mining and Industrial Record. *m* **29**(4) $3($ 25)*d*, *Can., Great Britain and U. S.*, $3 50*f*. *The Mines Publishing Co., Ltd., 43 Commerce Bldg., Vancouver, B. C.*

Mining and Metallurgy. *m* **7**(229) $3 ($ 50)*d*, $4*f* and *Can. American Institute of Mining and Metallurgical Engineers, Inc., 29 W. 39th St., New York City.*

***Mining and Scientific Press.** Combined in 1922 with **Engineering and Mining Journal** to form **Engineering and Mining Journal-Press.**

***Mining Engineering World.** Incorporated with **Engineering Mining Journal.**

Mining Journal, The. *w* 4 vols. **152**(4715). £1 12s(8d)*d*, £2*f* *15 George St., Mansion House, London, E. C. 4, Eng.*

Mining Magazine, The *m* 2 vols **34.** 12s(1s)*d*, $3 *U. S. The Mining Publications, Ltd., Salisbury House, London Wall, London, E. C. 2, Eng.*

Mitteilungen aus dem Gebiete der Lebensmitteluntersuchung und Hygiene *irr* **17.** F10(F1 80)*d* and *f* *Zimmermann et Cie., Bern, Switz.*

Mitteilungen aus dem Kaiser-Wilhelm Institut fur Eisenforschung zu Düsseldorf. *irr* **7**(10). *Verlag Stahleisen m. b. H., Düsseldorf, Ger.*

***Mitteilungen aus dem koniglichen Materialprüfungsamt zu Berlin-Lichterfelde West.** Name changed in 1919 to **Mitteilungen aus dem Materialprüfungsamt zu Berlin-Lichterfelde West.**

***Mitteilungen aus dem koniglichen Materialprüfungsamt zu Gross-Lichterfelde West.** Name changed to **Mitteilungen aus dem koniglichen Materialprüfungsamt zu Berlin-Lichterfelde West.**

Mitteilungen aus dem Materialprüfungsamt und dem Kaiser Wilhelm-Institut fur Metallforschung zu Berlin-Dahlem. *irr* 8 to 10 nos a year. [N. S.] **No. 1.** Price varies. *Julius Springer, Link-Str. 23/24, Berlin, W. 9, Ger.*

***Mitteilungen aus dem Materialprüfungsamt zu Berlin-Dahlem.** Name changed in 1923 to **Mitteilungen aus dem Materialprüfungsamt und dem Kaiser Wilhelm-Institut fur Metallforschung zu Berlin-Dahlem.**

***Mitteilungen aus dem Materialprüfungsamt zu Berlin-Lichterfelde West.** Name changed in 1920 to **Mitteilungen aus dem Materialprüfungsamt zu Berlin-Dahlem.**

Mitteilungen aus den Grenzgebieten der Medizin und Chirurgie *irr* **39.** *Gustav Fischer, Jena, Ger.*

***Mitteilungen aus den koniglichen technischen Versuchsanstalten zu Berlin.** Published under this title from 1883 to 1903. In 1904 it was changed to **Mitteilungen aus dem koniglichen Materialprüfungsamt zu Gross-Lichterfelde West.**

Mitteilungen aus der koniglichen Landesanstalt fur Wasserhygiene Name changed to **Mitteilungen aus der Landesanstalt fur Wasserhygiene zu Berlin-Dahlem.**

Mitteilungen aus der Landesanstalt fur Wasser-, Boden- und Lufthygiene zu Berlin-Dahlem. *irr* **No. 29(1925).** *Julius Springer, Link-Str. 23–24, Berlin, W. 9, Ger.*

***Mitteilungen aus der Landesanstalt fur Wasserhygiene zu Berlin-Dahlem** Name changed to **Mitteilungen aus der Landesanstalt fur Wasser-, Boden- und Lufthygiene zu Berlin-Dahlem.**

Mitteilungen der deutschen Landwirtschafts-gesellschaft. *w* **41.** Rm20*f* *Otto Harrassowitz, Querstr 14, Leipzig, Ger.*

Mitteilungen der internationalen bodenkundelichen Gesellschaft German edition of the **Proceedings of the International Society of Soil Science.**

Mitteilungen des chemisch-technischen Instituts der technischen Hochschule Karlsruhe i B *irr* **No. 2(1924)** Price varies. *Wilhelm Knapp, Muhlweg 19, Halle a. Saale, Ger.*

Mitteilungen des staatl. technischen Versuchsamtes, Wien. *q* **14(1925)** *Friedrich Jasper, Wien, Austria.*

Mitteilungen zur Geschichte der Medizin und der Naturwissenschaften. *irr* **25**(1) (Mar., **1926**) Rm24. *Johann Ambrosius Barth, Leipzig, Ger.*

***Mittheilungen aus dem chemischen Laboratorium der Universitat Innsbruck.** *Vienna.* 1867–73.

***Mittheilungen aus dem Gebiete der reinen und angewandten Chemie.** *Vienna* 1865–66

***Modern Medicine.** Name changed in 1921 to **The Nation's Health.**

***Molkerei-Zeitung (Berlin).**

Molkerei-Zeitung (Hildesheim). *sw* **40.** Gm2 50*d* per month. *Thomas Mann and W. Niewerth, Hildesheim, Ger.*

Monats-Bulletin d. schweizerische Verein

von **Gas-** u. **Wasserfach**männern. *m* **6.** F12(F1 50)*d*, F15*f* *Fachschr.-Verlag u. Buchdr A.-G, Stauffacherquai 36–38, Zurich 4, Switz.*

Monatshefte fur Chemie und verwandte Teile anderer Wissenschaften. *irr* **46**(3/4). Gm12 or Austrian sch 19 20*d* *Holder-Pichler-Tempsky, A.-G, Wien, Austria.*

***Monatsh**efte fur den **Naturw**issenschaftlichen **Unterricht** aller Schulgattungen und Natur und Schule Succeeded by **Naturw**issenschaftliche **Monatsh**efte fur den **biol**ogischen, **chem**ischen, **geograph**ischen und **geol**ogischen **Unterricht.**

Monatsschrift fur **Kinderheilk**unde. *m* 2 vols **32**(1)(Apr, **1926**). Rm26. *F C. W Vogel, Leipzig, Ger*

Moniteur de la **papeterie franç**aise, Le. *sm* 2 or more vols **63**. F52*d*, F65*f*. *154 Blvd Haussmann, Paris (8e), France*

***Mon**iteur de la **teint**ure des apprêts et de l'impression des tissus

Moniteur du **pétrole roumain.** *sm* **25.** (26th yr.). (Lei60)*d*, F200 *Belgium* and *France*, £4 *England*, Rm10 *Germany*, f40 *Holland*, L200 *Italy*, $20 *U S. Strada Regală 21, Bucharest, Rumania*

***Mon**iteur **scient**ifique, Le (Journal des sciences pures et appliquées) *Paris* 1864–70 Continuation of Le **Mon**iteur **scient**ifique du **chimiste** et du **manuf**acturier. Continued as **Mon**iteur **scient**ifique du Docteur Quesneville

***Mon**iteur **scient**ifique du **chimiste** et du **manuf**acturier. *Paris* 1857–63 Continuation of **Rev**ue **scient**ifique et **ind**ustrielle des faits les plus utiles et les plus curieux observés dans la médecine, l'hygiène, la physique, la chimie, la pharmacie, l'économie rurale et domestique, l'industrie nationale et étrangère. Continued as **Mon**iteur **scient**ifique, Le (Journal des sciences pures et appliquées)

***Mon**iteur **scient**ifique du Docteur Quesneville Combined with *Revue de chimie industrielle* in 1927.

Montanistische **Rundschau** (Zeitschrift fur Berg- und Huttenwesen). *sm* **18.** Austrian sch 36*d* and *Hungary*, Rm24 *Germany*, $12 *U S*, Swiss F30 *other countries. Robert Schwarz, Eschenbachgasse 9, Wien 1, Austria.*

***Monthly Mag**azine of **Pharm**acy, **Chem**istry, **Med**icine, etc, The *London.* 1876–80

Monthly Weather Review *m* **54.** $1 50 ($ 15)*d* *Govt Printing Office, Washington, D C*

Mountain States Mineral Age, The. *m* **11.** $2($ 20)*d* and *f* *312 Tabor Bldg., Denver, Colo.*

Münchener **med**izinische **Wochenschr**ift *w* **73**(4) Rm6 40 plus Rm3 25 postage (80pfg) *d*, F11 90 or $2 30*f* per quarter. *J. F. Lehmann, Paul Heyse-Str. 26, Munich, N W 2, Ger*

Municipal and **County Eng**ineering. *m* 2 vols **70.** $2($ 25)*d*, $2 75*f*, $2 40 *Can Engineering Publishing Co., 702 Wulsin Bldg, Indianapolis, Ind.*

***Munic**ipal **Eng**ineering Name changed to **Munic**ipal and **County Eng**ineering

Municipal **Eng**ineering and the **Sanit**ary **Record.** *w* 2 vols **77**(1884) 24s6d(4d)*d*, 26*f* *8 Breams Bldg, Chancery Lane, London, E. C 4, Eng*

***Munic**ipal Journal and Public Works Name changed in 1920 to **Public Works.**

***Mycol**ogisches **Centr**alblatt. Discontinued in 1915.

Nachrichten von der **Gesellschaft der Wissenschaften zu Göttingen. Geschäftl**iche **Mitt**eilungen, **Math**ematisch-**physik**alische **Klasse.** *Weidmannsche Buchhandlung, Berlin, Ger.*

***Nachr**ichten von der **k**oniglichen **Gesellschaft der Wissenschaften zu Göttingen** Name changed in 1923 to **Nachr**ichten von der **Gesellschaft der Wissenschaften zu Göttingen.**

National Advisory Committee for Aeronautics, Reports, Technical Memorandums and **Notes.** *Govt Printing Office, Washington, D C.*

National Canners' Association, Bulletins and **Circulars** *irr National Canners' Association, 1739 H St, N W, Washington, D C*

National Druggist, The. *m* **56.** $1($.10)*d*, $2*f* *in Postal Union 945–6 Century Bldg, St Louis, Mo*

National Glass Budget. *w* **41**(36). $3*d*, $4 50*f*, $3 50 *Can. A W and T. A. Kimes, 426 4th Ave, Pittsburgh, Pa.*

National Medical Journal of China, The *bm* **12.** $3Mex ($0 75Mex)*d*, $2 U S currency *f* *C. Voonping Yui, M.D., P. 352, Nanking Road, Shanghai, China.*

National Petroleum News. *w* **18.** $2 50 ($ 10)*d*, $5*f*, $3 50 *Can. National Petroleum Publishing Co, 812 Huron Road, Cleveland, Ohio*

National Physical Laboratory, Collected Researches and **Reports.** *H. M. Stationery Office, Adastral House, Kingsway, London, W C 2, Eng.*

National Research Council, Bulletins. See **Bulletin** of the **National Research Council.—Reprint** and **Circular Series.**

Issued separately Price varies *National Research Council, B and 21st Sts, Washington, D C*

Nation's Health, The. *m* **8.** $3($3.35)*d*, *U. S. Possessions, Can, Canal Zone, Cuba* and *Mex*, $3.50 or 15*sf*. *The Modern Hospital Publishing Co, Inc, 22–24 E Ontario St, Chicago, Ill*

Natural Gas. *m* **7.** $2($2.25)*d* *Natural Gas Assocn. of America, 4th National Bank Bldg, Cincinnati, Ohio*

***Natural Gas** and **Gasoline** Journal, The. Name changed in 1920 to **Natural Gas Industry.**

***Natural Gas Industry.** Name changed in 1922 to **Gas Industry.**

Nature. *w* 2 vols. **117**(2931) £2 12s(1s)*d*, £2 17*sf* *Macmillan & Co, Ltd, St Martin's St, London, W C 2, Eng*

Nature, La *w* 2 vols **54**(2700) F50 (F1)*d*, F65(F1.25)*f*. *Masson et Cie, 120 Blvd. St-Germain, Paris (6e), France*

Naturforscher, Der *m* **2** (10) M2(75pfg.)*d* per quarter, $2*f* per year. *Hugo Bermuhler Verlag, Wilhelmstr 16, Berlin-Lichterfelde, Ger*

Naturwissenschaften, Die. *w* **14.** Rm7.50 (Rm0.75)*d* and *f* per quarter. *Julius Springer, Link-Str. 23-24, Berlin, W 9, Ger.*

Naturwissenschaftliche Monatshefte fur den **biologischen, chemischen, geographischen** und **geologischen Unterricht.** *irr* **23**(2) M15*d* per vol. *B. G. Teubner, Poststr 3, Leipzig, Ger.*

Naturwissenschaftliche Umschau der **Chemiker-Zeitung** *m* **15.** Supplement to **Chemiker-Zeitung.**

***Naturwissenschaftliche Zeitschrift fur Forst- und Landwirtschaft.** Discontinued in 1920

Natuurwetenschappelijk Tijdschrift *irr* **8.** f5*d*, F25*f* *Natuur- en Geneeskundige Venootschap Vereeniging zonder winstgevend doel, Louisastraat 8, Antwerp, Holland.*

Naukhnuie Zapiski Gosudarstvennago Eksperimentalalnogo **Instituta Sakharnoi Promushlennosti** *irr* **5**(4)(**1927**) R10 or $5 per vol *Research Institute for the Technology of Agricultural Industries, Voroshaya 25, Kiev, Union of the Socialistic Soviet Republics*

Nederlandsch Maandschrift voor **Geneeskunde.** (New series of Maandschrift voor Verloskunde en Vrouwenziekten en voor Kindergeneeskunde) *m* **13**(6) f16 (f1.50)*d*. *S. C van Doesburgh, Leyden, Holland.*

Nederlandsch Tijdschrift voor **Geneeskunde.** *w* **70.** f29(f0.75)*d*. *De Erven F. Bohn, Haarlem, Holland.*

Nederlandsch Tijdschrift voor **Hygiëne, Microbiologie** en **Serologie.** *irr* **1.** f8.50 per vol. *S. C. van Doesburgh, Leiden, Holland.*

Neftyanoe Khozyaistvo (Petroleum Domain). (Printed in Russian) *m* **9**(**1925**) *Scientific Publication Bureau of the Council of the Petroleum Industry, Ilinka, Bogoiavlenskii per 3, Moscow, Union of the Socialistic Soviet Republics*

Néoplasmes, Les. *bm* **4.** F30(F5)*d*, F35*f*. *Vigot frères, 23 rue de l'École-de-médecine, Paris, France.*

***Neues allgemeines Journal der Chemie.** *Leipzig* 1803–06 Continuation of **Allgemeines Journal der Chemie** Continued as **Journal fur die Chemie, Physik** und **Mineralogie.**

***Neues chemisches Archiv** *Leipzig.* 1784–91. Continuation of **Chemisches Archiv.** Followed by **Neuestes chemisches Archiv**

***Neues Jahrbuch fur Mineralogie, Geognosie, Geologie** und **Petrefaktenkunde.** *Heidelberg* 1833–62 Continuation of **Jahrbuch fur Mineralogie, Geognosie, Geologie** und **Petrefaktenkunde** Continued as **Neues Jahrbuch fur Mineralogie, Geologie** und Palaontologie

Neues Jahrbuch fur Mineralogie, Geologie und Palaontologie Abt. **A** Mineralogie und Petrographie. 2 vols.; Abt. **B** Geologie und Palaontologie. 2 vols.; Beilage Band **53.** *E. Schweizerbart'sche Verlagsbuchhandlung (Erwin Nägele), G. m. b. H, Johannesstr. 3, Stuttgart, Ger.*

***Neues Journal der Pharmacie fur Aerzte, Apotheker** und **Chemiker.** Merged in 1834 with **Annalen der Pharmacie**

***Neues Journal der Physik.** *Halle* and *Leipzig.* 1795–97. Continuation of **Journal der Physik.** Continued as **Annalen der Physik.**

***Neuestes chemisches Archiv.** *Weimar* 1798 Continuation of **Neues chemisches Archiv**

New Jersey Zinc Co. Bulletins *irr.* Free on request *The New Jersey Zinc Co, 160 Front St, New York City.*

New Phytologist. 5 nos. a year. **25.** ($1.25). *Wheldon & Wesley, 2–4 Arthur St, New Oxford St, London, W C. 2, Eng*

New Technical Books. *q* **10**(**1925**). *New York Public Library, New York City.*

***New York Analyst,** The. *New York.* 1885. (Successor to an American reprint of the Analyst published in London;

hence it was styled "New Series"). Continued as **American Analyst.**

***New York Medical** Journal. Name changed in 1924 to **Medical Journal and Record.**

New Zealand Board of Science and Art, Bulletins, etc. *The Director, Dominion Museum, Wellington, New Zealand.*

New Zealand Journal of **Agriculture,** The. *m* 2 vols. **31.** 6s(1s)*d. Dept. of Agriculture, Wellington, New Zealand.*

New Zealand Journal of **Science** and **Technology,** The. 6 times a year. **8**(2). 10s(2s plus 1d postage)*d. The Director, Dominion Museum, Wellington, New Zealand.*

***Nieuwe chemische en physische Oefeningen** 1797. Continuation of **Chemische en physische Oefeningen voor de Beminnaars der Schei- en Natuurkunde.**

***Nieuwe Scheikundige Bibliotheek.** *Amsterdam.* 1799–1802. Continuation of **Scheikundige Bibliotheek.**

Nippon Kwagaku Kwai Shi. See Journal of the **Chemical Society of Japan.**

Nippon No Ikai. See The **Japan Medical World.**

Nippon Sûgaku-Buturigakkwai Kizi. See **Proceedings of the Physico-Mathematical Society of Japan.**

Nōgaku Kwai Hō. See Journal of the **Scientific Agricultural Society (Japan).**

Nordiskt Medicinskt Arkiv. Made up of two journals as follows· **Acta chirurgica Scandinavica** and **Acta medica Scandinavica.**

Norges Geologiske Undersökelse. *irr* **No. 127.** Price varies. *H. Aschehoug & Co., Oslo, Norway.*

Norsk Geologisk Tidsskrift. *irr* **9.** Price varies. *A. W. Broeggers Boktrykkeri A/S, Oslo, Norway*

Norsk Magazin for Laegevidenskapen. *m* [5]**24.** K25*d. Steenske Boktrykkeri, Raadhusgaten 30, Oslo, Norway*

North Carolina Geological and Economic Survey, Bulletins and Reports *Edwards & Broughton Printing Co., Raleigh, North Carolina.*

Northwestern Miller, The. *w* 4 vols. **145.** $2($ 10)*d, Can.* and *Cuba, $4f Miller Publishing Co., 118 S 6th St., Minneapolis, Minn*

Notiziario chimico industriale, Il *m* **1.** L80(L8)*d,* L140(L15)*f Via Ospedale N. 20, Turin, Italy.*

***Nouvelle répertoire de chimie, pharmacie, matière pharmaceutique et de chimie industrielle.** *Louvain.* 1831. Continuation of **Répertoire de chimie, pharmacie, matière pharmaceutique et de chimie industrielle.**

Nuovo cimento, Il. 8 nos. a year. [N. S] **3.** L50*d,* L65 *Europe.* L100 *other countries. Giulio Dalla Noce, R istituto di fisica, Bologna, Italy.*

Octrooiraad Nederland. (Dutch Patents) *irr Bureau voor den Industrieelen Eigendorn te s'Gravenhage, The Hague, Holland.*

Oesterreichische Chemiker-Zeitung. *sm* **29.** *Pestalozzigasse 6, Wien I, Austria.*

Oesterreichische Molkerei-Zeitung. Name changed to **Milchwirtschaftliche Zeitung.**

***Oesterreichische Zeitschrift für Berg- und Hüttenwesen** Name changed to **Montanistische Rundschau.**

***Oesterreichisch-ungarische Zeitschrift für Zuckerindustrie und Landwirtschaft.**

***Översikt av Finska Vetenskaps-Societetens Förhandlingar.** Discontinued with Vol **64(1921-22).**

Official Gazette of the United States Patent Office, The. *w* 12 vols **342.** $5($ 10) *Supt. of Documents, Govt. Printing Office, Washington, D. C.*

Ohio Journal of Science, The. *bm* **26.** $2($ 50)*d,* 2 50*f Lewis H Tiffany, Business Mgr, Ohio State University, Columbus, Ohio*

Ohio State University Bulletins, University Studies, etc *The Ohio State University, Columbus, Ohio.*

Oil Age. *m* **23.** $1($ 25)*d,* $2*f. The Oil Age Co, Inc, 720 Insurance Exchange Bldg, 9th and Olive Sts, Los Angeles, Calif.*

Oil and Fat Industries. *m* **4(1927).** $3*d,* $4*f. Russell Palmer, 220 W. 42nd St, New York City.*

Oil and Gas Journal, The. *w* **24**(33). $6($ 15)*d,* $7*f* and *Can The Petroleum Publishing Co, 114–116 W. 2nd St, Tulsa, Okla.*

Oil Bulletin. *m* **13(1927).** $2 50($.25)*d, U. S. Possessions* and *Mex,* $3.50*f Chamber of Mines and Oil, 1151 South Broadway, Los Angeles, Calif.*

***Oil Engineering and Finance.** Name changed in 1926 to **Oil Engineering and Technology.**

Oil Engineering and Technology. 7?(123?) 8s(6d)*d. 6 & 7 Coleman St., London, E C. 2, Eng.*

***Oil News.** Combined with **Oil Trade Journal** in 1924 to form **Oil Trade.**

Oil, Paint and Drug Reporter. *w* 2 vols. **109.** $5($.15)*d,* $10*f,* $7 *Can. 12 Gold St, New York City.*

Oil Trade, The, including Oil Trade Journal and Oil News *m* **17.** $2($ 25)*d*, $3*f*, $2.50 *Can.* and *Mex. Oil Trade Journal, Inc., 350 Madison Ave, New York City.*

***Oil Trade** Journal. Combined with **Oil News** in 1924 to form **Oil Trade.**

Oil Weekly. *w* 4 vols. **40**(2). $1($ 10)*d.* (Subscriptions restricted to those engaged in the oil business or the manufacture and distribution of oil field supplies) *1716 Dallas Ave., Houston, Texas.*

Oversigt over det **Kongelige Danske Videnskabernes Selskabs Forhandlinger.** *irr* Price varies. *Andr. Fred Host & Søn, Kgl. Hof-Boghandel, Copenhagen, Denmark.*

***Pahasapa Quarterly**, The. Suspended publication in 1921. Resumed publication in 1923 as **Black Hills Engineer**

***Paint Manufacturers' Association** of the United States, **Technical Circulars** of the Educational Bureau, Scientific Section, National Varnish Mfrs. Assocn. of U. S cooperating. Name changed in 1926 to **American Paint** and **Varnish Manufacturers' Association, Scientific Section, Educational Bureau, Circulars**

Paint, Oil and **Chemical Review.** *w* 2 vols. **81.** $3. *Trade Review Co, 610 Federal St, Chicago, Ill*

Paint, Oil and **Drug Review.** Name changed in 1920 to **Paint, Oil** and **Chemical Review.**

***Paper.** Merged in 1925 with **Paper Trade** Journal.

Paper Industry, The. *m* **7**(10) $2*d*, $3*f*, $2.50 *Can. Edward B Fritz, 356 Monadnock Bldg, Chicago, Ill*

Paper Industry (Russia). See **Bumazhnaya Promuishlennost.**

Paper-Maker and **British Paper Trade** Journal, The. *m* 2 vols **71.** 21s(1s6d, by post 2s)*d. S. C. Phillips and Co, 47 Cannon St, London, E. C. 4, Eng.*

Paper Makers' Monthly Journal, The. *m* **64.** 7s6d(6d, by post 8d). *Marchant Singer & Co, 47 St Mary Axe, London, E. C. 3, Eng.*

Papers and **Proceedings** of the **Royal Society** of **Tasmania.** *a* Price varies *The Tasmanian Museum, Argyle St, Hobart, Tasmania.*

Paper Trade Journal. *w* 2 vols **82.** $4 ($.10)*d*, $6*f. Lockwood Trade Journal Co., Inc., 10 E 39th St, New York City.*

Papeterie, La. (Revue technique et commerciale de l'industrie du papier.) *sm* **48.** F50(F3)*d*, $3(F4)*f. L'homme et Argy, 9 rue Lagrange, Paris (5e), France.*

Papier, Le. (Revue technique des industries du papier et du livre.) *m* **29.** F36*d*, $3.50 *U. S Edouard Henry, 63 ave. des Champs-Elysées, Paris, France.*

Papier-Fabrikant, Der. *w* **24.** Rm6 (M0.60)*d*, Rm6 plus postage *f*, per quarter. *Otto Elsner, Oranienstr. 140–2, Berlin, S. 42, Ger.*

Papir-Journalen. *sm* **14.** K20*d*, K25*f Papirindustriens Hus, Huitfeldtsgt. 1, Oslo, Norway.*

Parfumerie moderne, La *m* **19.** F36 (F4)*d*, F48*f. Publications Pierre Argence, 265 ave. Jean-Jaurès, Lyons, France.*

Parfums de France, Les. *m* **No. 35.** F50(F5)*d*, F60*f. Ave. de la Gare, Grasse, France.*

Pediatria, La. (**Archivio** di patologia e clinica pediatrica.) *irr* **I(1925).** L50*d*, L100*f* per vol ; with La **Pediatria (Rivista** quindicinale d'igiene, medicina e chirurgia d'infanzia). L80*d*, L160*f. S. Andrea delle Dame 21, Naples (57), Italy.*

Pediatria, La. (**Rivista** quindicinale d' igiene, medicina e chirurgia d'infanzia.) *sm* **34.** L40(L5)*d*, L80*f*; with La **Pediatria** (**Archivio** di patologia e clinica pediatrica) L80*d*, L160*f. S. Andrea delle Dame 21, Naples (57), Italy.*

Pédologie, La (**Russia**). (Printed in Russian) 4 times a year. **20(1925)** R6 (R2 5)*d*, $3 *U. S. Periodsector Gosizdat, Vozdvizhlenka 10–2, Moscow, Union of the Socialistic Soviet Republics.*

Peintures, pigments, vernis. *m* **3.** F20 (F2 50)*d*, F30(F4)*f. 53 rue de Ponthieu, Paris (8), France.*

***Pennsylvania Medical Journal**, The. Discontinued in 1923 but merged with **Delaware State Medical Journal** to form **Atlantic Medical Journal.**

Perfumers' Journal. *m* **7.** $3($.25)*d* and *Can*, $3.50*f. Joseph Byrne, 100 W. 41st St, New York City.*

Perfumery and **Essential Oil Record.** *m* **17.** 17s6d(1s6d)*d* and *f. 8 Serle St., London, W. C. 2, Eng.*

Pétrole et ses **dérivés**, Le. A part of **Matières grasses**, Les.

***Petroleum.** Combined with **Petroleum Age** in 1921 under the name **Petroleum Age** including Petroleum.

Petroleum Age. Combined with **Petroleum** Sept., 1921, under the name **Petroleum Age** including Petroleum. Name changed back to **Petroleum Age** in Dec., 1925. *sm* 2 vols. **17.** $2($.15)*d* and *U. S. Possessions*, $4*f*, $3 *Can. Graffis-Sutton Publishing Co., 28 E. Jackson Blvd., Chicago, Ill.*

***Petroleum Age** including Petroleum. Name

changed back to **Petroleum Age** in Dec , 1925

***Petroleum Gazette.**

***Petroleum Magazine.** Formerly **Petroleum.** Name changed back to **Petroleum.**

***Petroleum Review.** Replaced by **Petroleum Times.**

Petroleum Shale Journal (Russia). Same as **Neftyanoe i Slantsevoe Khozyaistvo.**

Petroleum Times, The *w* 2 vols **15**(365). 39s(9d)*d* and *f* *The Petroleum Times Office, 4 Broad St Place, London, E C 2, Eng*

Petroleum World, The (**London**). *m* **23**(304). 12s(1s, by post 1s3d)*d*, *$3f. 32 Great St Helens, London, E C 3, Eng*

Petroleum, Zeitschrift fur die gesamten Interessen der Mineralol-Industrie und des Mineralol-Handels 3 times a month **22.** Gm36*d*, 60sch *Austria* and *Hungary*, £3 *England*, $12 *U S Verlag fur Fachliteratur, G m b H , Courbièrestr 3, Berlin, W 62, Ger*

***Petroleum, Zeitschrift** fur die gesamten Interessen der Petroleum-Industrie und des Petroleum-Handels Name changed to **Petroleum, Zeitschrift** fur die gesamten Interessen der Mineralol-Industrie und des Mineralol-Handels

Pharmaceutica Acta Helvetiae About 12 nos a year **No. 1.** Supplement to **Schweizerische Apotheker Zeitung.**

Pharmaceutical Journal and Pharmacist, The *w* 2 vols **116** or [4]**62**(3246). 42s (1s, by post 1s1d)*d* *17 Bloomsbury Sq , London, W C 1, Eng*

***Pharmaceutisches Centralblatt** *Leipzig* 1830–49. Continued as **Chemisch-pharmaceutisches Centralblatt.**

Pharmaceutisch Weekblad. *w* **63.** f15 50 (f0 35)*d*, f20*f*. *D. B Centen, O. Z Voorburgwal 115, Amsterdam, Holland*

***Pharmacist,** The. *Chicago.* 1873–78 Continuation of The **Pharmacist** and **Chemical Record.** Continued as The **Pharmacist** and **Chemist.** Changed back to The **Pharmacist** in 1885. Merged in The **Western Druggist** in 1886.

***Pharmacist** and **Chemical Record,** The. *Chicago* 1868–72 Continued as The **Pharmacist.**

***Pharmacist** and **Chemist,** The *Chicago.* 1879–84. Continuation of The **Pharmacist.** Continued as The **Pharmacist.**

Pharmazeutische Monatshefte *m* **7.** 3sch *d* $ 50 *North America*, per quarter Issued free as supplement to Die oesterreichische **Pharmazeutische Post.**

Pharmazeutische Post, Die oesterreichische. *w* **59.** 7sch *d*, $1 25 *U. S.*, per quarter, including **Pharmazeutische Monatshefte.** *Allg oesterr Apotheker-Verein, Wien, Austria*

Pharmazeutische Presse. *sm* **31.** (3sch.)*d*, (Gm2 50) *Germany*, (L15) *Italy. Fuchsthallergasse 12, Wien 9/2, Austria.*

Pharmazeutische Zeitung, Die deutsche *sw* **71.** *Julius Springer, Link-Str. 23–24, Berlin, W 9, Ger.*

Pharmazeutische Zentralhalle fur Deutschland *w* **67.** M4 50 *d* per quarter. *Dr P Suss, Dresden-A24, Ger*

Philippine Agricultural Review, The. *q* **18(1925)** P2 or $1*d*, $2*f* *Bureau of Agriculture, Manila, P I*

Philippine Agriculturist, The *m* except Apr and May **14**(8). P4(40 centavos)*d*, $2 50($ 25)*f* *Business Manager, Los Baños College, Laguna, P I.*

Philippine Journal of Science, The. *m* 3 vols **29.** $5($ 50)*d* and *f*. *Business Manager, Philippine Journal of Science, Bureau of Science, Manila, P. I*

***Philosophical Journal** *London* 1797–1814 Combined with **Philosophical Magazine** and continued as **Philosophical Magazine and Journal**

***Philosophical Magazine** *London.* 1798–1814 Combined with **Philosophical Journal** and continued as **Philosophical Magazine and Journal**

***Philosophical Magazine and Journal** *London.* 1814–27. Continuation of **Philosophical Magazine** and **Philosophical Journal** Continued as **Philosophical Magazine** or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science

***Philosophical Magazine and Journal of Science,** The London and Edinburgh. *London.* 1832–40 Continuation of The **Philosophical Magazine** or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science. Continued as The London, Edinburgh and Dublin **Philosophical Magazine and Journal of Science**

Philosophical Magazine and Journal of Science, The London, Edinburgh and Dublin *m* 2 vols [7]1. *Taylor and Francis, Red Lion Court, Fleet St., London, E C , Eng.*

***Philosophical Magazine or Annals of Chemistry, Mathematics, Astronomy, Natural History and General Science** *London.* 1827–32. Continuation of **Philosophical Magazine and Journal.** Continued as The London and Edinburgh **Philo-**

sophical **Mag**azine and Journal of Science

Photographic Journal, The. *m* **66** or [N S]**50.** 35s(2s6d). *Secy., Royal Photographic Society of Great Britain, 35 Russell Sq, London, W C 1, Eng.*

Photographische Chronik. About *sw* **33.** Gold pfg 840*d*. *Wilhelm Knapp, Muhlweg 19, Halle a S, Ger*

Photographische Industrie, Die *w* **24.** Gm14*d*, Gm20*f* *Krausenstr 35–36, Berlin, S W 19, Ger*

Photographische Korrespondenz *irr* **61**(2) (July, **1925**) *Die Photographische Ges, Westhahnstr 25, Vienna, VII, Austria*

Photographische Rundschau und Mitteilungen. (Photographisches Zentralblatt) *sm* **63.** Gm0 70*d*. *Photographische Verlagsgesellschaft, m b H, Muhlweg 19, Halle a S, Ger*

Physica. *m* **6.** f7 50*d* and *colonies*, f8 50*f* *Postbus 18, Eindhoven, Holland*

Physical Review, The *m* 2 vols **27.** $7($ 75)*d* and *f* *1500 University Ave, S. E, Minneapolis, Minn*

***Physikalisch-chemisches Magazin** fur **Aerzte, Chemisten** und **Künstler.** *Berlin.* 1780.

***Physikalisch-chemisches Zentralblatt.** *Leipzig* 1903–09 Continued as **Fortschritte** der **Chemie, Physik** und **physikalischen Chemie**

Physikalische Berichte. *sm* **7.** Rm68*d* *Friedr Vieweg & Sohn, Akt.-Ges, Braunschweig, Ger.*

Physikalische Zeitschrift vereinigt mit dem Jahrbuch der Radioaktivitat und Elektronik *sm* **27.** Gm11*d*, $3*f* per quarter. *S Hirzel, Königstr 2, Leipzig, Ger.*

Physiological Abstracts. *m* **10**(10). 42s (5s)*d*. *H K Lewis & Co, Ltd, 136 Gower St, London, W C 1, Eng.*

***Physiological Researches.** Discontinued in 1923

Physiological Reviews *q* **6.** $6($2 50)*d*, $6 50*f*, $6 25 *Can.* per vol *D R Hooker, 19 W Chase St, Baltimore, Md*

Phytopathology. *m* **16.** $5($ 50)*d*, $5 50*f* *American Phytopathological Society, Cor. Lime and Green Sts, Lancaster, Pa*

Planta (Archiv fur wissenschaftliche Botanik) **Abteilung E** of **Zeitschrift** fur **wissenschaftliche Biologie.** **1(1925).** *Julius Springer, Link-Str 23–24, Berlin, W 9, Ger.*

Planter and **Sugar Manufacturer.** *w* 2 vols. **76.** $3($.20)*d*, $4*f* *The Louisiana Planter and Sugar Mfr. Co, Inc, 424 Camp St, New Orleans, La.*

***Plant World,** The. Discontinued under this name in 1919, but continued as **Ecology.**

Plastics. *m* **2.** $3($ 35)*d*, $4*f*. *461 4th Ave, New York City*

Pochvovedenie. See **Pédologie,** La (**Russia**).

***Popular Science News** and **Boston** Journal of **Chemistry.** *Boston.* 1883–92+. Continuation of **Boston** Journal of **Chemistry** and **Popular Science Review.**

***Posselt's Textile** Journal. Merged with **Textile World.** in 1923

***Potter,** The Combined with **Brick** and **Pottery Trades** Journal, The

Pottery Gazette and Glass Trade Review, The *m* **51**(583) 10s(1s; by post 1s6d) *d* and *f* *8 Broadway, Ludgate, London, E C 4, Eng.*

Power. *w* 2 vols **63.** $3($ 15)*d*, $6 or 25*f* *McGraw-Hill Co, Inc, 10th Ave at 36th St, New York City*

Power Plant Engineering *sm* **30.** $2 ($ 15)*d* and *U S Possessions*, $3 50*f*, $2 75 *Can* *Technical Publishing Co, 537 S. Dearborn St, Chicago, Ill*

***Practical Engineer** (Chicago) Name changed to **Power Plant Engineering**

Presse médicale, La. *bw* **34.** *Masson et Cie, 120 Blvd. St.-Germain, Paris (6e), France*

Proceedings and Transactions of the Nova Scotian Institute of Science, The. *irr* **15**(Pt 3 and 4)(Nov, **1923**). *Secy. of the Nova Scotian Institute of Science, Halifax, Nova Scotia*

Proceedings of the Academy of Natural Sciences of Philadelphia. *a* **78.** $5. *Academy of Natural Sciences, Philadelphia, Pa.*

Proceedings of the American Academy of Arts and Sciences *irr* **61**(3). $5 per vol *American Academy of Arts and Sciences, 28 Newbury St, Boston, Mass*

Proceedings of the American Association of Textile Chemists and Colorists. Published in the **American Dyestuff Reporter**

Proceedings of the American Chemical Society *New York.* 1877 Continued in the **Journal of the American Chemical Society.**

Proceedings of the American Concrete Institute. *a* **22.** $8 *2970 W Grand Blvd, Detroit, Mich*

Proceedings of the American Gas Association, Technical Section. *a* **7(1925).** $7. *American Gas Assocn, Inc, 342 Madison Ave., New York City.*

***Proceedings of the American Gas Institute** Discontinued when American Gas In-

stitute was combined with American Gas Association in 1918.

***Proceedings of the American Institution of Electrical Engineers.** Discontinued in 1919. Followed by **Journal of the American Institute of Electrical Engineers.**

Proceedings of the American Iron and Steel Institute. See **Year Book.**

Proceedings of the American Philosophical Society. *irr* **65.** *$3d. American Philosophical Society, 104 S 5th St, Philadelphia, Pa.*

Proceedings of the American Society for Municipal Improvements. *a* $7 50 *C. W. S. Sammelman, Secy, St Louis, Mo.*

Proceedings of the American Society for Testing Materials. *a* in 2 Pts. **26.** *American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa.*

Proceedings of the American Society of Civil Engineers *m* except June and July **52.** $8($1)*d American Society of Civil Engineers, 33 W. 39th St, New York City.*

Proceedings of the American Society of Horticultural Science. *a* Yearly dues $2 50 including Proceedings. *C P Close, Secy, College Park, Md.*

Proceedings of the American Wood-Preservers' Association. *a* **22.** $6 *E J Stocking, Secy-Treas, 111 W Washington St, Chicago, Ill*

Proceedings of the Annual Congress of the South African Sugar Association. *a* 4th Congress *South African Sugar Assocn, 344 Smith St., Durban, Natal, S. Africa.*

***Proceedings of the Annual Meeting of the Society for the Promotion of Agricultural Science.** Ceased publication in 1921.

***Proceedings of the Asiatic Society of Bengal.** Now incorporated in **Journal & Proceedings of the Asiatic Society of Bengal.**

***Proceedings of the Association of Official Agricultural Chemists.** *Washington* 1884–93

Proceedings of the Australasian Institute of Mining & Metallurgy. *q* [N S] **No. 61.** *Secy., Collins Court, 374 Little Collins St., Melbourne, Australia*

***Proceedings of the Australasian Institute of Mining Engineers** Name changed in 1919 to **Proceedings of the Australasian Institute of Mining & Metallurgy.**

Proceedings of the California Academy of Sciences. *irr* [4]**13**(27–28)(**1925**). Price varies. *California Academy of Sciences, San Francisco, Calif.*

Proceedings of the Cambridge Philosophical Society. *irr* 1 vol. every 2 yrs. **23.** Price of single copy varies *Cambridge University Press, Fetter Lane, London, E. C 4, Eng*

***Proceedings of the Chemical Society of London** *London.* 1841–43. Continued as **Memoirs and Proceedings of the Chemical Society of London.**

Proceedings of the Colorado Scientific Society. *irr* **11**(pp. 399–434) (Dec, **1923**). *Colorado Scientific Society, Denver, Colo.*

Proceedings of the Engineers' Society of Western Pennsylvania. *m* except Aug. and Sept. **41**(10). $5($ 50)*d. Engineers' Society of Western Pennsylvania, William Penn Hotel, Pittsburgh, Pa.*

***Proceedings of the First General Meeting of the Society of Chemical Industry** *London* 1881 Continued as **Journal of the Society of Chemical Industry.**

Proceedings of the Geological Society of South Africa. *a* To accompany the Transactions. **29.** £2 2s including Transactions *Geological Society of South Africa, P. O Box 1071, Johannesburg, S Africa*

Proceedings of the Indiana Academy of Science *a* **35**(**1925**). *J. J. Davis, Purdue Univ, Lafayette, Ind.*

***Proceedings of the Indian Association for the Cultivation of Science** Discontinued in 1926. Merged in **Indian Journal of Physics.**

Proceedings of the Indian Science Congress. 9th Congress. Published in Vol. **18,** No 6(1922)(issued in 1923) of the **Journal** and **Proceedings of the Asiatic Society of Bengal.**

Proceedings of the Institution of Civil Engineers (London), Minutes of *irr* **219**(**1924–5**). *Secy, Great George St., London, S. W. 1, Eng*

Proceedings of the Institution of Mechanical Engineers (London). *irr* 2 vols. **1926 I.** *Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S. W. 1, Eng*

Proceedings of the International Society of Soil Science. *q* [N S]**2.** Issued separately to members of the society only. Reprints from the **International Review of the Science and Practice of Agriculture**

Proceedings of the Iowa Academy of Science. *a* **32**(**1925**). $.50 per vol. Membership

$1 per year. *State University, Iowa City, Iowa.*

Proceedings of the Leeds Philosophical and Literary Society, Scientific Section. *irr* 1(Pt 2). *Prof. R. Whiddington, The University, Leeds, England.*

Proceedings of the Linnean Society of New South Wales, The. *irr* **50**(Pt. 5) (204). Price varies. *Macleay House, 16 College St., Sydney, N. S Wales.*

Proceedings of the National Academy of Sciences of the United States of America *m* **12.** $5($ 50). *Home Secy., National Academy of Sciences, B and 21st Sts, Washington, D. C.*

Proceedings of the National Association of Railroad Tie Producers. *a* $1 *Roy M. Edmonds, Secy., Syndicate Trust Bldg., St. Louis, Mo.*

Proceedings of the Oklahoma Academy of Science. Published in **University of Oklahoma Bulletin**

Proceedings of the Physical Society of London. *bm* from Dec. to Aug. **38**(Pt II). 30s (6s, by post 6s3d)*d* and *f. Fleetway Press, Ltd., 3–9 Dane St, High Holborn, London, W C. 1, Eng.*

Proceedings of the Physico-Mathematical Society of Japan. (Nippon Sûgaku-Buturigakkwai Kizi) 11 nos. a year. [3]**3.** Y7 00(Y0.70)*d* and *f. Z P. Maruzen & Co, Ltd., Nihonbashi, Tokyo, Japan*

Proceedings of the Royal Academy of Sciences of Amsterdam. (English edition of the **Verslag** koninklijke **Akademie** van **Wetenschappen** te **Amsterdam.**) *irr* **29.** *Koninklijke Akademie van Wetenschappen, Amsterdam, Holland*

Proceedings of the Royal Institution of Great Britain. *irr* **25,** Pt. 1 (120) *Royal Institution of Great Britain, Albemarle St., London, W 1, Eng.*

Proceedings of the Royal Irish Academy Section **A.** Mathematical, Astronomical and Physical Science. *irr* **37**(?) Section **B.** Biological, Geological and Chemical Science. *irr* **37**(10–11–12). Price varies. *Hodges, Figgis & Co, Ltd., 20 Nassau St., Dublin, Ireland.*

Proceedings of the Royal Society (London). Series **A.** Mathematical and Physical Sciences. *m* 2 or 3 vols. **110**(753). 20s per vol.; Series **B.** Biological Sciences. *irr* 1 or 2 vols **99**(695). 20s per vol. *Harrison & Sons, Ltd., 44–47 St. Martin's Lane, London, W. C. 2, Eng.*

Proceedings of the Royal Society of Edinburgh. *irr* **46**(Pt. I)(**1925–26**). Price varies. *Robert Grant & Son, 126 Princes St., Edinburgh, Scotland.*

Proceedings of the Royal Society of Medicine. *m* **19**(3). £5 5s. *Longmans, Green & Co., 39 Paternoster Row, London, Eng.*

Proceedings of the Royal Society of Queensland. *a* **36(1924)**(issued in 1925) 10s*d*. *A. J. Cumming, Brisbane, Queensland, Australia.*

Proceedings of the Royal Society of Victoria. [N. S.]**37(1925).** *Ford and Son, Drummond St., Carlton, Melbourne, Australia.*

Proceedings of the Society for Experimental Biology and Medicine. *m* from Oct. to June. **23**(4) $5 ($.70)*d*, $5.50*f*. *A. J. Goldform, Secy-Treas., College of the City of New York, New York City.*

Proceedings of the Society of Chemical Industry, Victoria. *irr* **23(1923).** *Society of Chemical Industry of Victoria, Melbourne, Australia.*

***Proceedings of the Society of Public Analysts.** 1876–77(?) Followed by **The Analyst.**

***Proceedings of the South African Association of Analytical Chemists.** Name changed in 1921 to **Proceedings of the South African Chemical Institute.**

Proceedings of the South African Chemical Institute. *a Hector R Adam, Honorary Secy, Box 3361, Johannesburg, S. Africa.*

Proceedings of the South Dakota Academy of Sciences. *a* **9**(5). Gratis *Mr. A. L. Haines, University of South Dakota, Vermillion, S. D.*

Proceedings of the South Wales Institute of Engineers *irr* **41**(6) (5s) *Secy. of the Institute, Park Place, Cardiff, S. Wales.*

Proceedings of the Staffordshire Iron and Steel Institute. *a* **39(1925).** *Mark and Moody, Ltd., 51–52 High St, Stourbridge, Eng.*

***Proceedings of the Steel Treating Research Society.** Discontinued in 1920. Merged in **Transactions of the American Society for Steel Treating.**

Proceedings of the Technical Section of the Paper Makers' Association of Great Britain and Ireland. **5**(Pt. I)(Sept., **1924**) *26 Farringdon St, London, E. C. 4, Eng.*

***Proceedings of the Tokyo Mathematico-Physical Society.** Name changed in 1919 to **Proceedings of the Physico-Mathematical Society of Japan.**

Proceedings of the United States National Museum. Beginning with Vol. 66 pa-

pers previously included in these volumes are to be published only as separate pamphlets which are free to libraries, scientific establishments and individuals actively engaged in the study of the different branches of natural history to which they relate *United States National Museum, Washington, D C*

Proceedings of the University of Durham Philosophical Society *irr* **7**(Pt 3) **(1925–26).** *Andrew Reid & Co, Ltd, Newcastle-upon-Tyne, Eng*

Proceedings of the Vermont Maple Sugar Makers' Association. *a* **31(1924)** *M. J. Corliss, Secy., Montpelier, Vermont*

Proceedings of the Yale Mineralogical Society. 1(1923–24) and **2(1924–25)**(Issued together in **1926**). *Yale Mineralogical Society, Yale Univ, New Haven, Conn*

Progrès agricole et viticole, Le. *w* 2 vols. **85.** F34(F0 75)*d*, F60*f* *Rue Albisson 1 (Rue nationale, maison Batigue), Montpellier, France*

***Progressive Age.** Name changed to **Gas Age.**

***Prometheus.** Combined in 1921 with Die **Umschau.**

Protoplasma. 1. Price varies *Gebr. Borntraeger, Leipzig, Ger*

Przemysl Chemiczny. *m* **10.** *Zoliborz, Ul Laznosci, Warsaw, Poland.*

Publications de la faculté des sciences de l'université Masaryk. See **Spisy vydávané Přírodovědeckou Fakultou Masarykovy University**

***Publications from the Jefferson Medical College and Hospital.** Discontinued in 1915.

Public Health Journal. *m* **17.** $2($ 20)*d*, $3*f*. *York Publishing Co, Ltd, 40 Elm St, Toronto, Ontario, Canada.*

Public Works. (A combination of "Municipal Journal" and "Contracting") *m* **57.** $3($ 35)*d*, *U. S Possessions, Cuba* and *Mex, $4f. 243 W. 39th St, New York City.*

Pulp and **Paper Magazine of Canada.** *w* **24.** $5($.15)*d*, *U. S.* and *British Empire*, $5($ 15) plus postage *f Industrial and Educational Publishing Co Ltd., Garden City Press, Gardenvale, P. Q, Canada.*

Quarterly Journal of Experimental Physiology. *q* **16.** *Charles Griffin and Co, Ltd., 42 Drury Lane, London, W. C. 2, Eng.*

Quarterly Journal of Medicine, The. *q* **19**(74). 35s(10s6d)*d*. *Humphrey Milford, Amen House, London, E. C 4, Eng*

***Quarterly Journal of the Chemical Society (London).** *London.* 1847–61. Continuation of **Memoirs** and **Proceedings of the Chemical Society** of London. Continued as **Journal of the Chemical Society** (London)

Quarterly Journal of the Geological Society, The *q* **82**(325) 30s(7s6d). *Geological Society of London, London, Eng*

Quarterly Journal of the Indian Chemical Society. *q* **3.** Rs16(Rs4)*d*. *Secy, Indian Chemical Society, 92 Upper Circular Road, Calcutta, India.*

Quarterly of the Colorado School of Mines. *q* **21.** *The Colorado School of Mines, Golden, Colo.*

Quarterly of the National Fire Protection Association 4 times a year. **19**(3) *National Fire Protection Assocn., 40 Central St, Boston, Mass.*

Quarterly Review of Biology, The *q* **1.** $5*d*, $5 50 *countries outside the Postal Union. Williams and Wilkins Co, Mt. Royal and Guilford Aves, Baltimore, Md*

Queensland Government Mining Journal, The. *m* **27**(308). 7s(6d)*d*, 10s*f*, 8s *Brit Empire* and *U. S. Dept. of Mines, Govt Insurance Bldg, George St, Brisbane, Queensland, Australia.*

Quimica e industria. *m* **3**(24). Pesetas15 (Pesetas1 50)*d* and *Latin America*, Pesetas 25*f*. *Rambla de Cataluña 125, Barcelona, Spain*

***Raccolta fisico-chimica italiana.** *Venice.* 1846–48. Followed by **Annali di fisica,** dell'Abbate F. C Zantedeschi

Radiology. *m* 2 vols. **6.** $5($.60)*d*. *Radiological Society of North America, Guardian Life Bldg, St Paul, Minn*

***Radium.** Discontinued in 1925

***Radium, Le.** Combined in 1920 with **Journal de physique,** théorique et appliquée to form **Journal de physique et le radium.**

***Railroad Red Book,** The. Discontinued in 1925.

Railway Age *w* 2 vols **80.** $6($ 25)*d*, *Can* and *Mex*, $8*f*. *Simmons-Boardman Publishing Co, 30 Church St, New York City*

***Railway Age Gazette.** Combined with and continued under the name of **Railway Age.**

Railway Engineering and Maintenance. *m* **22.** $2($.35)*d*, $3*f*. *Simmons-Boardman Publishing Co, 608 S. Dearborn St, Chicago, Ill.*

***Railway Maintenance Engineer.** Name changed in 1923 to **Railway Engineering and Maintenance.**

***Railway Review.** Consolidated with **Railway Age,** Jan., 1927.

Rapport annuel de l'institut des recherches agronomiques de l'état à Sofia (Bulgaria). *a* **1924**(published 1925). *Station agronomique de l'état, Sofia, Bulgaria.*

***Rapport annuel sur les progrès de la chimie,** présenté à l'académie royale des sciences de Stockholm. *Paris.* 1845–46. Continuation of **Rapport annuel sur les progrès des sciences physiques et chimiques** présenté à l'académie royale des sciences de Stockholm.

***Rapport annuel sur les progrès des sciences physiques et chimiques** présenté à l'académie royale des sciences de Stockholm. *Paris.* 1841–44. Continued as **Rapport annuel sur les progrès de la chimie,** présenté à l'académie royale des sciences de Stockholm.

Rassegna di clinica, terapia e scienze affini, La. *bm* **25.** *Istituto nazionale medico farmacologico, "Serono," Via Casilina 73, Rome, Italy*

Rassegna internazionale di clinica e terapia. *m* **7.** L30(L4)*d*, L50*f* *4 Via Gallupp1, Naples (10), Italy*

Rassegna mineraria, metallurgica e chimica *m* 2 vols. **64**(32nd yr.). L40(L4)*d*, L50*f* *Casella Postale 447, Rome, Italy.*

***Raw Material.** Ceased publication in 1923 and merged in **Electrical Record.**

Rayon. *sm* **2.** $3*d*, $6*f*. *The Rayon Publishing Corp., 154 Nassau St., New York City*

Rayon Journal, The. *m* **1.** $3*d*, $4*f*, $3 50 *Can The Textile Reporting Corp., 267 5th Ave., New York City.*

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***Recherches physico-chimiques** *Amsterdam.* 1792–94.

Records of the Geological Survey of India. 4 parts a year. **58.** Rs11. *Geological Survey of India, Calcutta, India*

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Recueil de la société des chimistes russes à Brno. (Printed in Russian and Bohemian.) **No. 1(1925)** *Spolek ruských chemiků, Chemicko-technologické ùstavy České vysoké školy technické-Brno, Moravia, Czechoslovakia.*

***Recueil des mémoires les plus intéressants de chimie et d'histoire naturelle contenus dans les actes de l'académie d'Upsal et dans ceux de l'académie royale des sciences de Stockholm.** *Paris.* 1764.

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***Rendiconti della società chimica italiana.**

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Rendiconti reale istituto Lombardo di scienze e lettere. *irr* [2]**58(1925).** L50*d*, L50 plus postage *f* *Ulrico Hoepli, 59–63 Galleria de Cristoforis, Milan, Italy*

Rendiconto dell accademia delle scienze fisiche e matematiche (Classe della società reale di **Napoli**). *irr* [3]**32.** *Tipografia della r. accademia delle scienze fisiche e matematiche, Naples, Italy.*

***Répertoire de chimie.** *Paris.* 1839 Continuation of **Répertoire de chimie scientifique et industrielle**

***Répertoire de chimie, de physique,** et d'**applications aux arts.** *Paris.* 1837. Continued as **Répertoire de chimie scientifique et industrielle**

***Répertoire de chimie, pharmacie, matière pharmaceutique et de chimie industrielle.** *Louvain.* 1828–30. Continued as **Nouvelle répertoire de chimie, pharmacie, matière pharmaceutique et de chimie industrielle.**

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***Répertoire de pharmacie, de chimie,**

de **physique, d'hygiène publique, de la médecine légale** et de **thérapeutique.** *Brussels.* 1842.

***Repertorio italiano di chimica e di farmacia.** *Florence.* 1865

***Repertorium der analytischen Chemie fur Handel, Gewerbe** und **öffentliche Gesundheitspflege.** *Hannover* (later *Hamburg*). 1881–87. Incorporated with Zeitschrift fur die **chemische Industrie** and continued as **Zeitschrift fur angewandte Chemie**

***Repertorium der Chemie und Pharmacie.** *St Petersburg* 1837+.

***Repertorium der neuen Entdeckungen** in der **organischen Chemie** *Leipzig* 1829–33. Continuation of **Repertorium der organischen Chemie.**

***Repertorium der neuen Entdeckungen in der unorganischen Chemie** *Leipzig.* 1826–27.

***Repertorium der organische Chemie (Leipzig).** *Leipzig* 1826–28 Continued as **Repertorium der neuen Entdeckungen in der organischen Chemie**

***Repertorium der Pharmacie** 1815–76

***Repertorium fur Chemie, Pharmacie und Arzneimittelkunde.** *Hildesheim* 1790 (Second edition in 1796) Continuation of **Magazin fur Apotheker, Chemisten und Materialisten.**

***Repertorium fur organische Chemie (Zürich).** *Zurich* 1841–43.

***Repertorium fur Pharmacie und praktische Chemie in Russland** *St. Petersburg.* 1842.

Report of the Aeronautical Research Institute, Tokyo Imperial University (Usually printed in English or German) *irr* **1**(13). Price varies *Director of Kôkû-Kenkyûzyo, Tokyo Imperial University, Hukagawa-ku, Tokyo, Japan*

Report of the Fuel Technology Institute of the Czech Polytechnic High School in Prague. *irr* **2(1922–23)**(issued in 1924).* *Fuel Technology Inst. of the Czech Polytechnic High School, Prague, Czechoslovakia.*

Report on the Operations of the Department of Agriculture, Punjab. *a* Sometimes in 2 pts Price varies. *High Commissioner for India, 42 Grosvenor Gardens, London, S W, Eng*

Reports of His Majesty's Inspectors of Explosives. *irr* Price varies. *H M. Stationery Office, 28 Abingdon St, London, S W 1, Eng*

Reports of the Chemical Laboratory of the American Medical Association, Annual. *a* **17–18(1924–25).** ($ 75)*d* *American Medical Assocn., 535 N. Dearborn St., Chicago, Ill.*

Reports of the Imperial Industrial Research Institute, Osaka, Japan. (Printed in Japanese) *irr* **5**(14)**(1925).** *Imperial Industrial Research Institute, Dept of Commerce and Industry, Osaka, Japan*

Reports of the Netherlands-Indian Civil Medical Service. See **Mededeelingen van den Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indië; Mededeelingen van den Dienst der Volksgezondheid in Nederlandsch-Indië.**

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Research Department, Woolwich, Reports *irr* **No. 65(1925).** *His Majesty's Stationery Office, Adastral House, Kingsway, London, W. C. 2, Eng.*

Researches of the Electro-Technical Laboratory, Ministry of Communications, Tokyo, Japan. *irr* **No. 164.** Also Circulars *Publishing Dept. of Kosei-kwai, 1 Ôtemachi, Kojimachi-ku, Tokyo, Japan.*

***Review of American Chemical Research.** Abstracts published in **Technology Quarterly,** 1895–1901, and in **Journal of the American Chemical Society,** 1897–1906.

Review of Applied Entomology. Series **A.** Agricultural *m* **14.** 12s(1s4d), Series **B.** Medical and Veterinary. *m* **14.** 6s(8d). *Asst. Director, Imperial Bureau of Entomology, 41 Queen's Gate, London, S. W. 7, Eng.*

***Revista agricola (Mexico),** La. Ceased publication in 1922.

Revista brasileira de medicina e pharmacia. *m* **2.** 20$(2$)*d*, 25$(3$)*f*. *Granado & Cia, Rua 1° de Marco 14, Caixa Postal 1252, Rio de Janeiro, Brazil*

Revista de agricultura de Puerto Rico. *m* 2 vols **16.** $1 50. *El departamento de agricultura y trabajo, San Juan, P. R.*

Revista de chimica e pharmacia militar. *m* **2**(10) 10$(1$)*d*. *Rua Evaristo da Veiga 95, Rio de Janeiro, Brazil.*

Revista de chimica pura e applicada. *m* [3]**1(1924).** *Rua Cândido dos Reis 47 a 49, Pôrto, Portugal.*

Revista de higiene y sanidad pecuarias (Madrid). *m* **16.** Pesetas 20*d*. *Cava Alta 17,2°, Madrid, Spain.*

Revista de la asociación rural del Uruguay. *m* **55.** $15($1 00)*d*. *Calle Uruguay, núm. 864, Montevideo, Uruguay.*

Revista de la facultad de ciencias químicas (Universidad nacional de La Plata).

sa **4.** *Facultad de química y farmacia, Calle 1 esq. 47, La Plata, Argentine Republic.*

Revista de la sociedad cubana de ingenieros. *bm* **18.** $2($.50). *Domicilio social, Avenida de Belgica No. 4, Havana, Cuba.*

***Revista del instituto bacteriologica** Apparently discontinued.

Revista industrial y agricola de Tucumán. About *bm* **16**(7 and 8). Gratis in the province of Tucumán. 12m/*nf*. *Estación experimental agricola, Casilla de Correo 71, Tucumán, Argentine Republic.*

Revista minera, metalurgica y de ingenieria. 4 nos. a month. **77**(3006). *Villalar 3, Bajo, Madrid, Spain.*

***Revista quimico-farmacéutica de Madrid.** *Madrid.* 1851.

Revista sud-americana de endocrinología, inmunologia, quimioterapia. *m* **9.** $5m/*nd*, $8m/*nf*. *Calle Rivadavia 1745, Plaza Congresa, Buenos Aires, Argentine Republic.*

Revue agricole de l'Île Maurice, La. *bm* **No. 25.** Rs12*d*. *T. Esclapon, 23 rue Sir William Newton, Port-Louis, Mauritius*

Revue de botanique appliquée et d'agriculture coloniale. *m* **5**(41)(**1925**) F40*d*, F50*f*. *Laboratoire d'agronomie coloniale, 57 rue Cuvier, Paris, France.*

***Revue de chimie analytique.** *Paris.* 1893+.

***Revue de chimie appliquée.**

***Revue de chimie industrielle, La.** Name changed in 1927 to **Revue de chimie industrielle et le moniteur scientifique** Quesneville réunis.

Revue de chimie industrielle et le moniteur scientifique Quesneville réunis. *m* **35** (409). F45(F5)*d* and *colonies*, F50*f* *Gauthier-Villars et Cie, 55 quai des Grands-Augustins, Paris* (*6e*), *France.*

Revue de géologie et des sciences connexes. About *m* **6**(**1925**) F55*d*. *G Tibaux, 35 rue des Armuriers, Liége, Belgium*

Revue de la parfumerie *m* **6**(56). F20-(F2)*d*, F30 or F35(F3 or F4)*f*. *9 rue du Faubourg-Montmartre, Paris* (*9e*), *France.*

***Revue de la société de l'industrie minérale.** Name changed to **Revue de l'industrie minérale.**

Revue d'électrochimie et d'électrométallurgie *m* **19**(127)(**1925**). F40(F4) *Paris*, F43 *France and Colonies*, F50*f*. *1 Blvd. St-Germain, Paris* (*5e*), *France.*

Revue de l'industrie minérale. *sm* **No. 121.** F90*d*, F100*f*. *Comité central des houillères de France, 35 rue St-Dominique, Paris, France.*

Revue de médecine. About *m* **42**(**1925**). *Librairie Félix Alcan, 108 Blvd. St-Germain, Paris* (*6e*), *France.*

Revue de métallurgie *m* **23.** $8($.70) *U S. 5 Cité Pigalle, Paris* (*9e*), *France*

***Revue de physique et de chimie et de leurs applications industrielles.** *Paris.* 1896+.

***Revue des industries chimiques et agricoles** *Paris.* 1878–91+

***Revue des industries et des sciences chimiques et agricoles.** *Paris* 1873–82

Revue des instituts de recherches agronomique en Bulgarie. *irr* **3**(**1925**) *Station agronomique de l'état, Sofia, Bulgaria.*

Revue des matériaux de construction et de travaux publics, La *m* **No. 196.** F25(F3)*d*. *148 Blvd Magenta, Paris* (*10e*), *France.*

Revue des produits chimiques, La. *sm* **29.** F48(F3 plus postage)*d*, *French colonies* and *Sarre*, F66 *Belgium* and *Luxemburg*, F90 *other countries in Postal Union. 54 rue de Turbigo, Paris* (*3e*), *France.*

Revue de viticulture *w* 2 vols. **64**(1645) F40(F1)*d*, F50*f*. *35 Blvd St Michel, Paris, France.*

***Revue d'hygiène** Name changed in 1927 to **Revue d'hygiène et de médecine préventive.**

***Revue d'hygiène et de médecine infantile** et annales de la polyclinique H. de Rothschild.

Revue d'hygiène et de médecine préventive. *m* **49**(**1927**) F60(F6)*d*, $2.80 *U. S. Masson et Cie, 120 Blvd. St.-Germain, Paris* (*6e*), *France.*

***Revue d'hygiène et de police sanitaire.** Name changed to **Revue d'hygiène**

***Revue électrique, La.** Combined in 1917 with **Lumière électrique** to form **Revue générale de l'électricité.**

Revue générale de botanique. *m* **38**(445) F40*d* and *Algeria*, F45*f*. *L'administrateur de la librairie générale de l'enseignement, 4 rue Dante, Paris* (*5e*), *France.*

***Revue générale de chimie pure et appliquée.**

Revue générale de l'industrie textile. Published as part of **Revue générale des matières colorantes, de la teinture, de l'impression, du blanchiment et des apprêts**

Revue générale des colloïdes et de leurs applications industrielles. *m* **4**(27). F40*d*, $3 50 or $4*f*. *9 rue Coëtlogon, Paris* (*6e*), *France.*

Revue générale des matières colorantes, de la teinture, de l'impression, du blanchi-

ment et des apprêts *m* **30**(348). F70 (F8 75)*d*, $5*f*. *Bureaux de la revue, rue de Rennes 123, Paris (6e), France*

***Revue générale des matières colorantes**, dela teinture, de l'impression et des apprêts Name changed in 1924 to **Revue générale des matières colorantes**, de la teinture, de l'impression, du blanchiment et des apprêts.

Revue générale des matières plastiques. *m* **2.** F75*d*, $5 or $6*f* *61 Avenue Jean-Jaurès, Paris, France*

Revue générale des sciences pures et appliquées. *sm* **37.** F48(F2 25)*d* and *colonies*, F52 or F57*f* *Gaston Doin et Cie, 8 Place de l'Odéon, Paris (6e), France*

Revue générale de teinture, impression, blanchiment, apprêt. Also known as **Tiba.**

Revue générale du caoutchouc. *m* except July and Aug. **2**(18). F50(F7)*d*, F80*f* *18 rue Duphot, Paris (1e), France*

***Revue hebdomadaire de chimie scientifique et industrielle** *Paris* 1869–75

Revue industrielle, La *m* [N S] **56**(50) F40(F5)*d*, 12s(1s3d)*f* *57 rue Pierre-Charron, Paris (8e), France.*

***Revue internationale de pharmacie**

Revue internationale de renseignements agricoles. French edition of **International Review of the Science and Practice of Agriculture**

Revue mensuelle du **blanchissage,** du **blanchiment** et des apprêts. Published as part of **Revue générale des matières colorantes**, de la teinture, de l'impression, du blanchiment et des apprêts

Revue pétrolifère, La *w* F150*d* and *colonies*, £2*f*. *19 rue de Marignan, Paris (8e), France.*

Revue pratique de biologie appliquée à la clinique et à la thérapeutique. *m* **19**(12) *H Carrion et Cie, 54 Faubourg St. Honoré, Paris, France.*

***Revue scientifique.** Name changed in 1925 to **Revue scientifique illustrée.**

***Revue scientifique et industrielle des faits les plus utiles et les plus curieux observés dans la médecine, l'hygiène, la physique, la chimie, la pharmacie, l'économie rurale et domestique, l'industrie nationale et étrangère. *Paris.* 1840–52. Followed by **Moniteur scientifique du chimiste et du manufacturier, Le.**

Revue scientifique illustrée *sm* **64.** F45 (F2.50)*d*, F60 or F70(F3)*f*. *286 Blvd. St.-Germain, Paris (7e), France.*

Revue universelle des mines. *sm* 4 vols. [7]**9.** F85(F5)*d*, F100*f* *Comité scientifique de l'association des ingénieurs, 16 quai des États-Unis, Liége, Belgium.*

Rhodesia Agricultural Journal. *m* **23.** 5s*d* *The Dept. of Agriculture, Salisbury, Rhodesia.*

***Riforma chimica, La.** *Naples.* 1897+

Rikwagaku Kenkyujo Iho. See **Bulletin of the Institute of Physical and Chemical Research (Tokyo).**

***Rivista di chimica, medica e farmaceutica, tossicologia, farmacologia e terapia.** *Torino.* 1883–85 Combined with **Annali di chimica applicata alla medicina,** cioè, alla **farmacia,** alla **tossicologia,** all'igiene, alla **fisiologia,** alla **patologia** ed alla **terapeutica** and continued as **Annali di chimica medico-farmaceutica e di farmacologia.**

Rivista italiana delle essenze e profumi. *m* **8.** L25(L3 90)*d*, L40(L5)*f* *E Fenaroli, Via M D'Oggiono, Milan (15) Italy*

***Rivista tecnica d'elettricità.** Discontinued at end of 1921

Rivista tecnica delle ferrovie italiane *m* 2 vols **29.** L72(L7 50)*d*, $4 50 (L12 50)*f* *Collegio nazionale degli ingegneri ferroviari italiane, Via delle Coppelle 35, Rome (20), Italy*

Roads and Streets. *m* **65.** $1 50($ 20)*d*, $1 50 plus $ 65 postage *f*. *Engineering and Contracting Publishing Co., 221 E 20th St, Chicago, Ill*

Rock Products with which is incorporated Cement and Engineering News *bw* **29.** $2($ 25)*d* and *U S Possessions*, $3*f* and *Can Tradepress Publishing Corp, 542 S Dearborn St, Chicago, Ill*

Roczniki Chemji *irr* **6.** *Redakcja Roczników Chemji, Prof Dr W Swientoslawski, Politechnika Koszykowa 75, Warsaw, Republic of Poland*

Roure-Bertrand fils, Scientific and Industrial Bulletin *sa* [4](3)(**1921**) Gratis *Roure-Bertrand fils, Inc, 461–3 4th Ave., New York City*

Rubber Age (London). *m* **6**(11) 10s (1s)*d*, $3*f* *43 Essex St, Strand, London, W. C. 2, Eng.*

Rubber Age (New York) *sm* 2 vols. **18**(7). $2($.10)*d*, $3*f*, $2 50 *Can Palmerton Publishing Co, Inc, 250 W. 57th St, New York City*

***Rubber Age and Tire News.** Name changed to **Rubber Age, The (New York)**

***Rundschau für die Interessen der Pharmacie, Chemie und der verwandten Fächer.** *Leitmeritz* 1875–85. *Prague.* 1886–92+

***Russisches Jahrbuch der Pharmacie.** *Riga* 1803–08. Continued as **Russisches Jahrbuch fur die Chemie und Pharmacie.**

***Russisches Jahrbuch fur die Chemie und Pharmacie.** *Riga* 1809–10. Continuation of **Russisches Jahrbuch der Pharmacie**

***Russisches Journal fur experimentelle Landwirtschaft.** Same as **Zhurnal Opuitnoi Agronomii.**

Safety in Mines Research Board (London) Papers, etc *irr* **No. 17.** Price varies. *H. M. Stationery Office, Adastral House, Kingsway, London, W C. 2, Eng.*

Salt Lake Mining Review, The *sm* **27**(19). $2.50($ 15)*d*, $3 50*f*. *Walker Bank Bldg., Salt Lake City, Utah.*

***Sanitary Record** and Municipal Engineering. Name changed to **Municipal Engineering** and the **Sanitary Record.**

***Savonnerie,** La. *Zurich* 1887–92.

Sbornik Obshchestva Russkikh Khimikov v Brno. See **Recueil** de la **société** des **chimistes russes à Brno.**

***Scheikundige Bibliotheek.** *Delft* 1790–98. Continued as **Nieuwe Scheikundige Bibliotheek.**

***Scheikundige Bijdragen.** *Amsterdam* 1867

Schimmel & Co., Annual Report on Essential Oils, Synthetic Perfumes, etc *a* Gratis. *Fritzsche Brothers, Inc., 82–84 Beekman St., New York City.*

Schnurpfeil's Review for Glass Works. *m* **10**(106). Kč200*d*, $10 *U. S. H. Schnurpfeil, Sprudelstr 40, Carlsbad, Czechoslovakia*

School of Mines and Metallurgy, University of Missouri. Bulletin. *irr* **18; Technical Series. 9**(2). Free to residents of Missouri *Director, Mining Expt Station, Rolla, Mo*

***School of Mines Quarterly**

Schweizer Archiv fur Tierheilkunde *m* **68.** F30 30(F3)*d*, F33*f*. *Art Institut Orell Fussli, Zurich, 3, Switz.*

Schweizerische Apotheker Zeitung (Journal suisse de pharmacie, Giornale svizzero di farmacia). *w* **64.** F30*d* and *f*, including scientific supplement, **Pharmaceutica Acta Helvetiae** (Reserve right to make exceptions.) *Schweizerische Apotheker Verein, Peterstr. 10, Zurich, Switzerland.*

***Schweizerische Chemiker Zeitung** (Wochenschrift fur angewandte Chemie, Industrie- und Handelsblatt). Name changed in 1923 to **Technik u. Industrie** und **Schweizer Chemiker-Zeitung.**

***Schweizerische elektrotechnische Zeitschrift.** Discontinued in 1919.

Schweizerische Milchzeitung. *sw* **52.** F10*d*, F18*f*. *Kühn & Co., Schaffhausen, Switzerland.*

Schweizerische mineralogische und petrographische Mitteilungen. *sa* **5(1925).** F25 (F13 50)*d*. *Gebr. Leemann and Co., A.-G., Zurich, Switzerland*

Schweizerische Wochenschrift fur Chemie und Pharmacie. See **Schweizerische Apotheker-Zeitung.**

Science. *w* 2 vols. [N S.]**63**(1618). $6 ($ 15) *The Science Press, Grand Central Terminal, New York City.*

Science Abstracts. *m* **29**(337) Section **A.** Physics Section **B.** Electrical Engineering. Each section 30s(3s) or $7.50($.75). Both sections for 50s or $12 50. *E & F. N. Spon, Ltd., 57 Haymarket, London, S. W. 1, Eng.* or *Spon & Chamberlain, 120 Liberty St., New York City.*

***Science and Industry (Australia).** Discontinued in 1920

Science (China). *m* **11.** $2 50Mex.($ 2 5 Mex)*d* *The Science Society of China, La Universitato Utopia, Shanghai, China*

Science du sol, La *irr* **4(1925)** *Librairie des établissements Georges Truffaut, 90 bis, ave de Paris, Versailles, France*

Science et industrie *irr* **9**(150). F75 (F15)*d*, F150*f* *Ch J. Heudebot, Directeur général, 22 ave Montaigne, Paris, France.*

Science Progress. *q* **20**(79) 31s2d(7s6d, by post 7s9½d)*d* *John Murray, 50 Albemarle St., London, W 1, Eng.*

Science Reports of the Tôhoku Imperial University, The First Series. Mathematics, Physics, Chemistry (Printed in English or German) *irr* **15.** Third Series. Mineralogy, Petrology, Economic Geology. *irr* **3.** Fourth Series. Biology. *Maruzen Co., Ltd., Tokyo, Japan*

Science, technique et industries photographiques. 1921–22. Supplement to **Revue française de photographie.** Separate journal in 1923 Name changed to **Science et industries photographiques** in 1924.

Scientia. *m* 2 vols. [2]**39** (CLXV–1). L130*d* and *colonies*, F150*France and colonies*, Gm30 *Germany*, *40s Brit Empire*, $10*U. S.*, L150 *other countries Via A. Bertani 14, Milan (26), Italy.*

Scientific Agriculture. *m* **6**(5). $2($ 25)*d* and *U. S.*, $2.50*f*. *Canadian Society of Technical Agriculturists, P. O Box 625, Ottawa, Ont., Can.*

Scientific Lubrication. Apparently discontinued in 1922.

Scientific Monthly, The. *m* 2 vols **22.** $5($ 50). *Science Press, Grand Central Terminal, New York City*

Scientific Papers of the **Institute of Physical** and **Chemical Research (Tokyo).** *irr* Price varies. *Iwanami Shoten, 16 Minamijinbocho, Kanda, Tokyo, Japan.*

Scientific Proceedings of the **Royal Dublin Society,** The. *irr* **18**(10 to 16). Price varies *Ballsbridge, Dublin, Ireland* or *Williams & Norgate, 14 Henrietta St, Covent Garden, London, W C 2, Eng*

Scienza per **tutti,** La. *sm* **33.** L56 (L2.50)*d*, L66(L4)*f* *Casa editrice Sonzogno, Via Pasquirolo 14, Milan (4), Italy.*

Scottish Journal of **Agriculture,** The *q* **9.** 4s6d(1s2d)*d*. *H M Stationery Office, 120 George St, Edinburgh, Scotland*

Scripta Universitatis atque **Bibliothecae Hierosolymitanarum.** Biologia et chimia Mathematica et physica. (Articles are published in English, French, German or Italian as well as in Hebrew) *irr* **1(1923).** *Dr. Immanuel Velikovsky, c/o Jewish University Library, Jerusalem., Palestine.*

***Seifenfabrikant,** Der. Name changed in 1920 to **Zeitschrift** der **deutschen Öl-** und **Fett-Industrie**

Seifensieder-Zeitung und Rundschau uber die Harz-, Fett- und Ölindustrie mit dem Beiblatt: Der Chem.-techn Fabrikant. *w* **53.** Rm10(Rm1)*d*; Rm12(Rm1 20)*f* per quarter. *Verlag für chemische Industrie, H. Ziolkowsky, G m. b. H, Augsburg, Ger.*

Semana medica, La **(Buenos Aires).** *w* **33**(Pt. I). $5gold($.30)*f*. *Emilio Spinelli, 2254 Córdoba, Buenos Aires, Argentine Republic.*

***Shale Review,** The. Merged with The **Mountain States Mineral Age** in 1922.

Shoe & Leather Reporter. *w* 4 vols. **161.** $6d, $8*f*, $7 *Can Shoe and Leather Reporter Co., 166 Essex St., Boston, Mass*

Shokubutsu Kwagaku Zasshi. See **Acta Phytochimica.**

Siemens-Zeitschrift. *m* **6.** Gm3*d*, Gm4*f* per quarter *Ssemens-Schuckertwerke, Berlin-Ssemensstadt, Ger.*

Silk Journal, The *m* 2 vols. **2**(20). 9s (6d)*d*, 12s*f*. *John Heywood, Ltd., 121 Deansgate, Manchester, Eng.*

Silliman's Journal. See **American** Journal of **Science,** The.

***Simmons' Spice Mill** Name changed to The **Spice Mill.**

Sitzungsberichte, Akademie der **Wissenschaften in Wien,** Mathematisch-naturwissenschaftliche Klasse. **Abteilung I,** Mineralogie, Krystallographie, Botanik, Physiologie der Pflanzen, Zoologie, Paläontologie, Geologie, physische Geographie und Reisen. *irr* **134(1925); IIa,** Mathematik, Astronomie, Physik, Meteorologie und Mechanik. *irr* **132**(5/6)**(1924). IIb,** Chemie Contains same articles as those published in **Monatshefte** fur Chemie und verwandte Teile anderer Wissenschaften. **III,** Anatomie und Physiologie des Menschen und der Tiere sowie theoretische Medizin. *irr* **130–131(1923).** *Akademie der Wissenschaften in Wien, Universitätsplatz 2, Wien, I, Austria.*

***Sitzungsberichte der königlich preussischen Akademie der Wissenschaften.** Name changed to **Sitzungsberichte** der **preussischen Akademie** der **Wissenschaften.**

Sitzungsberichte der **mathematisch-naturwissenschaftlichen Abteilung** der **bayerischen Akademie** der **Wissenschaften** zu **München.** *irr* About 2 nos. a year. *Verlag der bayerischen Akademie der Wissenschaften in Kommission des G Franz'schen Verlags (J. Roth), Munich, Ger.*

***Sitzungsberichte** der **mathematisch-physikalischen Klasse** der **bayerischen Akademie** der **Wissenschaften** zu **München.** Name changed in 1924 to **Sitzungsberichte** der **mathematisch-naturwissenschaftlichen Abteilung** der **bayerischen Akademie** der **Wissenschaften** zu **München.**

***Sitzungsberichte** der **mathematisch-physikalischen Klasse** der K. B. **Akademie** der **Wissenschaften** zu **München.** Name changed to **Sitzungsberichte** der **mathematisch-physikalischen Klasse** der **bayerischen Akademie** der **Wissenschaften** zu **München.**

Sitzungsberichte der **Naturforscher-Gesellschaft** bei der **Universitat Tartu.** *irr* **33.** *The Naturalists' Society, Acta 48, Tartu, Esthonia.*

Sitzungsberichte der **preussischen Akademie** der **Wissenschaften.** Physikalisch-mathematische Klasse. *irr* Rm20*d*. *Walter de Gruyter & Co., Berlin, Ger.*

Sitzungsberichte und **Abhandlungen** der **naturforschenden Gesellschaft** zu **Rostock.** Apparently discontinued.

***Skandinaviens kemisk-tekniske Centralblad** for Danmark, Sverige, Norge og Finland. *Copenhagen.* 1882–91.

Skandinavisches Archiv für **Physiologie.**

irr About 2 vols. **47**(3–4–5). Rm20*d*, $3 *U. S.* per vol. *Walter de Gruyter & Co., Berlin, Ger.*, or *Westermann and Co., New York City.*

Skrifter Utgit av det **Norske Videnskaps-Akademi i Oslo I. Matematisk-Naturvidenskapelig Klasse.** (Printed in German.) *a Norske Videnskaps-Akademi i Oslo, Oslo, Norway*

Smithsonian Institution Publications. Contributions to Knowledge and **Miscellaneous Collections.** *irr* Vols. not sold, separates at varying prices. Free to public libraries, **Reports.** *a* Limited no. of vols. and separates distributed free to all applicants Vols. only for sale at office of the *Supt of Documents, Govt Printing Office, Washington, D. C.*; **Special Publications.** *irr* Prices vary. *Smithsonian Institution, Washington, D C.*

Soap. *m* **1**(5). $3($ 25). *MacNair-Dorland Co, Inc., 136 Liberty St, New York City.*

Societas scientiarum fennica, commentationes biologicae. 2(1925). *Societas Scientiarum Fennica, Helsingfors, Finland.*

Societas scientiarum fennica, commentationes physico-mathematicae. 2(1924) *Societas Scientiarum Fennica, Helsingfors, Finland.*

Soil Science. *m* 2 vols. **21.** $10*d*, *Cuba* and *Mex*, $10.50*f* per vol. *Williams & Wilkins Co., Mt. Royal and Guilford Aves., Baltimore, Md*

South African Association for the **Advancement** of **Science** See The **South African** Journal of **Science** comprising the Report of the South African Association for the Advancement of Science.

***South African** Journal of **Industries** The **Official Labour Gazette** of the **Union** of **South Africa** was incorporated with this journal in 1925 and the title was changed to The **South African** Journal of **Industries** and Labour Gazette.

***South African** Journal of **Industries** and Labour Gazette, The. Discontinued in 1925

South African Journal of **Science**, The, comprising the Report of the South African Association for the Advancement of Science. *irr* **22(1925).** £1 10*sd. Assistant General Secy., P. O. Box 6894, Johannesburg, S. Africa.*

South African Mining and **Engineering Journal.** *w* **36**(Pt. II)(1788). £1 10s (6d)*d*, £2(7½d)*f*. *Johannesburg, S. Africa.*

Sperimentale, Lo. *bm* **79(1925).** L50*d*, L100*f*. *Via Alfani 33, Florence 15, Italy.*

Spisy vydávané přírodovedeckou Fakultou Masarykovy University. *irr Faculté des sciences de l'université Masaryk, Kounicova 63, Brno, Moravia, Czechoslovakia.*

Sprechsaal. (Zeitschrift fur die keramischen, Glas- und verwandten Industrien.) *w* **59.** Gm 3.40*d* per month. *Muller & Schmidt, Coburg, Ger.*

Stahl und Eisen. *w* **46.** M40(M1 50)*d*, M50*f*, M45 *Austria* and *Luxemburg. Verlag Stahleisen, m. b. H., Schliessfach 664, Düsseldorf, Ger*

Stain Technology. *q* **1.** $1 50($ 50)*d*. *H. J Conn, New York Agr Expt. Sta, Geneva, N. Y.*

Stazioni sperimentali agrarie italiane, Le. *irr* **58**(1 to 6)**(1925)** L30*d*, L40*f Dr. G LoPriore, R stazione agraria di Modena, Modena, Italy.*

Structural Materials Research Laboratory, Lewis Institute, Bulletins and **Circulars** *irr Structural Materials Research Lab, Lewis Institute, Chicago, Ill.*

Sucrerie belge, La *sm* **45**(9) F25(F2)*d*, F35*f M M Nérincx, 14 rue des Petits-Carmes, Brussels, Belgium.*

Süddeutsche Apotheker-Zeitung. Several nos. a week **65(1925)** Gm2(Gm 35)*d* per month. *Stähle und Friedel, Tübinger Str. 53, Stuttgart, Ger.*

Sugar. *m* **28.** $2($ 25)*d*, *U. S. Possessions and wherever American domestic postage rates apply*, $3*f* Three-year rate: $5*d*, $7.50*f*. *Sugar Publishing Corporations, 153 Waverly Pl., New York City.*

***Sugar Beet,** The. *Philadelphia.* 1880–91+.

***Sugar Cane,** The. *Manchester.* 1869–90+.

***Sugar** Central and Planters **News.** Name changed in 1927 to **Sugar News.**

Sugar News. *m* **8(1927).** P5 or $2.50*d* and *U. S.*, P6 or $3*f The Sugar News Co., Cosmopolitan Bldg., Manila, P. I.*

Suomalaisen Tiedeakatemian Toimituksia. See **Annales academiae scientiarum fennicae.**

Surgery, Gynecology and **Obstetrics.** *m* 2 vols. **42.** $12($1.25)*d*, $14*f*. *The Surgical Publishing Co. of Chicago, 54 E. Erie St., Chicago, Ill.*

Surveyor and Municipal and County Engineer, The. *w* 2 vols. **69**(1772). 28s (6d)*d*, 32s*f*. *St. Brides' Press, Ltd., 14 Bride-Lane, Fleet St., London, E. C. 4, Eng.*

Svensk Farmaceutisk Tidskrift. 3 times

a month. **30.** K25. *Elias Ekblom, Vallingatan 26[II] tr., Stockholm, Sweden.*

Svensk Kemisk Tidskrift. *m* **38.** *Kemistsamfundet, Birgerjarlsgatan 99 B, Stockholm, Sweden.*

Svensk Pappers-Tidning. *sm* **29.** *Svenska Pappersbruksföreningen, Hovslagaregatan, Stockholm, Sweden*

Tartu Ulikooli juures oleva **Loodusuurijate Seltsi aruanded** toimetanud H. G. Perlitz. See **Sitz**ungsberichte der **Naturforscher-Gesellschaft** bei der **Universität Tartu.**

***Taschenbuch** fur die **ges**amte **Mineral**ogie. 1807–. Continued as **Z**eitschrift fur **Mineral**ogie.

Tea and **Coffee Trade** Journal, The. *m* 2 vols **50.** $3($ 35)*d*, $3 50*f*, $3 25 *Can. 79 Wall St, New York City*

Technical and **Economic Magazine (Russia).** (Printed in Russian.) 12 nos. a yr **6.** *Myasnitzkaya 1, kw. 14, Moscow, Union of the Socialistic Soviet Republics*

Technical Association Papers. Published proceedings of conventions of the Technical Association of the Pulp and Paper Industry. **Paper Trade** Journal is the official organ of this Association.

Technical Book Review Index. *q* **10.** $1*d* *Technology Dept, Carnegie Library of Pittsburgh, Pittsburgh, Pa.*

Technical Journal, The (Australia). Apparently discontinued.

***Technical Review, The.** Discontinued in 1921.

Technik u. **Industrie** und **Schweizer Chemiker-Zeitung.** 24 nos. a year issued in double nos F10(F1)*d* *Rascher & Cie. A. G., Rathausquai 2, Zurich 1, Switz.*

***Technikum** des **Ledermarkt.**

Technik und Wirtschaft. Supplement to **Z**eitschrift des **Ver**eines **deut**scher **Ing**enieure.

Technique moderne, La. *sm* **18.** F110*d*, $5 or $5 75*f* *92 rue Bonaparte, Paris, France.*

Technique sanitaire et **munic**ipale, La. *m* **20(1925).** F40(F3.75)*d*, F45*f* *13 rue de l'Odéon, Paris (6e), France.*

***Technisch-chemisches Jahrbuch.** *Berlin.* 1880–91.

***Technisches Central**blatt. *Halle.* 1884.

***Technology Quarterly.** *Boston.* 1887–1908.

Technology Reports of the Tohoku Imperial University, The. (Printed in English.) *irr* **6.** *Maruzen Co., Ltd., Tokyo, Japan.*

Teer. 3 times a month. **24.** Gm4*d* per quarter. *Wilhelm Knapp, Muhlweg 19, Halle (Salle), Ger.*

Tegel. *m* **16.** K10(K1 50)*d*, K12*f* *Sveriges Tegelindustrie-förening, Kungsgatan 66, Stockholm, Sweden.*

Teinturier pratique, Le Published as part of **Re**vue **gé**nérale des **matières colo**rantes, de la teinture, de l'impression, du blanchiment et des apprêts.

Tekhniko-Ekonomicheskii Vestnik. See **Tech**nical and **Econ**omic **Magazine (Russia).**

Teknisk Tidskrift. 56. Composed of 5 Upplagas. **Upplaga A.** *w* Contains material in Upplagas B, C, D and E issued under one cover with separate pagination. K30*d*, *Denmark, Finland and Norway*, K35*f*; **Upplaga B.** Elektroteknik; **Upplaga C.** Kemi och Bergsvetenskap; **Upplaga D.** Mekanik och Skeppsbyggnadskonst; **Upplaga E.** Vog- och Vattenbyggnadskonst Upplagas B C, D and E each have 12 nos a year and the price of each is K6*d*, *Denmark, Finland* and *Norway*, K7*f* per year *Humlegårdsgatan 29, Stockholm 5, Sweden*

Teknisk Ukeblad. *w* **73.** K20*d*, K24*f* *Akersgaten 7, Oslo, Norway.*

***Tekno-Kemisk** Journal. *Stockholm* 1847–48.

***Testing.** Discontinued in 1924, only 4 nos having been published

Textilberichte uber **Wissen**schaft, **Industrie** und **Handel.** Name changed in 1923 to **Melliands' Textilber**ichte

Textilchemiker und **Colorist,** Der. *m* Supplement to **Deut**sche **Färber-Zeitung.**

Textile American, The *m* 2 vols. **45.** $2($ 20)*d*, $3*f*. and *Can., Textile American Publishing Co., 848 Old South Bldg., Boston, Mass.*

Textile Colorist. *m* **48**(565). $5($ 75)*d*, $6*f*. *Textile Colorist, Inc., Woolworth Bldg., New York City*

***Textile Institute Journal.** Name changed to **Journal of the Textile Institute.**

***Textile Manufacturers' Journal.** Combined in 1915 with **Textile World Record** to form **Textile World Journal.**

Textile Recorder. *m* **44**(513). 24s *Gt. Britain and Ireland*, 30s*f* *John Heywood, Ltd., c/o Textile Recorder, Ridgefield, Manchester, Eng.*

Textile World. *w* 2 vols. **69.** $4*d*, $7*f*, $5 *Can., Mex.*, and *S. America. Bragdon, Lord & Nagle Co., Inc., 334 4th Ave. at 25th St., New York City*

***Textile World Journal.** Name changed in 1921 to **Textile World.**

***Textile World Record.** Combined in 1915

with **Textile Manufacturers' Journal**, to form **Textile World Journal**.

***Therapeutische Halbmonatshefte.** Discontinued in 1921 Merged in **Klinische Wochenschrift.**

***Therapeutische Monatshefte.** Name changed to **Therapeutische Halbmonatshefte.**

Tiba (Revue générale de teinture, impression, blanchiment, apprêt). *m* **4.** F75*d*, $5 or $6*f*. *61 Avenue Jean Jaurès, Paris, France.*

***Tidsskrift for anvendt Chemi, for Fabrikanter, Chemikere, Pharmaceuter og Handlende.** *Copenhagen.* 1869–70

***Tidsskrift for Kemi.** Discontinued in 1920.

***Tidsskrift for Kemi, Farmaci og Terapi.** Name changed in 1918 to **Tidsskrift for Kemi.**

Tidsskrift for Kemi og Bergvesen. 12 nos a year. **6.** K10*d*, K12*f* *Akersgaten 7, Oslo, Norway.*

***Tidsskrift for Physik og Chemi** samt disse **Videnskabers Anvendelse** *Copenhagen.* 1862–70.

***Tijdschrift voor schei- en artsenijhereidkunde.** *Leyden* 1844–45

***Tijdschrift voor vergelijkende Geneeskunde.** Discontinued in 1925 Followed by **Nederlandsch Tijdschrift voor Hygiëne, Microbiologie en Serologie.**

Tôhoku Journal of Experimental Medicine, The (Printed in English, French or German) *irr* **7.** Y7*d*, Y8*f* per vol. *Maruzen & Co., Kokubunmachi, Sendai, Japan*

Tokyo Kwagaku Kwai Shi. See **Journal of the Tokyo Chemical Society.**

Tokyo Teikoku-Daigaku Kôkû-Kenkyûzyo Hôkoku. See **Report of the Aeronautical Research Institute, Tokyo Imperial University**

Tonindustrie-Zeitung. Every 2 or 3 days **50.** Rm2*d* per nonth *Dreysestr 4, Berlin, N W. 21, Ger*

Torreya. *bm* **26.** $1($1.30)*d* and *Can Torrey Botanical Club, 8 W King St., Lancaster, Pa*

Torrey Botanical Club Memoirs *irr* **17(1918).** *Brooklyn Botanic Garden, 1000 Washington Ave, Brooklyn, N. Y.*

Transactions and Proceedings of the New Zealand Institute. *a* **56.** Bulletins are also issued irregularly. *W A. G Skinner, Govt Printing Office, Wellington, New Zealand* or *Wheldon & Wesley, Ltd., 2, 3 & 4 Arthur St., New Oxford St., Strand, London, W.C 2, Eng.*

Transactions and Proceedings of the Royal Society of South Australia. *a* **49 (1925).** *Royal Society of South Australia, Royal Society Rooms, North Terrace, Adelaide, S. Australia.*

Transactions of the Academy of Science of St. Louis. *irr* **25(1924).** *Academy of Science, St Louis, Mo*

***Transactions of the American Ceramic Society.** 1899–1917. Followed by **Journal of the American Ceramic Society.**

Transactions of the American Electrochemical Society *a* **47(1925).** $6.50. *Secy. American Electrochemical Society, Columbia Univ., New York City*

Transactions of the American Foundrymen's Association. *a* **33.** $7. *C E Hoyt, Secy-Treas, 140 S Dearborn St, Chicago, Ill*

Transactions of the American Institute of Chemical Engineers *a* in 2 pts **17 (1925)**(Published in **1926**). $5. *Secy, American Institute of Chemical Engineers, Polytechnic Inst, Brooklyn, N. Y*

Transactions of the American Institute of Electrical Engineers *a* **43(1924).** $5 *33 W. 39th St, New York City*

Transactions of the American Institute of Mining and Metallurgical Engineers 2 or more vols a year. **73.** $5*d*, $5.50*f* *American Institute of Mining and Metallurgical Engineers, 29 West 39th St., New York City.*

Transactions of the American Philosophical Society *irr* [N. S.]**22**(Pt. 5) **(1925)** $5 per vol. *American Philosophical Society, 104 S. 5th St, Philadelphia, Pa*

Transactions of the American Society for Steel Treating. *m* 2 vols. **9.** $10-($1)*d*. *4600 Prospect Ave, Cleveland, Ohio.*

Transactions of the American Society of Civil Engineers *a* **88(1925)** *29 W. 39th St, New York City.*

***Transactions of the American Urological Association** Discontinued as a separate publication in 1921. Now published in **Journal of Urology**

Transactions of the Cambridge Philosophical Society *irr* **23**(8). Price varies. *Cambridge University Press, London, Eng*

Transactions of the Canadian Institute of Mining and Metallurgy and of the Mining Society of Nova Scotia. *a* **27(1925).** *603 Drummond Bldg., Montreal, Can.*

***Transactions of the Canadian Mining Institute, The.** Name hanged in 1920 to **Transactions of the Canadian Institute of Mining and Metallurgy and of the**

Mining Society of Nova Scotia.

Transactions of the Ceramic Society (England). 1 vol. a year. 2 or more pts. **25(1925–26).** 45s per vol. *The Ceramic Society, Stoke-on-Trent, Eng*

Transactions of the College of Physicians of Philadelphia. *a* [3]**47.** Price varies *College of Physicians, 22nd St., above Chestnut St., Philadelphia, Pa.*

Transactions of the Faraday Society *irr* **23(1927).** Price varies *13 South Square, Gray's Inn, London, W. C. 1, Eng.*

Transactions of the Geological Society of South Africa. *a* **29.** £2 2s including Proceedings. *P. O. Box 1071, Johannesburg, S. Africa.*

Transactions of the Highland and Agricultural Society of Scotland. *a* [5]**38.** Free to members. *William Blackwood and Sons, 45 George St., Edinburgh, Scotland.*

Transactions of the Illuminating Engineering Society (New York). *m* except June and Aug. **21.** $7 50 ($1)*d*, $8*f*. *29 W. 39th St, New York City.*

Transactions of the Institute of Economic Mineralogy and Metallurgy (Moscow). *irr* (Printed in Russian, with English summaries) *Scientific-Technical Dept. of the Supreme Council of National Economy, Myasnitzkaya 1, Moscow, Union of the Socialistic Soviet Republics.*

Transactions of the Institute of Economic Mineralogy and Petrography (Moscow). (Printed in Russian, usually with English summaries.) *irr Scientific-Technical Dept. of the Supreme Council of National Economy, Myasnitzkaya 1, Moscow, Union of the Socialistic Soviet Republics.*

Transactions of the Institute of Fertilizers (Moscow). (Printed in Russian, usually with English summaries.) *irr Scientific Technical Dept of the Supreme Council of National Economy, Myasnitzkaya 1, Moscow, Union of the Socialistic Soviet Republics.*

Transactions of the Institute of Marine Engineers. *m* **37.** *The Premises of the Institute of Marine Engineers, Minories Tower Hill, London, E, Eng.*

Transactions of the Institute of Pure Chemical Reagents (Moscow). (Printed in Russian) *irr Scientific-Technical Dept. of the Supreme Council of National Economy, Myasnitzkaya 1, Moscow, Union of the Socialistic Soviet Republics.*

Transactions of the Institution of Engineers and Shipbuilders in Scotland (Inc.). *a* **68(1925).** *39 Elmbank Crescent, Glasgow, Scotland.*

Transactions of the Institution of Engineers, Australia. 7. *Macleay House, 16 College St., Sydney, Australia.*

Transactions of the Institution of Mining Engineers (London). *m* 2 vols. **70(4)** £1 16s*d*. *Cleveland House, 225 City Road, London, E C. 1, Eng.*

Transactions of the Institution of the Rubber Industry. *bm* **1**(5). £1 1s (4s6d) to individuals. *Institution of the Rubber Industry, Faraday House, 10 Charing Cross Rd, London, W. C. 2, Eng.*

Transactions of the Karpov Institute for Chemistry. (Printed in Russian.) *irr Scientific-Technical Dept of the Supreme Council of National Economy, Myasnitzkaya 1, Moscow, Union of the Socialistic Soviet Republics.*

Transactions of the Manchester Association of Engineers. *a* **1924.** *Herald and Walker, Ltd., Pool Fold Chambers, Chapel Walks, Manchester, Eng.*

Transactions of the Maryland Academy of Sciences *irr* **4(1921).** *Maryland Academy of Sciences, 105 W. Franklin St, Baltimore, Md.*

Transactions of the Mining and Geological Institute of India. *q* **20**(Pt. I)**(1925).** Rs15*d* per vol. of 4 pts. Rs4 per pt *The Baptist Mission Press, Calcutta, India*

***Transactions of the Newcastle-upon-Tyne Chemical Society.** *Newcastle.* 1868–82.

Transactions of the North of England Institute of Mining and Mechanical Engineers. Published in the **Transactions of the Institution of Mining Engineers (London).**

Transactions of the Optical Society (London). About 5 nos a year. **27(1925–26).** 50s(10s)*d*. *The Optical Society, Imperial College of Science and Technology, South Kensington, London, S. W. 7, Eng.*

Transactions of the R. Institute of Applied Chemistry (Moscow). (Printed in Russian) *irr Scientific-Technical Dept. of the Supreme Council of National Economy, Myasnitzkaya 1, Moscow, Union of the Socialistic Soviet Republics.*

Transactions of the Royal Canadian Institute. *irr* One or two parts a year. **15**(Pt. 2)(34). $2*d* and *f*. *Royal Canadian Institute, 198 College St., Toronto, Can.*

Transactions of the Royal Society, Edinburgh. *irr* **54**(Pt. 2)**(1925–26).** Price varies. *Robert Grant & Son, 126 Princes St., Edinburgh, Scotland; Williams*

& Norgate, Ltd., 14 Henrietta St., Covent Garden, London, W C 2, Eng

Transactions of the Royal Society of Canada. *a* Section **III.** Mathematical, Physical and Chemical Sciences; Section **IV.** Geology, Palæontology, Mineralogy, Geography and Allied Subjects; Section **V.** Biological Sciences. [3]**20.** $5. *The Copp Clark Co., Ltd., Toronto, Can.*

Transactions of the Royal Society of London, Philosophical Series **A.** Physical and Mathematical. *irr* **225**(633); Series **B.** Biological. *irr* **214**(416). Price varies. *Harrison & Sons, Ltd., 44–47 St. Martin's Lane, London, W. C. 2, Eng.*

Transactions of the Royal Society of South Africa. *irr* **13**(Pt. 2). Price varies. *Royal Society of South Africa, Cape Town, S Africa,* or *Wheldon and Wesley, Ltd., 2–3–4 Arthur St., New Oxford St., London, W. C. 2, Eng.*

Transactions of the Scientific Chemical-Pharmaceutical Institute (Moscow). (Printed in Russian.) *irr Scientific-Technical Dept. of the Supreme Council of National Economy, Myasnitzkaya 1, Moscow, Union of the Socialistic Soviet Republics.*

Transactions of the Society of Engineers (London). *q* **17.** *A. S E Ackermann, Secy, 17 Victoria St, Westminster, London, S. W 1, Eng.*

Transactions of the Society of Motion Picture Engineers 4 nos. a year. **No. 23.** Price varies. *J A Summers, Secy, c/o Edison Lamp Works, Harrison, N. Y.*

Transactions of the Wisconsin Academy of Sciences, Arts and Letters About *a* **22.** $2 *Secy, Biology Bldg., Univ. of Wisconsin, Madison, Wis.*

Tropical Agriculture (Trinidad). (The Journal of the Imperial College of Tropical Agriculture.) *m* **3.** 6s(6d)*d*, 7s (7d)*f*. *Imperial College of Tropical Agriculture, St Augustine, Trinidad, British West Indies.*

Tropical Agriculturist (Ceylon), The. *m* 2 vols **66.** Rs10(Rel)*d* *Manager Publication Depot, Dept. of Agriculture, Peradeniya, Ceylon.*

Tschermak's mineralogische und petrographische Mitteilungen. Publication suspended in 1915–16 and since being resumed in 1917 is bound with **Wiener mineralogischen Gesellschaft** and paged separately.

Tubercle. *m* **7(4).** 25s(2s6d)*d*, $6.85($.80)*f*. *John Bale Sons and Danielsson, Ltd., 83–91 Great Titchfield St, London, W 1, Eng.*

Ukrainskii Khemichnii Zhurnal (Ukrainian Chemical Journal). *irr* **1(1925).** R5 *All-Ukrainian Council of the Society of Friends of Chemical Defense and Industry of the Ukrainian Soc. Sov., Kharkov, Ukrainia.*

Umschau, Die, vereinigt mit Naturwissenschaftl. Wochenschrift u Prometheus. *w* **30.** Rm6 30(50pfg)*d*, 8 5sch. *Austria,* Rm6.30 plus postage *f* per quarter. *Verlagsgeschäftsstelle, Niddastr. 81–83, Frankfurt a M, Ger.*

Union of South Africa, Department of Agriculture, Science Bulletin. *irr* **No. 43.** *The Govt. Printing and Stationery Office, Pretoria, S. Africa.*

United States Department of Agriculture, Bulletins, Circulars, etc. *Govt. Printing Office, Washington, D. C.*

United States Geological Survey, Bulletins, Circulars, Professional Papers and Water Supply Papers. *Govt. Printing Office, Washington, D. C.*

United States House and Senate Documents, Congressional Hearings, etc. *irr* Price varies. *Supt. of Documents, Govt. Printing Office, Washington, D. C.*

United States Naval Institute Proceedings. *m* **52**(275). $5($.50)*d*, $5 50*f*. *Secy-Treas., U. S. Naval Institute, 450 Ahnaip St., Menasha, Wis*

United States Naval Medical Bulletin. *q* 2 vols. **24.** $ 75($ 25)*d*, $1.10($.35)*f*. *Supt. of Documents, Govt. Printing Office, Washington, D. C.*

United States Public Health Service, Hygienic Laboratory Bulletins. *irr* **No. 142. Public Health Bulletins.** *irr* **Public Health Engineering Abstracts.** *w* **Public Health Reports.** *w* **41.** Price varies. *Govt. Printing Office, Washington, D. C*

United States Tariff Commission, Tariff Information Series. *irr Govt. Printing Office, Washington, D. C.*

Universidad de Tucumán, Boletin, etc. *Universidad de Tucumán, Tucumán, Argentine Republic.*

University of California Bulletins, Publications in Agricultural Sciences, in **Pathology** and in **Physiology,** etc. *Univ. of California Press, Berkeley, Calif.*

University of Illinois, Bulletins, Circulars, etc. *University of Illinois, Urbana, Ill.*

University of Kansas, Bulletins, Engineering Bulletins, Science Bulletins, etc.

Library of the University of Kansas, Lawrence, Kansas

University of Oklahoma Bulletin. *sm* Gratis. *The University of Oklahoma, University Hall, Norman, Oklahoma.*

University of Pennsylvania, Bulletins and other publications. *University Publication Committee, University of Pennsylvania, Philadelphia, Pa.*

University of Texas, Bureau of Economic Geology and Technology, Bulletins. Free to citizens of Texas. *University Publications, University of Texas, Austin, Texas.*

V D I. See Zeitschrift des Vereines deutscher Ingenieure.

Verhandelingen der koninklijke Akademie van Wetenschappen te Amsterdam. *irr* First Section **13**(3)(**1924**). *Koninklijke Akademie van Wetenschappen, Amsterdam, Holland.*

Verhandlungen der deutschen physikalischen Gesellschaft. *irr* [3]**7.** *Deutsche Physikalische Gesellschaft, Werner Siemensstr 8-12, Berlin-Charlottenburg 2, Ger.*

***Vermischte Abhandlungen der physisch-chemischen Warschauer Gesellschaft.** *Warsaw* and *Dresden.* 1768.

Verre, Le. *m* **5**(**1925**). F30*d*, F35*f*. *26 Place du Sud, Charleroi, Belgium.*

Verslagen van Landbouwkundige Onderzoekingen der Rijkslandbouwproefstations. *irr* **No. 31.** Price varies. *Algemeene Landsdrukkerij, The Hague, Holland*

Verslag koninklijke Akademie van Wetenschappen te Amsterdam. *irr* About 10 nos. a year. **35.** *Koninklijke Akademie van Wetenschappen, Amsterdam, Holland.*

Verslag van de Gewone Vergadering der Afdeeling Natuurkunde. Same as **Verslag koninklijke Akademie van Wetenschappen te Amsterdam.**

***Verslag van de Gewone Vergadering der Wis- en Natuurkundige Afdeeling.** Name changed in 1925 to **Verslag van de Gewone Vergadering der Afdeeling Natuurkunde.**

Videnskapsselskapets - Skrifter. I. Matematisk-naturvidenskabelig Klasse (Kristiania). Name changed in 1925 **to Skrifter** Utgit av det **Norske Videnskaps-Akademie i Oslo. I. Matematisk-naturvidenskapelig Klasse.**

***Vierteljahresschrift der Chemie der Nahrungs- und Genussmittel.** 1882–91. **Continued as Vierteljahrsschrift über die Fortschritte auf dem Gebiete der Chemie der Nahrungs- und Genussmittel.**

***Vierteljahresschrift für praktische Pharmazie.** Combined with **Archiv der Pharmacie** in 1923. Published as a separate section one year only (Vol. 20).

***Vierteljahresschrift für technische Chemie.** *Quedlinburg.* 1859–69.

Vierteljahrsschrift der naturforschenden Gesellschaft in Zürich. *sa* **71.** Price varies. *Beer & Co., Zurich, Switz.*

***Vierteljahrsschrift fur gerichtliche Medizin und öffentliches Sanitatswesen.** Merged in **Deutsche Zeitschrift für die gesamte gerichtliche Medizin.**

***Vierteljahrsschrift uber die Fortschritte auf dem Gebiete der Chemie der Nahrungs- und Genussmittel, der Gebrauchsgegenstande, sowie der hierher gehörenden Industriezweige** *Berlin.* 1886–97. Continued as **Zeitschrift fur Untersuchung der Nahrungs- und Genussmittel sowie der Gebrauchsgegenstände.**

Wärme, Die. *w* **49.** Gm3 50 per month *d*, $6.50*f*. *Rudolf Mosse, Jerusalemer Str. 46–49, Berlin, S. W. 19, Ger.*

Wärme & Kälte Technik. *sm* **28.** Gm12 (G pfg 60)*d*, Gm18(G pfg.75)*f*. *Deutsche Zeitschriften Gesellschaft m. b. H., Erfurt, Ger*

Wasser und Abwasser. About *m* 1 or more vols **21**(4). *Gebr Borntraeger, Schöneberger Ufer 12a, Berlin, W. 35, Ger*

Wasser und Gas. *sm* **15**(7)(**1925**). Gm16 (Gm0.75)*d*, Gm16 plus postage*f*. *Deutscher Kommunal-Verlag, G. m. b. H., Hertelstr. 5, Berlin-Friedenau, Ger.*

Water and Water Engineering. *m* [N. S.] **28**(325). 7s6d(6d). *30–31 Furnival St., Holborn, London, E. C 4, Eng.*

Water Works. *m* **65.** $1.50($20)*d*, $1.50 plus $.65 postage*f*. *Engineering and Contracting Publishing Co., 221 E. 20th St, Chicago, Ill.*

Welsh Journal of Agriculture, The. *a* **1**(**1925**). (2s6d). *University of Wales Press Board, Cardiff, Wales*

***Western Contractor.** Discontinued in 1917.

***Western Druggist,** The. *Chicago.* 1879–92+.

***West Indian Bulletin.** Discontinued in 1922.

Wiener Archiv fur innere Medizin. *irr* 2 or 3 vols. **12.** Price varies. *Urban & Schwarzenberg, Mahlerstr. 4, Vienna 1, Austria.*

Wiener klinische Wochenschrift. *w* **39.** *Gesellschaft der Aerzte, Vienna, Austria.*

Wiener medizinische Wochenschrift. *w* **76.** Gm24.80(Gold pfg.62)*d*, **$7($.18)***f*. *Moritz Perles, Adlergasse 6, Vienna 1, Austria.*

Wisconsin Engineer, The *m* Oct. to May **30**(4). $1.50($.25)*d*. *Wisconsin Engineering Journal Assocn., 306 A Engineering Bldg., Madison, Wis*

Wissenschaftliche Veröffentlichungen aus dem Siemens-Konzern. *irr* **5.** Price varies. *Julius Springer, Link-Str 23–24, Berlin, W. 9, Ger*

***Wissenschaftlich-praktische Forschungen auf dem Gebiete der Landwirtschaft.** *Leipzig* 1872–76.

Wochenblatt fur Papierfabrikation. *w* **57.** Gm1.20(Gm.60)*d* per month, Gm5*f* per quarter. *Gunter-Staib, Biberach a d. Riss, Württemberg, Ger.*

***Wochenschrift des Zentralvereines fur die Rübenzucker-Industrie**

Wochenschrift fur Brauerei *w* **43.** Rm1.50 *d* and *f* per month. *Paul Parey, Berlin, S W. 11, Ger.*

***Wood Preserving.** Discontinued in 1918.

Wood Preserving News. *m* **4.** *American Wood Preservers' Assocn., 10 S. La Salle St, Chicago, Ill.*

World Power. *m* 2 vols. **5**(25) 15s-(1s6d, by post 1s10d)*d* and *f* *60 Lincoln's Inn Fields, London, W. C. 2, Eng.*

World's Health. *m* **7.** F5*d*, $1*f* *League of Red Cross Societies, 2 ave. Velasquez, Paris (8e), France.*

World's Paper Trade Review, The. *w* 2 vols. **85.** £1 6s(6d)*d* and *f* *Stonehill and Gillis, 58 Shoe Lane, London, E C. 4, Eng.*

Yakugakuzasshi. See Journal of the **Pharm**aceutical **Soc**iety of **Japan.**

Year Book of the **Am**erican **Iron** and **Steel Inst**itute. *a* **15(1925).** *40 Rector St, New York City.*

***Zapiski.** Name changed in 1927 to **Naukh**nuie **Zapiski** Gosudarstvennogo Eksperimentalnogo **Inst**ituta **Sakh**arnoi **Prom**uishlennosti.

Zeitschrift der deutschen **geo**logischen **Ges**ellschaft. **A.** Abhandlungen. *q* **77 (1925). B.** Monatsberichte. *m* **77(1925).** *Ferdinand Enke, Hasenbergsteige 3, Stuttgart, Ger.*

Zeitschrift der deutschen Öl- und Fett-Industrie. *w* **46.** Rm7.50(Rm0.75 plus postage)*d* and *f* per quarter. *Julius Springer, Link-Str. 23-24, Berlin, W. 9, Ger.*

***Zeitschrift des allgemeinen oesterreichischen Apotheker-Vereines.** Apparently discontinued.

***Zeitschrift des internationalen Vereines der Bohringenieure und Bohrtechniker** Name changed to **Internationale Zeitschrift für Bohrtechnik, Erdölbergbau und Geologie.**

Zeitschrift des oesterreichische Vereines von Gas- u. Wasserfachmannern. *m* **66.** 6 sch.(0.60 sch.)*d* and *Germany,* Swiss F6(SwissF0 5)*f*. *Josefstädter Str. 10, Vienna 8/1, Austria.*

Zeitschrift des Vereins der deutschen Zucker-Industrie. *m* **76**(832). *Das Vereins-Direktorium, Kleiststr. 32, II, Berlin, W. 62, Ger.*

***Zeitschrift des Vereines der Gas- und Wasserfachmänner in Österreich und Ungarn.** Name changed in 1920 to **Zeitschrift des Vereines von Gas- und Wasserfachmännern.**

Zeitschrift des Vereines deutscher Ingenieure. *w* **70.** Rm40(Rm1.75)*d*. Rm 59(Rm1.95)*f*. *Verein deutscher Ingenieure, Ingenieurhaus, Berlin, N. W 7, Ger.*

***Zeitschrift des Vereines von Gas- und Wasserfachmännern.** Name changed in 1924 to **Zeitschrift des österreichische Vereines von Gas- und Wasserfachmännern.**

***Zeitschrift fur allgemeine Physiologie** Discontinued in 1923

Zeitschrift fur analytische Chemie. *irr* **67**(10). *J. F. Bergmann, Munich, Ger.*

Zeitschrift fur angewandte Chemie. *w* **39.** Rm32(Rm0.80)*d*, Rm38(Rm1)*f*; with Die Chemische Industrie, Rm52*d*, Rm62*f*. *Verlag Chemie, G. m. b. H., Bosestr. 2, Leipzig, Ger.*

***Zeitschrift für anorganische Chemie.** Name changed in 1915 to **Zeitschrift für anorganische und allgemeine Chemie.**

Zeitschrift fur anorganische und allgemeine Chemie. *irr* 6 to 10 vols. a year **150**(2/3). Rm18*d*, Rm18 plus postage *f* per vol. *Salomonstr 18b., Leipzig, Ger*

***Zeitschrift für Beleuchtungswesen,** Heizungs- und Luftungstechnik.

Zeitschrift für Biologie. *m* about 2 vols **84** or [N. S.]**66.** *J F. Lehmann, Munich, Ger.*

***Zeitschrift für biologische Technik und Methodik.** Discontinued in 1915.

Zeitschrift fur Botanik. *m* **18(4).** Rm30 per vol. *Gustav Fischer, Jena, Ger.*

***Zeitschrift für Chemie.** *Göttingen.* 1865–71. Continuation of **Zeitschrift für Chemie und Pharmacie.**

***Zeitschrift für Chemie und Industrie der**

Kolloide. Name changed in 1913 to **Kolloid-Zeitschrift.**

*Zeitschrift fur **Chemie** und **Pharmacie** *Erlangen* (later *Heidelberg*). 1860–64. Continuation of **Kritische Zeitschrift fur Chemie, Physik, Mathematik** und die **verwandten Wissenschaften** und **Disciplinen.** Continued as **Zeitschrift fur Chemie.**

Zeitschrift fur Chemotherapie und verwandte Gebiete. Teil **I. Originale.** Teil **II. Referate.** Apparently discontinued.

*Zeitschrift fur **Dampfkessel** und **Maschinenbetrieb.** Name changed in 1922 to Die **Wärme.**

*Zeitschrift fur das **chemische Grossgewerbe.** *Berlin.* 1876–82.

Zeitschrift für das gesamte Brauwesen. Now issued as a supplement to **Allgemeine Brauer- u Hopfenzeitung.**

*Zeitschrift fur das **gesamte Getreidewesen** (Technische und wissenschaftliche Monatshefte fur Landwirtschaft, Mullerei und Backerei) Discontinued in 1922

Zeitschrift fur das gesamte Schiess- und Sprengstoffwesen *m* **21.** Gm24(Gm2)*d*, Gm26*f*. *Dr August Schrimpff, Ludwigstr. 14, Munich, Ger.*

*Zeitschrift fur das **landwirtschaftliche Versuchswesen** in Deutsch Oesterreich. Discontinued under this name in 1924 Continued as **Fortschritte der Landwirtschaft.**

Zeitschrift fur den physikalischen und chemischen Unterricht. *bm* **39.** Rm 15*d*. *Julius Springer, Link-Str. 23–24, Berlin, W. 9, Ger*

Zeitschrift fur Desinfektion u. Gesundheitswesen. *m* **18.** M10*d*. *Erich Deleter, 8 Silbermannstr , Dresden 16, Ger*

*Zeitschrift fur die **chemische Industrie.** *Berlin.* 1887 Continued as **Zeitschrift fur angewandte Chemie.**

Zeitschrift fur die gesamte experimentelle Medizin. *m* 3 or 4 vols. Price varies. *Julius Springer, Link-Str. 23–24, Berlin, W 9, Ger*

Zeitschrift fur die gesamte Kälte-Industrie *m* **33.** M18*d*, $6*U. S.*, 25s *England. Dr M Krause, Klopstockstr 9, Berlin, N. W. 23, Ger.*

Zeitschrift für die gesamte Textil-Industrie. *w* **29.** Gm15.60*d*, Gm32*f*. *L A. Klepzig, Göschenstr. 6, Leipzig, Ger*

Zeitschrift für Eis- und Kälte-Industrie. *m* **19.** 20sch.*d*. *Geschäftsstelle, 4 Vegagasse, Vienna 19/1, Austria.*

*Zeitschrift für **Elektrochemie.** Name changed in 1904 to **Zeitschrift für Elektrochemie und angewandte physikalische Chemie.**

Zeitschrift fur Elektrochemie und angewandte physikalische Chemie. *m* **32.** M36 (M3 50)*d*, M38(M3 80)*f*. *Verlag Chemie, G m. b. H., Bosestr. 2, Leipzig, Ger.*

*Zeitschrift fur **Elektrotechnik und Elektrochemie.** *Halle.* 1894. Continued as **Zeitschrift fur Elektrochemie.**

*Zeitschrift fur **experimentelle Pathologie** u. **Therapie.** Merged with **Zeitschrift fur die gesamte experimentelle Medizin.**

*Zeitschrift fur **Farben-Industrie.** Discontinued in 1921

*Zeitschrift fur **Gärungsphysiologie** Name changed to **Zeitschrift fur technische Biologie.**

Zeitschrift fur Hygiene und Infektionskrankheiten *irr* 2 or more vols **106.** Price varies *Julius Springer, Link-Str 23-24, Berlin, W. 9, Ger.*

Zeitschrift fur Immunitätsforschung und experimentelle Therapie. About *sm* 2 or 3 vols **46.** Rm28 per vol. *Gustav Fischer, Jena, Ger.*

Zeitschrift fur Instrumentenkunde. *m* **46.** Rm12(Rm4.80)*d* and *f* per quarter *Julius Springer, Link-Str 23-24, Berlin, W 9, Ger*

Zeitschrift fur Kinderheilkunde. *irr* 2 or more vols , 6 nos. per vol. **40**(?) Price varies *Julius Springer, Link-Str 23-24, Berlin, W 9, Ger.*

Zeitschrift fur klinische Medizin. *irr* 2 or more vols **102**(6) Price varies. *Julius Springer, Link-Str 23–24, Berlin, W. 9, Ger.*

Zeitschrift fur komprimierte und flüssige Gase sowie fur die **Pressluft-Industrie** *m* **25.** Rm16*d*, Rm18*f*. *Verlag von Carl Steinert, Weimar, Ger*

Zeitschrift fur Krebsforschung. *bm* **23.** Price varies. *Julius Springer, Link-Str. 23-24, Berlin, W 9, Ger.*

Zeitschrift fur Kristallographie (Kristallgeometrie, Kristallphysik, Kristallchemie). *irr* About 2 vols. **63.** M60 per vol *Akademische Verlagsgesellschaft m. b H., Markgrafenstr. 4, Leipzig, Ger.*

*Zeitschrift fur **Krystallographie** und **Mineralogie** Name changed in 1921 to **Zeitschrift fur Kristallographie.**

*Zeitschrift fur **Leder-** und **Gerberei-Chemie.** Discontinued in 1923

Zeitschrift fur Metallkunde. *m* **18.** Rm 30(Rm2.75)*d*, Rm32.50*f*, R m 3 1 6 0 *Austria* und *Luxemburg Verein deutscher Ingenieure Verlag, G. m b H., Dorotheenstr. 40, Berlin, N. W. 7, Ger.*

*Zeitschrift für **Mineralogie**. 1825–30 Continuation of **Taschenbuch** fur die **gesamte Mineralogie**. Continued as **Jahrbuch** fur **Mineralogie, Geognosie, Geologie** und **Petrefaktenkunde**.

*Zeitschrift fur **öffentliche Chemie**. Discontinued in 1922.

Zeitschrift fur **Pflanzenernährung** und **Düngung. A.** Wissenschaftlicher Teil *irr* **6**(4) M12(M2 50)*d*, M13(M2 80)*f*; **B.** Wirtschaftlich-praktischer Teil. *m* **4(1925)**. M15(M1 50)*d*, M16(M1.70)*f*. Both **A** and **B** at special price. *Verlag Chemie G m. b. H., Bosestr. 2, Leipzig, Ger.*

*Zeitschrift fur **Pflanzenkrankheiten** und **Gallenkunde**. Name changed in 1926 to Zeitschrift fur **Pflanzenkrankheiten** und **Pflanzenschutz**.

Zeitschrift fur **Pflanzenkrankheiten** und **Pflanzenschutz**. *bm* **36**. Gm24*d*. *Eugen Ulmer, Olgastr 83, Stuttgart, Ger.*

Zeitschrift fur **Physik**. *irr* 5 to 8 vols a year **35**(5) Rm46*d* per vol. *Julius Springer, Link-Str 23-24, Berlin, W. 9, Ger.*

Zeitschrift fur **physikalische Chemie**, Stochiometrie und Verwandtschaftslehre. *irr* About 5 vols. **119**. *Akademische Verlagsgesellschaft m. b. H., Markgrafenstr. 4, Leipzig, Ger.*

*Zeitschrift fur **physikalische** und **diätetische Therapie**, einschliesslich Balneologie und Klimatologie. Discontinued in 1922.

Zeitschrift fur **physiologische Chemie** (Hoppe-Seylers). *irr* Several vols a year **152**. *Walter de Gruyter & Co, Berlin* and *Leipzig, Ger.*

Zeitschrift fur **praktische Geologie** mit besonderer Berucksichtigung der Lagerstattenkunde *m* **34**. Gm6*d* per quarter *Wilhelm Knapp, Muhlweg 19, Halle a S, Ger.*

*Zeitschrift fur **Reproduktionstechnik**.

*Zeitschrift fur **Sauerstoff-Stickstoff-Industrie**. Name changed to **Gas-Industrie**, Die.

Zeitschrift fur **Spiritusindustrie**. *w* **49**. Rm1.90(Rm0.50)*d* and *f* per month *Paul Parey, Verlagsbuchhandlung, Hedemannstr. 10–11, Berlin, S. W. 11, Ger*

*Zeitschrift fur **technische Biologie**. Name changed in 1924 to **Chemie** der **Zelle** und **Gewebe**.

Zeitschrift für **technische Physik**. *m* **7**. Rm25*d*, Rm25 50*f* per half year. *Johann Ambrosius Barth, Salomonstr. 18b, Leipzig, Ger.*

Zeitschrift fur **Tierzüchtung** und **Züchtungsbiologie** einschliesslich **Tierernährung**. *irr* 2 or 3 vols. **5(1925)**. Rm25 to Rm30 per vol. *Paul Parey, Hedemannstr. 10 u. 11, Berlin, S. W. 11, Ger.*

Zeitschrift fur **Tuberkulose**. *m* 2 or 3 vols **44**(3) Rm26*d*, $6 40*f* *Johann Ambrosius Barth, Salomonstr. 18b, Leipzig, Ger.*

Zeitschrift fur **Untersuchung** der **Lebensmittel**. *m* **51**. Rm36*d* per half year. *Julius Springer, Link-Str. 23–24, Berlin, W. 9, Ger.*

*Zeitschrift für **Untersuchung** der **Nahrungs-** und **Genussmittel** sowie der Gebrauchsgegenstande. Name changed in 1926 to Zeitschrift fur **Untersuchung** der **Lebensmittel**.

Zeitschrift fur **Urologie**. *m* **20**. M8*d* per quarter. *Georg Thieme, Antonstr. 15, Leipzig, Ger.*

Zeitschrift fur **vergleichende Physiologie**. (**Abteilung C** of Zeitschrift fur **wissenschaftliche Biologie**.) **3**(?). *Julius Springer, Link-Str. 23–24, Berlin, W. 9, Ger.*

Zeitschrift für **wissenschaftliche Biologie**. Composed of 5 Abteilungen: **Abt. A.** Zeitschrift fur **Morphologie** und **Ökologie** der **Tiere; Abt. B.** Zeitschrift fur **Zellforschung** und **mikroskopische Anatomie**; **Abt. C.** Zeitschrift fur **vergleichende Physiologie**; **Abt. D.** Wilhelm Roux **Archiv** fur **Entwicklungsmechanik** der **Organismen**; **Abt. E. Planta**, Archiv fur wissenschaftliche Botanik. *Julius Springer, Link-Str 23–24, Berlin, W. 9, Ger.*

Zeitschrift fur **wissenschaftliche Mikroskopie** und fur mikroskopische Technik *q* **43**. Gm25*d*, $6 50*f*. *S. Hirzel, Königstr. 2, Leipzig, Ger.*

Zeitschrift fur **wissenschaftliche Photographie**, Photophysik und Photochemie. *irr* **24**. Rm24*d*, Rm24.80*f*. *Johann Ambrosius Barth, Salomonstr. 18b, Leipzig, Ger.*

Zeitschrift fur **Zellforschung** und **mikroskopische Anatomie** (**Abteilung B** of Zeitschrift fur **wissenschaftliche Biologie**). *irr* **3**(2). *Julius Springer, Link-Str. 23–24, Berlin, W. 9, Ger.*

Zeitschrift fur **Zuckerindustrie der cechoslovakischen Republik**. *w* **50**(18/19). K156(K4)*d*, K240(K5)*f*. *O. Fallada, Havlíčkovo nám. 32, Prague II, Czechoslovakia*

*Zeitschrift fur **Zuckerindustrie in Böhmen**. Name changed to Zeitschrift für **Zuckerindustrie der cechoslovakischen Republik**.

*Zellstoffchemische **Abhandlungen**. Name

changed in 1921 to **Zellstoff und Papier.**

Zellstoff und Papier. *m* **6.** M7 20*d* and *Austria*, M8.40*f*. *Verlag Carl Hofmann, G. m b. H., Dessauerstr 2, Berlin, S. W. 11, Ger*

Zement (Wochenschrift fur Zement und Zementverarbeitung). *w* **15.** (M1.) *Zementverlag, G m b H, Knesebeckstr. 30, Charlottenburg 2, Ger.*

***Zement und Beton.** Discontinued in 1911.

***Zentralblatt** der **experimentelle Medizin.** Discontinued in 1914.

***Zentralblatt** fur **Biochemie** und **Biophysik** mit Einschluss der theoretischen Immunitatsforschung. Merged in **Berichte** uber die **gesamte Physiologie** und **experimentelle Pharmakologie** in 1918.

Zentralblatt fur die **gesamte Hygiene** und ihre **Grenzgebiete.** 2 vols. of 15 nos. **12.** Rm60*d* per vol. *Julius Springer, Link-Str 23–24, Berlin, W 9, Ger.*

Zentralblatt fur die **gesamte Tuberkulose-Forschung.** *irr* About 2 vols. **25**(5/6). Included in subscription price of **Beitrage zur Klinik der Tuberkulose** und spezifischen Tuberkulose-Forschung.

Zentralblatt fur **innere Medizin.** *w* **47.** Rm10*d*, Rm11 50*f* per quarter. *Johann Ambrosius Barth, Salomonstr. 18b, Leipzig, Ger.*

***Zentralblatt** fur **Physiologie.** Merged in **Archiv** fur die **gesamte Physiologie** des Menschen und der Tiere (Pfluger's).

Zhurnal Khimicheskoi Promuishlennosti. See Journal of **Chemical Industry (Russia).**

Zhurnal Opuitnoi Agronomii. *irr* **23 (1925)** *The People's Commissariat of Agriculture, Leningrad, Union of the Socialistic Soviet Republics.*

Zhurnal Russkii Fiziko-Khimicheskii Obshchestva. See Journal of the **Russian Physical-Chemical Society.**

Zhurnal Russkii Metallurgicheskii Obshchestva. See Journal of the **Russian Metallurgical Society.**

Ziegelwelt (Deutsche Töpfer und Ziegler Zeitung). *w* **57.** Gm3 30 plus postage *d* and *f* per quarter *Wilhelm Knapp, Mühlweg 19, Halle a. d. Saale, Ger.*

Zjazd Chemików Polskich. *irr Wydawnictwo Komitetu Organizacyjnego Zjazdu, Warsaw, Poland.*

Zucker-, Frucht- und Gemüseverwertung. Supplement to **Centralblatt** fur **Zuckerindustrie.** Apparently discontinued.

APPENDIX 7

A LIST OF CHEMICAL BOOK DEALERS AND PUBLISHERS

Part I. Dealers

Blackwell, B. H., Ltd., 50–51 Broad St., Oxford, England. New scientific books.

Blanchard, Louis, 10, rue de la Sorbonne, Paris (V). Scientific books (new and second-hand) and journal sets.

Brentano's, Inc., 1 West 47th St., New York, and 218 S Wabash Ave , Chicago. General dealers in books and periodicals in all languages.

Bryce, William, 54–54a Lothian St., Edinburgh. Scientific books and journals. Chemical catalog, No. 275 in 1927 (68 pages). New and second-hand.

Chapman and Hall, Ltd., 11 Henrietta St., Covent Garden, London, W C 2.

Chemical Catalog Co., Inc., 419 Fourth Ave., at 29th St., New York Current technical and scientific books. Book section in Chemical Engineering Catalog revised Sept., 1926 (45 pages, over 2000 books).

Commercial Press, Paoshan Road, Shanghai.

Delsman, H. C., Ltd., Keizersgracht 686, Amsterdam. Out of business? Published a valuable catalog of German books.

Evans, Edward, and Sons, 30 N. Szechuen Road, Shanghai.

Foyle, W. and G., Ltd., 121 Charing Cross Road, London, W. C. 2 New and second-hand scientific books.

Hafner, Alfred. See Stechert.

Heffer, W., and Sons, Ltd., 4, Petty Cury, Cambridge, England. Books and journals. Catalog 265 in 1926 (50 pages). New and second-hand.

Hermann, J., 6, rue de la Sorbonne, Paris (V). Scientific books and journal sets New and second-hand.

Horr and Choperena, La Motolinia No 4, Mexico City.

Kendrick-Bellamy Co., 16th St. at Stout, Denver, Colo.

Lemcke and Buechner. See Westermann

Lewis, H. K., and Co., Ltd., 136 Gower St., London, W. C. 1. New scientific books.

Login, B., and Son, 29 East 21st St., New York. Chemical and medical periodicals, especially back issues (1926 catalog, 6 pages). Also chemical books, new and second-hand, domestic and foreign

Maruzen Company, 11–16 Nihonbashi, Tori-Sanchome, Tokyo.

Philadelphia Book Co., 22 N Ninth St , Phila. Engineering and technical books a specialty Catalog in 1927 (32 pages). Journal sets

Presses Universitaires de France, Les, 49, Boul Saint-Michel, Paris (V). A coöperative publishing house from whom current French books of all kinds may be ordered.

Schmidt, G., 415 Woodland Ave , Leonia, N. J Scientific books and journals, old and new. Foreign books imported. Chemical catalog in prepn., about 8 pages.

Smith, John, and Son, Ltd., 195 George St , Glasgow. New scientific books

Sotheran, Henry, and Co., 140, Strand, London, W. C. 2. General dealers in old, rare and current books and journal sets. Catalog 800 in 1926, part 7, chemistry and chemical technology (208 pages).

Spon, E. and F. N., 57 Haymarket, London S. W. 1. New scientific books.

Stechert, G. E., and Co. (Alfred Hafner), 31–33 East 10th St., New York Books and periodicals. Good stock of foreign (especially German) scientific books and of dictionaries. Chemistry catalog No. 53 in 1924 (128 pages). New and second-hand.

Stevens, B. F., and Brown, 4 Trafalgar Square, London. Recommended by a librarian for British and French books.

Technical Book Co., 525 Market St., San Francisco.

Van Nostrand, D., Co., 8 Warren St ,

New York. American and British current, scientific and technical books. Catalog in 1927 (about 200 pages). Also a few important earlier books second-hand.

Westermann, B., Co., 13 West 46th St, New York City. (Formerly Lemcke and Buechner.) Chemical, medical and technical books, especially German and French.

Wheldon and Wesley, Ltd., 2, 3, 4 Arthur St., New Oxford St, London, W. C. 2. Chemical catalog, new series No. 4 in 1922 (104 pages). New and second-hand

Williams and Norgate, 14 Henrietta St, London, W C 2 New scientific books.

Wilson, H. W., Co., 958–972 University Ave, New York Scientific journals (odd numbers, sets and volumes).

Part II. Publishers

The following list of 83 publishers includes the names of all that have three or more books in the Select List (Appendix 8). The letters in black type constitute the abbreviations used in the Select List.

Akademische Verlagsgesellschaft. Leipzig.

Appleton, D., and Co., 29–35 W. 32d St., New York.

Arnold, Edward, and Co, 41–43 Maddox St., London, W. 1 (Longmans, Green and Co. in America).

Baillière, J. B, et Fils, 19, rue Hautefeuille, **Paris.**

Baillière, Tindall and Cox, 8, Henrietta St., **London,** W. C 2.

Baird, Henry Carey, and Co., 2 W. 45th St., New York

Barth, Johann Ambrosius, **Leipzig.**

Bell, George, and Sons, Ltd, 6, Portugal St, London, W C. 2.

Benn, Ernest, Ltd, 8, Bouverie St, London, E. C. 4.

Blackie and Son, Ltd, 50, Old Bailey, London, E. C. 4.

Blakiston's, P., Son and Co., 1012 Walnut St., Philadelphia.

Borntraeger, Gebrüder, Berlin.

Cambridge University Press, 133–137, Fetter Lane, London, E C 4.

Century Co., 353 Fourth Ave., New York

Chapman and Hall, Ltd, 11 Henrietta St, London, W. C. 2.

Chemical Catalog Co., Inc, 419 4th Ave, at 29th St, New York

Chemical Foundation, Inc, 85 Beaver St., New York.

Chemical Publishing Co, Easton, Pa (Williams and Norgate in London)

Chicago University Press, 5750 Ellis Ave, Chicago.

Churchill, J and A 7, Great Marlborough St, London, W 1

Clarendon Press. See Oxford University Press.

Constable and Co, Ltd, 10–11, Orange St, London, W. C. 2 (Van Nostrand in New York.)

Doin, Octave, et Fils (also Doin, Gaston), 8, place de l'Odéon, Paris

Dunod, H, et Pinat, E., 47–49, quai des Grandes-Augustins, Paris

Dutton, E. P., and Co., 681 Fifth Ave, New York

Engelmann, Wilhelm, Leipzig

Enke, Ferdinand, Stuttgart

Ernst und Sohn, 90, Wilhelmstrasse, Berlin.

Faraday Society, 90, Great Russell St, London, W C 1.

Fischer, G., Jena.

Frowde, Hodder and Stoughton, London.

Gauthier-Villars et Cie, 55, quai des Grandes-Augustins, Paris

Ginn and Co, 15 Ashburton Place, Boston

Griffin, Charles, and Co., Ltd, 12, Exeter St., London, W. C 2

Gruyter, Walter de, and Co, Berlin and Leipzig.

Gurney and Jackson, 33, Paternoster Row, London, E C 4.

Harper and Brothers, 49 E 33d St, New York, 35 Great Russell St, London.

Hartleben, A., Silberstrasse 1, Vienna

Heath, D. C., and Co, 50 Beacon St, Boston.

Heffer, W., and Sons, Ltd, 4 Petty Cury, Cambridge, England.

Hermann, A, 8, 12, rue de la Sorbonne, Paris

Hirzel, S., Leipzig.

H. M. Stationery Office, 19, Kingsway, London, W. C 2

Holt, Henry, and Co, 19 W 44th St, New York

Jänecke, Max, Leipzig.

Knapp, W, Halle a. S, Germany.

Krayn, M., Berlin

Lea and Febiger, 706–710 Sansom St, Philadelphia.

Lippincott, J. B., Co., E. Washington Sq., Philadelphia. (Griffin in London).

Lockwood, Crosby, and Son, 7, Stationers' Hall Court, London, E. C 4

Longmans, Green and Co , 443–449 Fourth Ave , New York; 38–41, Paternoster Row, London, E C 4.

McGraw-Hill Book Co , Inc , 239 W 39th St., New York.

Macmillan Co., 64–66 Fifth Ave , New York; 10–15 St. Martin's St , London, W. C. 2.

Masson et Cie., 120, Boulevard Saint-Germain, Paris.

Methuen and Co , Ltd , 36, Essex St , London, W. C 2

Murray, John, 50A, Albemarle St , London, W. 1.

National Research Council, 21st and B Sts , Washington.

Oldenbourg, R., München and Berlin

Oxford University Press (Clarendon Press) Warwick Sq , London, E. C. 4; 35 W 32d St , New York.

Parey, Paul, Berlin.

Penton Publishing Co , Twelfth and Chestnut Sts , Cleveland, Ohio.

Pitman, Sir Isaac, and Sons, Ltd., 39–41, Parker St , London, W. C. 2; 2–6 W 45th St , New York.

Presses Universitaires de France, Les, 49, Boul. Saint-Michel, Paris (V).

Putnam's, G. P , Sons, 2–6 W. 45th St., New York.

Rodger, Norman, 2, St. Dunstan's Hill, London, E C 3.

Routledge, George, and Sons, Ltd , 68–74, Carter Lane, London, E C 4. (Alfred A. Knopf in New York).

Saunders, W. B., Co., W. Washington Sq., Philadelphia.

Scott, Greenwood and Son, 8, Broadway, London, E. C. 4. (Van Nostrand in New York.)

Spamer, Otto, Leipzig

Spon, E. and F. N., Ltd , 57, Haymarket, London, S.W 1.

Springer, Julius, Berlin.

Steinkopff, Theodor, Dresden and Leipzig.

Tauchnitz, Ch Herman, Leipzig.

Teubner, B. G., Leipzig and Berlin.

Urban and Schwarzenberg, Berlin and Vienna.

Van Nostrand, D , Co , 8 Warren St , New York

Veit und Ges., Leipzig.

Vieweg, Friedrich, und Sohn, Braunschweig, Germany.

Vogel, F. C W., Leipzig

Voss, Hamburg and Leipzig Combined with Barth in 1927.

Waverly Press See Williams and Wilkins.

Wiley, John, and Sons, Inc , 440 Fourth Ave , New York (Chapman and Hall, London).

Williams and Wilkins (Waverly Press), Baltimore

Yale University Press, 120 College St , New Haven, Conn

(See also the list of Publishers' Series, pages 25–7.)

APPENDIX 8

A SELECT LIST OF CHEMICAL BOOKS

The following list was prepared with the advice of experts in the various phases of chemistry and the assistance of several technical librarians. All deserve the deep gratitude of the authors and some have put us under very special obligation by the time and care which they have given to their judgments and comments. The names of these co-workers are given below.

The authors have acted as editors of the list, and any errors in final judgment as to choices of books should be charged to them. The agreement between specialists in the same field has been on the whole very good. There have been extreme cases in which one expert "starred" a book and another crossed it off the list, but these have been few; to balance them there have been instances of remarkable unanimity. If the divergence proved too great, additional advice was sought. The number of advisers for any particular section of the list was in no case less than two; it was very often three, and in some cases four or five.

In dealing with cases left in doubt by the experts the editors were guided by considerations such as the following. (1) Reviews: whether favorable or unfavorable. (2) Language: books in English are preferred, especially in the case of textbooks, and a book in any foreign language other than German or French has a special handicap to overcome. (3) Books in the same field: a book without competitors may be included for lack of a better one on the subject. (4) Character of the topic: books on the border line of chemistry or on a narrowly special subject are less likely to be included than those more definitely chemical or treating of a broader field. (5) Character of the treatment: books giving full information and references and valuable as aids in literature searches are preferred over those giving elementary or popular information. (6) Age: other things being equal, the more recent book is preferred and the fact that a book is out of print has been taken into account. (7) Price: unduly high price in relation to the information given by the book was a determining factor in a few instances.

An American bias can easily be discerned in the selections and might as well be acknowledged frankly. It was unavoidable inasmuch as it was not considered feasible to enlist the aid of a large number of foreign advisers. The bias is particularly noticeable in the case of introductory textbooks, since teaching conditions are different in the United States and England and American teachers are often not familiar with British texts. However, it will be found that, with the exceptions mentioned, many foreign books are included, in spite of the fact

that in many lines chemists naturally prefer books that reflect practice in their own country.

No attempt has been made to cover Government bulletins or similar publications, but they have been mentioned in the list in certain connections and individual bulletins have been entered as books in cases where the advisers have called special attention to them. Bulletins as a class are treated on page 128.

It cannot be emphasized too strongly that this is not a list of "the best chemical books" in any absolute sense; it is merely a selection of books which certain individuals believe, with more or less agreement, to be good. There is no question that many good books do not appear on it, for one reason or another. Furthermore, almost all books are good *for something;* in selecting this list, only the most general viewpoint could be adopted. Objections can be urged against attempting to prepare such a list at all, but the authors of this book believe that the benefits to be derived from it by chemists and librarians ought to outweigh the counterarguments.

Users are warned against considering the ratings as absolute, especially as between classes. It might easily happen that a starred book in one class is less valuable than an unstarred book in another, either because advisers in one class tended to star more freely than those in the other, because one book had more competition than the other, or for some other circumstance. The "double-star" rating (**) has been carefully safeguarded; it has not been given except with the unanimous (or, in the case of four or more advisers, almost unanimous) agreement of the advisers.

A dagger (†) is placed before books that were entered too late to be rated, or to be rated completely, they should therefore be regarded only as candidates for rating. The majority of "daggered" books are of very recent date (in some instances new editions), but some are older books that were recommended by some one of the advisers and not passed on by the rest.

CLASSIFICATION

The list is classified according to subjects, the main numbers (1 to 30) corresponding to the numbers of the departments in *Chemical Abstracts*, a numbering with which many chemists are familiar. The Select List is followed by an author index (p. 411). A subject index to the list is included in the main index at the end of the book.

ABBREVIATIONS

The abbreviations of publishers' names are such as will readily be understood by those receiving orders for books; their meaning is given in Appendix 7. Other abbreviations used in the Select List are:

**	Indispensable or very important.	Assocn.	Association
*	Important.	Bull.	Bulletin
†	Too late to be rated.	Bur.	Bureau
£	Pounds sterling.	d.	pence
Agr.	Agriculture	ed.	editor, edited, edition
Am.	America, American	fr.	francs
		Geol.	Geological

Inst.	Institution, Institute	rev.	revised
M.	gold marks	s.	shillings
Mech.	Mechanical	Tech.	Technological
o. p.	out of print	trans.	translated, translation
p.	page, pages	U.	University
prepn.	preparation	v.	volume, volumes
pub.	publishing, publication		

PRICES

Prices are subject to change and should be taken as an approximate guide only. They are ordinarily given in the money of the country of publication. The approximate American prices, in dollars, of German books may be computed by dividing prices in gold marks by four, and of British books (roughly) by dividing prices in shillings by *three*. The French franc was not stabilized when the Select List was prepared. When a book is furnished both unbound and bound, or in more than one style of binding, the price in the Select List refers to a serviceable cloth or half-leather binding unless otherwise noted.

The editors take pleasure in acknowledging the value of the *Technical Book Review Index* (see p. 28) as an aid in connection with the preparation of the list.

STATISTICS

The entire Select List contains 145 double-starred entries, 397 single-starred, and 669 unstarred; in addition to which there are 474 daggered entries; total, 1685. The books selected amount, including the daggered entries, to 40% of all the books considered, which number 4229. The large number of daggered entries is eloquent testimony to the rapidity with which new chemical books are constantly appearing.

Of the 1685 books here listed, 778 are American, 481 are British, 362 are in German, 56 are in French, and 8 are in other languages.

The advisers and helpers number 154.

Every effort has been exerted to make the information about the books correct but its accuracy is not guaranteed.

LIST OF ADVISERS AND HELPERS

C. S. Adams, Antioch College
Harald Ahlqvist, consulting engineer, New York City
Jerome Alexander, consulting chemist and engineer, New York City
W. L. Badger, University of Michigan
A. K. Balls, University of Pennsylvania
G. E. Barton, Whitall Tatum Co., Millville, N. J.

Edward Bartow, University of Iowa
Firman E. Bear, Ohio State University
Stanley R. Benedict, Cornell Medical School
D. D. Berolzheimer, literature service, New York City
F. Russell Bichowsky, Johns Hopkins University
F. C. Blanck, Bureau of Chemistry
A. V. Bleininger, Homer Laughlin China Co., Newell, Va.
R. H. Bogue, Portland Cement Association Fellowship, Bureau of Standards
Cecil E. Boord, Ohio State University
J. Howard Brown, Johns Hopkins University
C. A. Browne, Bureau of Chemistry
Allison Butts, Lehigh University
W. S. Calcott, Jackson Laboratory, E. I. du Pont de Nemours and Co., Wilmington, Del.
Joseph S. Caldwell, Bureau of Plant Chemistry
J. H. Campbell, consulting chemist and metallurgist, St Louis
E. L. Chappell, Mass. Inst. Tech.
Friend E. Clark, West Virginia University
George L. Clark, Mass. Inst. Tech.
Geo. F. Comstock, consulting metallurgical engineer, Niagara Falls, N. Y.
George L. Coyle, Georgetown University
H. Jermain Creighton, Swarthmore College
Carl E. Curran, Forest Products Laboratory, Madison, Wis.
W. P. Cutter, A. D. Little, Inc., Cambridge, Mass.
F. B. Dains, University of Kansas
C. C. Davis, Boston Woven Hose and Rubber Co., Boston
H. G. Deming, University of Nebraska
D. J. Demorest, Ohio State University
L. C. Drefahl, Grasselli Chemical Co., Cleveland, Ohio
B. M. Duggar, National Research Council
(Miss) Louise Duvall,* librarian, Bureau of Chemistry
Junius D. Edwards, Aluminum Company of America, New Kensington, Pa.
D. I. Elder, Chicago
W. O. Emery, Bureau of Chemistry
A. C. Fieldner, Bureau of Mines Experiment Station, Pittsburgh
Colin G. Fink, Columbia University
Harry L. Fisher, United States Rubber Co., New York City
Fulton B. Flick, Aluminum Company of America, New Kensington, Pa.
C. W. Foulk, Ohio State University
(Mrs.) Elma P. Foulk, Ohio State University
John G. Frayne, Antioch College
Charles N. Frey, The Fleischmann Laboratories, New York City
Amos A. Fries, Chemical Warfare Service
H. B. Froning, Notre Dame University
I. Gemerchak, The Titanium Alloy Manufacturing Co., Cleveland, Ohio
F. H. Getman, Hillside Laboratory, Stamford, Conn.

* Deceased.

H. M. Goodwin, Mass. Inst. Tech.
Neil E. Gordon, University of Maryland
George C. O. Haas, technical translator, New York City
William T. Hall, Mass. Inst. Tech.
W. A. Hamor, Mellon Institute, Pittsburgh
P. J. Hanzlik, Stanford University Medical School, San Francisco
Philip B. Hawk, Food Research Laboratories, Inc., New York City
P. B. Hawley, Forest Products Laboratory, Madison, Wis.
E. P. Henderson, United States Geological Survey
B. Clifford Hendricks, University of Nebraska
B. Herstein, United States Industrial Alcohol Co., New York City
Jack J. Hinman, Jr., University of Iowa
Marion Hollingsworth, Ohio State University
Harry N. Holmes, Oberlin College
B. Smith Hopkins, University of Illinois
H. E. Howe, editor "Industrial and Engineering Chemistry"
Jas. Lewis Howe, Washington and Lee University
Paul E. Howe, Bureau of Animal Industry
Andrew Hunter, University of Toronto
E. J. Janitzky, Illinois Steel Co., South Chicago
Sebastian Karrer, Fixed Nitrogen Research Laboratory, Washington
Elmer O. Kraemer, University of Wisconsin
J. B. Krak, "The Glass Industry," New York City
R. D. Landrum, The Titanium Alloy Manufacturing Co., Cleveland, Ohio
Victor Lenher,* University of Wisconsin
S. C. Lind, University of Minnesota
Arthur D. Little, Arthur D. Little, Inc., Cambridge, Mass.
J. F. Lyman, Ohio State University
E. H. McClelland, technology librarian, Carnegie Library of Pittsburgh
David F. McFarland, Pennsylvania State College
Edward Mack, Jr., Ohio State University
William McPherson, Ohio State University
A. P. Mathews, University of Cincinnati
(Miss) Nevart Matossian, librarian, Combustion Utilities Corporation, Long Island City, N. Y.
Brian Mead, Humble Oil and Refining Co., Baytown, Texas
C. E. Kenneth Mees, Eastman Kodak Co., Rochester, N. Y.
William F. Meggers, Bureau of Standards
(Miss) Ruth E. Merling, librarian, E. I. du Pont de Nemours and Co., Wilmington, Del.
A. R. Middleton, Purdue University
Lewis B. Miller, Universal Portland Cement Co., Buffington, Ind.
Harlan S. Miner, Welsbach Co., Gloucester, N. Y.
F. W. Mohlman, Sanitary District of Chicago
C. B. Morison, American Institute of Baking, Chicago
C E. Mullin, Eavenson and Levering Co., Camden, N. J.

*Deceased.

Charles E. Munroe, Bureau of Mines
John R. Murlin, University of Rochester
L. C. Newell, Boston University
Frederick A. Norton, patent attorney, New York City
W. A. Noyes, University of Illinois
L. A. Olney, Lowell Textile School, Lowell, Mass.
J. C. Olsen, Brooklyn Polytechnic Institute
Cullen W. Parmelee, University of Illinois
(Miss) Florence I. Peterman, Yale University
W. B. Plummer, Combustion Utilities Corporation, Long Island City, N. Y.
Sheppard T. Powell, Baltimore
F. B. Power, Bureau of Chemistry
Merle Randall, University of California
E. Emmet Reid, Johns Hopkins University
Wm. D. Richardson, Swift and Co., Chicago
John R. Roebuck, University of Wisconsin
Allen Rogers, Pratt Institute, Brooklyn
F. M. Rogers, Standard Oil Co., Whiting, Ind.
Chas. A. Rouiller, Johns Hopkins University
A. H. Sabin, National Lead Co., New York City
E. Scherubel, Swift and Co., Chicago
H. I. Schlesinger, University of Chicago
W. W. Scott, University of Southern California
Wilhelm Segerblom, Phillips Exeter Academy
H. C. Sherman, Columbia University
Alexander Silverman, University of Pittsburgh
H. E. Simmons, University of Akron
J. J. Skinner, Bureau of Plant Industry
Edwin E. Slosson, Science Service, Washington, D. C.
Edgar F. Smith, University of Pennsylvania
Julian F. Smith, technical librarian, B. F. Goodrich Co., Akron, Ohio
G. E. Stechert and Co., book dealers, New York City
C. G. Storm, Ordnance Department, Washington, D. C.
Hugh S. Taylor, Princeton University
Arthur W. Thomas, Columbia University
Edward C. Uhlig, Brooklyn Union Gas Co., Brooklyn
D. D. Van Slyke, Rockefeller Institute
Sigmund Waldbott, Lloyd-Waldbott Analytical Laboratory, Cincinnati, Ohio
Percy H. Walker, Bureau of Standards
George B. Wallace, New York University
E. W. Washburn, Bureau of Standards
Arthur S. Watts, Ohio State University
H. Gideon Wells, University of Chicago
Gerald L. Wendt, Pennsylvania State College
F. A. Wertz, Varcraft Works, Inc., Pottstown, Pa.
David Wesson, Southern Cotton Oil Co., New York City
Clarence J. West, National Research Council
Edgar T. Wherry, Bureau of Chemistry

Alfred H. White, University of Michigan
Frank C. Whitmore, Northwestern University
H. H. Willard, University of Michigan
John Arthur Wilson, A. F. Gallun and Sons Co., Milwaukee, Wis.
James R. Withrow, Ohio State University
J. C. Witt, chemical engineer, Chicago
Edgar J. Witzemann, The Mayo Foundation, Rochester, Minn.
H. C. Wood, E. I. du Pont de Nemours and Co., Wilmington, Del.
A. G. Woodman, Mass. Inst. Tech.
Fred C. Zeisberg, E. I. du Pont de Nemours and Co., Wilmington, Del
F. W. Zerban, New York Sugar Trade Laboratory, New York City

SUMMARY OF THE CLASSIFICATION

("*Chemical Abstracts*" sections)

1. Apparatus and plant equipment
2. General and physical chemistry
3. Subatomic phenomena and radiochemistry
4. Electrochemistry
5. Photography
6. Inorganic chemistry
7. Analytical chemistry
8. Mineralogical and geological chemistry
9. Metallurgy and metallography
10. Organic chemistry
11. Biological chemistry
12. Foods
13. General industrial chemistry
14. Water, sewage and sanitation
15. Soils, fertilizers and agricultural poisons
16. Fermentation industries
17. Pharmaceutical chemistry
18. Acids, alkalies, salts and sundries
19. Glass, clay products, refractories and enameled metals
20. Cement and other building materials
21. Fuels, gas, tar and coke
22. Petroleum, lubricants, asphalt and wood products
23. Cellulose and paper
24. Explosives and explosions
25. Dyes and textile chemistry
26. Paints, varnishes and resins
27. Fats, fatty oils, waxes and soaps
28. Sugar, starch and gums
29. Leather and glue
30. Rubber and allied substances

A SELECT LIST OF CHEMICAL BOOKS

1 APPARATUS AND PLANT EQUIPMENT

1A LABORATORIES

Munby, A. E. Laboratories, their planning and fittings. Bell. 1921. 220 p. 25s.

***Russell, T. H.** Planning and fitting-up of chemical and physical laboratories. B. T. Batsford, London. 1903. 178 p. *o.p.*

1B GLASS BLOWING

***Bolas, B. D.** A handbook of laboratory glass blowing. Routledge 1921. 106 p. 3s.6d.

†**Briggs, D. B.** Practical glass manipulation. Lockwood. 1926. 55 p. 2s.6d.

†**Ebert, H.** (ed. F. Hauser). Anleitung zum Glasblasen. Barth. 1926 ed 6. 134 p. M7.50.

Frary, F. C. Laboratory manual of glass blowing. McGraw. 1914. 60 p. $1.

Shenstone, W. A. The methods of glass blowing. Longm. 1907. ed. 3. 96 p. $1.10. Reprints of ed. 3 include a chapter on "Working silica in the oxy-gas flame."

***Waran, H. P.** Elements of glass blowing. Bell. 1923. 126 p 2s.4d.

1C OPTICS

(*Microscope*, see also 7F)

Baker, T. T. The spectroscope and its uses in general analytical chemistry. Baillière, London. 1923. ed. 2. 218 p. 8s 6d.

Beck, C. The microscope. R. and J. Beck, London 1921–23. In 2 v. (1)A simple handbook. 144 p. 2s.6d. (2) An advanced handbook. 231 p. 7s.6d.

Clark, C. H. Practical methods in microscopy. Heath. 1925. ed. 5. 337 p. $3. A concise text for the beginner.

***Rolfe, G. W.** The polariscope in the chemical laboratory. Macmil. 1905. 320 p. $2.25.

†**Roth, W. A., and Eisenlohr, F.** Refraktometrisches Hilfsbuch. Veit. 146 p.

Spiers, F. S. The microscope; its design, construction and applications. Lipp. 1920. 260 p. $8.

1D TEMPERATURE

American Institute of Mining and Metallurgical Engineers. Pyrometry. The Inst., New York. 1920. 701 p. $6.

***Burgess, G. K., and LeChatelier, H.** The measurement of high temperatures. Wiley. 1912. ed. 3. 510 p. $5.

†**Griffiths, E.** Methods of measuring temperature. Griffin 1925. ed. 2. 203 p 10s 6d

1E MISCELLANEOUS

Dunoyer, L. See 1F10

***Dushman, S.** Production and measurement of high vacuum. General Electric Review, Schenectady. 1922. 239 p. $2 75.

†**Kaye, G. W. C.** High vacua. Longmans. 1927 187 p. $3 75.

Krayer, P. J. The use and care of a balance Chem. Pub. 1913. 42 p. $1.

***Manufacturing Chemists' Association of the United States.** Standard specifications for laboratory apparatus. The Assocn., Washington. 1922.

1F PLANT EQUIPMENT AND PROCESSES

(See also 9A1 (*Ore dressing*), 13 (*General industrial chemistry*, especially 13C, *Materials*))

1F1 GENERAL

†**Hartmann, K.** Sicherheitseinrichtungen in chemischen Betrieben. Spamer. 1911. 312 p

†**Hausbrand, E.** Hilfsbuch für den Apparatebau. Springer. 1919. ed. 3. 132 p.

†**Krause, H.** Maschinenkunde fur Chemiker. Vieweg. 1926. 436 p. M22.

***Walker, W. H.,** and others. Principles of chemical engineering. McGraw. 1923. 624 p. $5. "The best work of its kind."

1F2 TRANSPORTATION OF FLUIDS

Drysdale, C. V., and others. Mechanical properties of fluids; a collective work. Van Nost. 1923. 378 p $6. "The very best on each aspect of this important subject."

Svensen, C. L. A handbook on piping. Van Nost. 1918. 359 p. $4. "Useful as a textbook for draftsmen and students."

Swindin, N. Pumping in the chemical works. Benn. 1922. 80 p. 3s. "Small, interesting volume, may be a help in making selection of a proper pump."

1F3 HEATING AND EVAPORATING

***Badger, W. L.** Heat transfer and evaporation. Chem. Cat. 1926. 306 p. $6.

"One of the most complete works of its kind."

***Hausbrand, E.** (trans.). Evaporating, condensing and cooling apparatus. Scott. 1919. From German ed. 2. 428 p. 14s. 6d. "Good, is continually referred to; not so important since the books of Badger and of Webre and Robinson have been published."

Rockwell (W. S.) Co. Elements of industrial heating. "An unusually well balanced and impartial review."

***Trinks, W.** Industrial furnaces Wiley. 1926. v. 1. ed. 2. 319 p $4 50. 1925. v. 2. 405 p. $5 50. "Practical." "Best and only book there is"

Webre, A. L, and Robinson, C. S. Evaporation. Chem. Cat. 1926. 500 p. $8 50. "Essentially practical."

†Weiss, F. J. Kondensation. Springer 1910 430 p. "The most authoritative book on condenser design"

1F4 FILTRATION

†Bryden, C. L., and Dickey, G. D. Industrial filtration and the various types of filters used. Chem Pub. 1923 376 p. $5 50. "Best in its field." "Profusely illustrated"

Wright, A. Industrial filtration Chem. Cat. 1923. 336 p. $6. Not as good as Bryden and Dickey but widely used.

1F5 CENTRIFUGING

†Alliott, E. A. Centrifugal dryers and separators Benn. 1926. 151 p. 6s.

1F6 DRYING

***Hausbrand, E.** (trans). Drying by means of air and steam. Scott 1924. ed. 3. 85 p $2 50.

1F7 DISTILLATION

***Hausbrand, E.** (trans) Principles and practice of industrial distillation. Chapman. 1925. From German ed. 4, with additions. 312 p. 21s. To make practical use of it a scientific training is almost necessary.

Leslie, E. H. See 21A.

†Mariller, C. Distillation et rectification des liquides industriels. Dunod. 1925. 731 p. 95 fr.

Rechenberg, C. von. Einfache und fraktionierte Destillation in Theorie und Praxis. Schimmel and Co, Leipzig. 1923. 814 p M18. Based on an earlier book, "Theorie der Gewinnung und Trennung der atherischen Oele durch Destillation."

***Robinson, C. S.** Elements of fractional distillation. McGraw. 1922. 204 p. $2.50. The principles of fractional distillation explained and illustrated.

Robinson, C. S. Recovery of volatile solvents Chem. Cat. 1922. 188 p. $4. "Textbook for the chemical engineer."

***Young, S.**, and others. Distillation principles and processes Macmil. 1921. 509 p 40s. "Exhaustive." "Authoritative"

1F8 CONVEYING SOLIDS

†Hetzel, F. V. Belt conveyors and belt elevators. Wiley. 1926 333 p. $5

***Wright, R. V.**, and others. Material handling cyclopedia. Simmons-Boardman Pub. Co, New York 1921. 846 p $6 "Only book there is" of its kind

Zimmer, G. F. Mechanical handling and storing of material Lockwood. 1922. ed 3. 804 p. £3 3s. "Probably the most complete work ever published on handling and storing."

1F9 CRUSHING AND GRINDING

†Naske, C. Zerkleinerungsvorrichtungen und Mahlanlagen. Spamer. 1926. ed 4. 385 p. M36.

1F10 PRODUCTION OF VACUA

(See also 1E.)

†Dunoyer, L. (trans) Vacuum practice Bell. 1926. 228 p 12s 6d. "Very theoretical, a good guide for specialists"

Newman, F. H. The production and measurement of low pressures. Benn. 1925. 192 p. 16s. "Excellent and authoritative"

1F11 PRODUCTION OF PRESSURE

†Goodwin, H. Autoclaves and high pressure work Benn. 1925 166 p. 6s. "A practical works handbook."

†Kearton, W. J. Turbo-blowers and compressors. Pitman. 1926 333 p. 21s. Theory and practice, for designers, works managers and students.

1F12 MISCELLANEOUS

Stillman, A. L. Briquetting Chem. Pub. 1923. 466 p. $6. "A reliable survey." "Special reference to American practice"

2 GENERAL AND PHYSICAL CHEMISTRY

2A DICTIONARIES AND ENCYCLOPEDIAS

(For older works by Frémy, Ladenburg, Ure and Wurtz, see pp. 14–15)

Blücher, H. See 13A.

"Chemical Age" chemical dictionary. Benn 1925. v. 1. Chemical terms. 158 p 16s. Names of substances will be treated in later vols.

Fehling, H. von, and others. Neues Handworterbuch der Chemie. Vieweg. 1871–1926 9v. See p. 14

Gardner, W. Chemical synonyms and trade names. Lockwood 1926 ed. 3 355 p 30s About 20,000 brief definitions.

Kingzett, C. T. Chemical encyclopædia. Baillière, London. 1924 ed. 3. 606 p 30s See p 15

Lange, O. Bluchers Auskunftsbuch See 13M

†**Lueger** (ed F von Frey) Lexikon der gesamten Technik und ihrer Hilfswissenschaften. Deutsche Verlags-Anstalt, Stuttgart. 1926 ed 3 2 v. 1619 p. M45

Muspratt, J. S. (F Stohmann and others, eds) Theoretische praktische und analytische Chemie in Anwendung auf Kunste und Gewerbe Encyclopadisches Handbuch der technischen Chemie Vieweg. 1888–1922 ed. 4 12 v. with supplements. See p 14

***Thorpe, T. E.** A dictionary of applied chemistry. Longm 1921– . ed. 6. 6 v (A—Tetryl) in 1926 60s each See p 13

Turner, F. M., Jr. and others. The condensed chemical dictionary Chem. Cat 1919 525 p. $5 ($6 leather). Information about commercial substances.

****Ullmann, F.** Enzyklopadie der technischen Chemie Urban. 1914–23 12 v. $88

Watts, H. (ed H. F. Morley and M. M. P. Muir) Dictionary of chemistry. Longm 1888–94. 4 v 3287 p £6 16s 6d ($50). See p. 13.

2 B GENERAL CHEMISTRY

2B1 GENERAL TREATISES

(A systematic treatise of the whole field of chemistry is now rarely attempted. Either the encyclopedia form is used (see 2A), or else the field is divided (see 2C1, 6A, 10A, etc.).)

Arnold, C. (trans.). Repetitorium der Chemie. Voss. 1923. ed. 16. 686 p M9.60. (English trans. from German ed. 11, Wiley, 627 p., $4.) A small reference book intended especially for physicians and pharmacists.

Bloxam, C. L. (rev. A G Bloxam and S. J. Lewis) Chemistry, inorganic and organic Churchill 1923. ed. 11. 832 p. 36s A well-known small reference book.

Mellor, J. W. See 6A.

Mendeléeff, D. (trans.). The principles of chemistry. Longm. 1905. English ed. 3 2 v. 1190 p *o p.* A classic that is now somewhat out of date

Molinari, E. See 6A, 10A

Ostwald, Wi., and Drucker, C. (eds). Handbuch der allgemeinen Chemie. Akad Verlags 1919– . A projected series of about 20 v by different authors, of which 4 (chemical literature, noble gases, properties of gases, conductivity of solutions) had appeared in 1924.

Roscoe and Schorlemmer. See 6A.

†**Trautz, M.** Lehrbuch der Chemie. Gruyter 1922–24 3 v. 1054 p. M84.

2B2 COLLEGE TEXTS ON GENERAL CHEMISTRY

(See also 6B (*College inorganic texts*))

Bray, W. C., and Latimer, W. M. Course in general chemistry. Macmil. 1923. 114 p. $1 60 *Introductory.*

†**Brinkley, S. R.** Principles of general chemistry Macmil. 1926. 470 p. $3 50. The order of presentation is a departure.

†**Cady, H. P.** General chemistry. McGraw 1926. ed 2 557 p. $3 25

Chapin, W. H. Second year college chemistry Wiley. 1925. ed. 2 367 p. $3 Theory emphasized

†**Clark, W. H.,** and others General chemistry for college and university students. Miner Pub Co , Macomb, Ill. 1926. 678 p $3 50.

***Deming, H. G.** General chemistry. Wiley. 1925 ed 2. 650 p. $3 50. "Many graphic aids."

Foster, W. Introduction to general chemistry. Princeton U. 1924. 643 p. $3.

†**Gordon, N. E.** Introductory college chemistry World Book Co , Yonkers, New York 1926 702 p. $3 80.

***Holmes, H. N.** General chemistry. Macmil 1921 650 p. $3.50.

Holmes, H. N. Introductory college chemistry. Macmil. 1925. 500 p. $3 25. *Introductory.*

†**Kendall, J.** General chemistry. Century. 1927. $3 50.

McCoy, H. N., and Terry, E. M. Introduction to general chemistry. McGraw. 1920. ed 2. 648 p. $3 50 Theory emphasized.

***McPherson, W., and Henderson, W. E.** A course in general chemistry Ginn. 1921. ed 2. 737 p. $3 "Traditional order" —† ed. 3. 1927. 712 p.

McPherson, W., and Henderson, W. E. An elementary study of chemistry. Ginn. 1924. ed. 3. 628 p. $2.40. *Introductory.*

†**Mellor, J. W.** Introduction to modern inorganic chemistry. Longm. 1920. 710 p. 9s.

***Newell, L. C.** College chemistry. Heath 1925. 645 p. $3

†**Noyes, W. A.** A textbook of chemistry Holt. 1926. new ed. 619 p $3

***Schlesinger, H. I.** General chemistry Longm 1925. 631 p $3 75

***Smith, A.** (ed J Kendall). College chemistry Century. 1923 747 p $3 50. "Conservative"

Smith, A. (ed. J. Kendall and E E Slosson). Intermediate textbook of chemistry. Century 1922. new ed. 566 p. $3 25 *Introductory.*

†**Sneed, M. C.** General inorganic chemistry Ginn. 1926. 680 p. $3

2B3 ELEMENTARY TEXTS ON GENERAL CHEMISTRY

(See also the books marked *"Introductory"* under 2B2. *Reference books:* see 2B2, 6A, 6B)

***Black, N. H., and Conant, J. B.** Practical chemistry. Macmil. 1920. 474 p. $1.68.

Blanchard, A. A., and Wade, F. B. Foundations of chemistry. Am. Book Co., New York. 1914. 446 p. $1 64. "Teachers should know it"

Bradbury, R. H. First book in chemistry Appleton. 1922 687 p $1 80 Inductive in method.

***Brownlee, R. B.,** and others Elementary principles of chemistry. Allyn and Bacon, Boston 1926 New ed. 614 p $1 60.

Dinsmore, E. L. Chemistry for secondary schools. F M. Ambrose and Co, New York. 1925. 574 p $1 68 Almost starred.

***Dull, C. E.** High school chemistry. Holt. 1925. 577 p. $1.80.

Emery, F. B. and others. Chemistry in everyday life. Lyons and Carnahan, Chicago. 1924. 680 p. $1 76. Very full.

Foster, W. The elements of chemistry. Van Nost. 1925. 594 p. $2. Full, many portraits

***Gray, C. W., Sandifur, C. W., and Hanna, H. J.** Fundamentals of chemistry. Houghton Mifflin Co, Boston. 1924 445 p. $1.68. "A break with tradition"

Greer, C. C., and Bennett, J. C. Chemistry for boys and girls. Allyn and Bacon, Boston. 1925 844 p. $1 80. Elementary; distinctive.

***McPherson, W., and Henderson, W. E.** Chemistry and its uses Ginn. 1926 New ed. 468 p $1 60.

***Newell, L. C.** Practical chemistry. Heath 1922. 693 p. $2.24.

Ostwald, Wi. (trans.) Conversations on chemistry. Wiley 1906 2 pts. 623 p $3 50 *o p.* Not a text but inserted here anyway.

Remsen, I. Introduction to the study of chemistry Holt 1909 577 p. $1.72. By an eminent teacher

Sadtler, S. S. See 2K.

Smith, A. (ed. J. Kendall and others). Smith's elementary chemistry. Century. 1924. 423 p $1 80. "Was long standard"

2B4 HOUSEHOLD CHEMISTRY

(See also 11E (*Nutrition*) and 12 (*Foods*).)

****Beery, P. G.** Chemistry applied to home and community. Lipp 1926 ed. 2. 555 p $3 50 College text with experiments

***Bureau of Standards Circulars.** No. 55 Measurements for the household. 1915 149 p. 15¢. No. 70. Materials for the household. 1917. 259 p 25¢. No 75. Safety for the household 1918. 127 p 15¢

Snell, J. F. Elementary household chemistry Macmil. 1914. 307 p. $2. Text with expts.

Tinkler, C. K., and Masters, H. Applied chemistry. Lockwood. v. 1. Water, detergents, textiles, fuels, etc 1920. 300 p $4 50. v. 2. Foods. 1925. 280 p $6.

Vulté, H. T. Household chemistry for the use of students in household arts. Chem. Pub 1920. ed. 3. 243 p. $2.25.

2B5 OTHER SPECIAL TEXTS ON GENERAL CHEMISTRY

(This class includes texts for students of agriculture, dentistry, medicine, etc. It has not seemed wise to make selections.)

2B6 LABORATORY MANUALS ON GENERAL CHEMISTRY

(Many books in this list are designed to accompany texts by the same authors).

Arendt, R., and others. Technik der Experimentalchemie. Voss 1925? ed. 5. 732 p. $6.80.

Bender, A. See 6D.

High School

***Black, N. H.** Laboratory experiments in chemistry. Macmil. 1920. 167 p. 80¢.

Bradbury, R. H. Laboratory studies in chemistry. Appleton. 1923. 210 p. $1.12.

***Foster, W., and Heath, H. W.** Laboratory exercises in general chemistry. Van Nost. 1925 192 p. $1.25.

***Gray, C. W., and Sandifur, C. W.** Laboratory manual. Houghton Mifflin Co., Boston. 1924. 137 p 92¢

Jaques, A. F. Laboratory chemistry for girls. Heath 1923. 244 p. $1 48 Emphasizes physiology and foods.

Smith, H. R., and Mess, H. R. Laboratory study of chemistry Holt 1918. 296 p. $1 20.

College

†**Brinkley, S. R., and Kelsey, E. B.** Laboratory manual. Macmil. 1926. 159 p. $1 50.

Chapin, W. H. Second year college chemistry, a manual of laboratory exercises Wiley 1927. ed 2 154 p. $2.

****Deming, H. G., and Arenson, S. B.** Exercises in general chemistry and qualitative analysis. Wiley 1926 ed 2. 282 p $1 80

***Foster, W.** Laboratory manual in general chemistry. Princeton U. 1924. 205 p. $2.

***Holmes, H. N.** Laboratory manual of general chemistry. Macmil. 1926 new ed. 141 p. $1 60.

***McPherson, W., and Henderson, W. E.** Exercises in chemistry. Ginn. 1925 new ed. 149 p. 60¢. *Introductory.*

McPherson, W., and Henderson, W. E. Laboratory manual. Ginn. 1921 ed. 2. 150 p. $1 20

***Newell, L. C.** Experiments in college chemistry. Heath 1925. 325 p. $1.60.

†**Schlesinger, H. I., and Link, A. D.** Laboratory manual of general chemistry. Longm. 1926. 128 p. $1.50.

Walton, J. H., and Krauskopf, F. C. Laboratory manual of general chemistry. Banta Pub. Co, Minasha, Wis. 1920. 172 p.

2C PHYSICAL AND THEORETICAL CHEMISTRY

2C1 GENERAL WORKS

Arrhenius, S. A. Theories of chemistry. Longm. 1907. 224 p. $2 50. A critique.

†**Bredig, G.** (ed.). Handbuch der angewandten physikalischen Chemie in Einzeldarstellungen. Barth. 1905–24. 13 v. Volumes of this series are classified according to subject, as individual books.

†**Eggert, J.** Lehrbuch der physikalischen Chemie in elementarer Darstellung. 1926. 547 p. M26

****Eucken, A.** (trans) The fundamentals of physical chemistry McGraw. 1925. 699 p $5 50 From German ed 2.

Getman, F. H. Outlines of theoretical chemistry. Wiley. 1927 ed 4. 728 p $3.75.

Hoff, J. H. van't (trans). Lectures on theoretical and physical chemistry. Arnold 1900. 3 v 553 p 29s.

Jellinek, K. Lehrbuch der physikalischen Chemie. Enke. 1914– . 4 v (1 and 2 published).

****Lewis, W. C. M.** A system of physical chemistry Longm. v. 1 Kinetic theory. 1918. ed. 2. 506 p. $5. v. 2. Thermodynamics. 1925. ed. 4. 489 p. $4 75. v. 3. Quantum theory. 1925. ed. 3. 417 p. $4.75. Advanced text and reference.

***Mellor, J. W.** Chemical statics and dynamics. 1914. 542 p.

Millard, E. B. Physical chemistry for colleges McGraw. 1926. ed. 2. 458 p. $3 50.

***Nernst, W.** Theoretical chemistry. Macmil. 1923. ed. 5 from German ed. 8–10 992 p. $7. A classic.

Noyes, A. A., and Sherrill, M. S. Advanced course of instruction in chemical principles. Macmil. 1922. new ed. 310 p. $4.

***Ostwald, Wi.** Lehrbuch der allgemeinen Chemie. Engelmann. 1906–11. 4 v.

Ostwald, Wi. (trans.). Outlines of general chemistry. Macmil. 1912. ed. 3 from German ed. 4. 596 p. $7. The well-known "Grundriss."

†**Senter, G.** Outlines of physical chemistry. Van Nost. 1926. ed. 14. 441 p. $3. "A fine little text for elementary work."

***Taylor, H. S.** (ed). A treatise on physical chemistry. Van Nost. 1924. 2 v. 1323 p. $12. By a group of writers, without suffering thereby.

†**Taylor, H. S.** Elementary physical chemistry. Van Nost. 1927. 512 p.

***Walker, J.** Introduction to physical chemistry. Macmil. 1922. ed. 9 440 p. $4 50.

***Washburn, E. W.** An introduction to the principles of physical chemistry McGraw. 1921. ed. 2. 516 p. $4 More mathematical than some other beginning texts.

2C2 CATALYSIS

†**Bancroft, W. D.,** and others. Reports of the committee on contact catalysis Nos 1–4, 1922–25. Natl. Research Council, Reprint and Circ Series Nos 30, 50, 59, —. "Invaluable summaries"

Ellis, C. See 27A.

Falk, K. G. Catalytic action Chem Cat. 1922. 172 p. $3.50. "A manual of theory"

***Faraday Society.** Catalysis with special reference to newer theories of chemical action. Gurney. 1922. 129 p 9s A symposium by leaders, reprinted from the Society's Transactions.

Jobling, E. Catalysis and its industrial application. Churchill 1920. ed 2 152 p 7s.6d. "An excellent brief summary"

***Rideal, E. K., and Taylor, H. S.** Catalysis in theory and practice Macmil. 1926 ed 2 516 p $6. "Ed 2 is a considerable amplification of ed 1 on the theoretical side"

****Sabatier, P.** (trans) Catalysis in organic chemistry Van Nost 1922 406 p $5 Standard, with added material by the translator, E E Reid A German trans (Akad. Verlags, 1927 M24) contains good bibliographies for the period 1920-26

Woker, G. Die Katalyse Enke. 2 v (1) 1910. Paper, $4 (2) Parts only in 1915 and 1925 A comprehensive, noncritical bibliography on the rôle of catalysis in analysis.

2C3 CRYSTALLOGRAPHY AND CRYSTAL STRUCTURE

Barker, T. V. Graphical and tabular methods in crystallography Van Nost 1922 161 p. $5.

Born, M. Atomtheorie des festen Zustandes (Dynamik der Kristallgitter). Teubner 1923. 260 p

Bragg, W. H. The crystalline state. Oxford U. 31 p. 70¢.

****Bragg, W. H., and Bragg, W. L.** X-rays and crystal structure. Bell. 1924. ed 4. 322 p. 21s. Thoroughly revised, excellent for students

***Ewald, P. P.** Kristalle und Röntgenstrahlen. Springer. 1923. 327 p. $6.

****Groth, P. H. von.** Chemische Krystallographie. Leipzig. 1906–19. 5 v. $25. The standard authority.

Groth, P. H. von (trans.). The optical properties of crystals. Wiley. 1910. ed. 4 309 p $3 50

Rinne, F. (trans). Crystals in relation to the fine structure of matter. Dutton 1924 195 p $4 20 From German ed. 2. A good introduction.

Schoenflies, A. Theorie der Kristallstruktur, ein Lehrbuch Borntraeger. 1923 555 p. 18s. New ed. of "Krystalsysteme und Krystallstruktur"

***Tutton, A. E. H.** Crystallography and practical measurement Macmil. 1922 ed. 2 2 v. 1446 p. $35. "A mine of accurate information" "Seems to have been written for students chiefly."

†**Tutton, A. E. H.** Crystalline form and chemical constitution. Macmil 1926. 264 p $3 60

***Wyckoff, R. W. G.** The structure of crystals Chem. Cat 1924. 462 p $7.50. (A C S. monograph) For workers, not general readers

2C4 PHOTOCHEMISTRY

(See also 5 (*Photography*) and 11D (*Plant chemistry*))

Allen, H. S. Photo-electricity. Longm. 1923 ed. 2. 320 p. $6 50.

Bose, J. C. The physiology of photosynthesis. Longm. 1924 307 p $5 50. Largely about his own work.

***Ellis, C., and Wells, A. A.** The chemical action of ultra-violet rays. Chem Cat. 1925. 362 p. $6 50 Noncritical compilation.

†**Faraday Society.** Photochemical reactions in liquids and gases. The Society. 1926? 221 p. 15s.6d.

Luckiesh, M. Ultraviolet radiation. Van Nost. 1922. 258 p. $3.50. A useful monographic summary.

Plotnikov, J. Allgemeine Photochemie Gruyter 1920. 729 p. $10 Voluminous and noncritical

Pringsheim, P. Fluoreszenz und Phosphoreszenz in Lichte der neueren Atomtheorie. Springer. 1921. 202 p. "An excellent monograph"

***Sheppard, S. E.** Photo-chemistry. Longm. 1914. 474 p. $3.50. "The best theoretical book in English but out of date, tedious and difficult to read."

†**Spoehr, H. A.** Photosynthesis. Chem.

Cat. 1926. 382 p. $6.50. (A. C. S. monograph.)

†**Weigert, F.** Die chemischen Wirkungen des Lichts. Enke 1913. "An excellent monograph on 'classical' photochemistry."

2C5 SOLUTIONS

Arrhenius, S. A. Theories of solutions. Yale U. 1912. 247 p. $3. A course of lectures.

†**Blasdale, W. C.** Equilibria in saturated salt solutions. Chem. Cat 1927 200 p. $4.50. (A C S monograph)

****Foerster, F.** Elektrochemie wasseriger Losungen. Barth. 1923 ed. 4. 900 p. M32.

Hildebrand, J. H. Solubility. Chem. Cat. 1924. 206 p $4 (A C S. monograph) "A real attempt to develop a general theory of solubility."

***Kraus, C. A.** Properties of electrically conducting systems. Chem Cat. 1922. 415 p. $6.50. (A. C. S monograph.)

Lecomte du Noüy, P. See 2D

†**Legendre, R.** La concentration en ions hydrogène de l'eau de mer. Presses Univ. 1925. 283 p. 30 fr

Walden, P. Das Leitvermogen der Losungen. Akad. Verlags. 1924. In 3 parts, 1126 p. in all. M50. (v. 4 of the Ostwald-Drucker Handbuch, list 2B1). A valuable but not very critical reference work.

Walden, P. Elektrochemie nichtwasseriger Losungen. Barth 1924. 515 p M22. "Monumental."

Walden, P. Leitfahigkeit von wassrigen und nichtwassrigen Losungen. Akad. Verlags 1924? 600 p $8

Walden, P. Molekulargrössen von Elektrolyten in nichtwasserigen Losungsmitteln Steinkopff. 1923. 350 p. 10s.

2C6 SPECTROSCOPY

(See also 3 (*Subatomic phenomena and radiochemistry*))

****Baly, E. C. C.** Spectroscopy Longm. 1924. ed 3. v 1. 298 p. $4 75 v. 2 and 3 in prepn. Standard advanced work.

Fowler, A. Report on series in line spectra. Fleetway Press, London. 1922. 183 p. 12s.6d. Voluminous data, not indexed

Hicks, W. M. Treatise on the analysis of spectra. Cambridge U. 1922. 326 p. 35s.

†**Hund, F.** Linienspektren und periodisches System der Elemente. 1927. 227 p. M16.20.

†**Kayser, H.** Tabelle der Hauptlinien der Linienspektra aller Elemente nach Wellenlänge geordnet. Springer. 1926. 198 p. M24. The table at the end of v. 6 of the "Handbuch," revised.

Kayser, H., and Konen, H. Handbuch der Spektroskopie. Hirzel 1900– . (v. 1–6 and 7, part 1 out in 1926.) "Complete and reliable."

†**Lecoq de Boisbaudran, F., and Gramont, A. de.** Analyse spectrale appliquée aux recherches de chimie minérale. Hermann. 1923. 341 p. Text and atlas.

†**Lifschitz, I.** Spektroskopie und Kolorimetrie. 1927. 336 p. M27. (v. 2, ed. 2 of Bredig's Handbuch der angewandten physikalischen Chemie).

Lyman, T. The spectroscopy of the extreme ultra-violet. Longm 1914 140 p. $2.35.

Paschen, F., and Götze, R. Seriengesetze der Linienspektren Springer. 1922. 154 p

Twyman, F. Wavelength tables for spectrum analysis. A. Hilger, London. 1923. 106 p 7s.9d.

2C7 THERMODYNAMICS AND THERMOCHEMISTRY

Bourion, F. Thermochimie. Doin. 1924. 363 p 25 fr.

†**Boutaric, A.** Thermodynamique et chimie. Hermann 1926. 656 p. 70 fr. Based on P Duhem's book of the same title. ed 2

†**Bridgeman, P. W.** A condensed collection of thermodynamic formulas. Harvard U. 1925. 34 p. $1 50. An important summary

†**Drucker, C.,** and others (eds.). Thermische Eigenschaften der Stoffe. Springer. 1926. 490 p. M37.50.

†**Eucken, A.** and others (eds). Physikalische, chemische und technische Thermodynamik. v. 3, first half, of the Muller-Pouillet "Lehrbuch der Physik." Vieweg 1926. 1203 p. M68. "For the most part a treatise on physical chemistry."

†**Freundlich, E.,** and others. Anwendung der Thermodynamik. Springer. 1926. 454 p. M37 20.

Goodenough, G. A. Principles of thermodynamics. Holt. 1920. ed. 3. 353 p. $5. For engineers.

****Lewis, G. N., and Randall, M.** Thermodynamics and the free energy of chemical substances. McGraw. 1923. 653 p. $5. "The most readable and stimulating book on thermodynamics yet written. Does not lend itself to classroom use."

Lewis, W. C. M. See 2C1.

Lucke, C. E. Engineering thermodynamics. McGraw. 1912. 1176 p. $8. "Useful for numerical data."

MacDougall, F. H. Thermodynamics and chemistry. Wiley. 1926. ed 2. 421 p. $5.50.

†**Nernst, W.** (trans.). The new heat theorem. Methuen. 1926. From German ed. 2. 297 p. 12s.6d.

Partington, J. R. Chemical thermodynamics. Constable. 1924. ed 2. 282 p. 10s 6d. A rewritten ed. of the "Textbook on thermodynamics with special reference to chemistry."

†**Planck, M.** Treatise on thermodynamics. Longm. 1927. English. ed 3 from German ed. 7. 309 p $5. "The best presentation of the classical point of view."

Sackur, O. (trans). A textbook of thermochemistry and thermodynamics. Macmil. 1917. 439 p. $4.

***Thomsen, J.** (trans.). Thermochemistry. Longm. 1908. 510 p. Reprinted 1920 12s 6d. (Ramsay series.) A classic.

2C8 OTHER SPECIAL SUBJECTS

(See also 2D (*Colloids*).)

X-Rays, see 3 (*Subatomic phenomena*, etc).

***Bingham, E. C.** Fluidity and plasticity. McGraw. 1922. 440 p. $4

†**Cohen, E.** Physico-chemical metamorphosis and some problems in piezochemistry. McGraw 1927. 190 p. $2 50. Three lectures at Cornell.

†**Conseil de Chimie.** Structure et activité chimiques. Gauthier. 1926. v. 2. 672 p. 96 fr

****Findlay, A.** The phase rule and its application. Longm. 1923. ed. 5. 298 p. $3 50. "The best elementary treatise on the subject."

Fry, H. S. Electronic conception of valence and the constitution of benzene. Longm. 1921. 300 p. $5 50

Guye, C. E. (trans). Physico-chemical evolution. Dutton 1925. 172 p $2.40. "Largely a discussion of Carnot's principle as applied to living organisms "

†**Hedges, E. S., and Myers, J. E.** The problem of physico-chemical periodicity. Longm 1926. 95 p. $2.75.

†**Hinshelwood, C. N.** The kinetics of chemical change in gaseous systems. Oxford U. 1926 204 p. 12s 6d

Jeans, J. H. The dynamical theory of gases. Cambridge U. 1925. ed. 4. 444 p. 30s. Requires considerable mathematical knowledge.

†**Job, P.** Les méthodes physiques appliquées á la chimie. Doin. 1926. 258 p. 30 fr.

†**Loeb, L. B.** Kinetic theory of gases. McGraw. 1927. 555 p. $5.50.

†**Ostwald, Wi.** Farbnormen-Atlas. Part 1. Die Farbe. Verlag Unesma (Leipzig). 1926. ed. 3. Parts 1 and 2. 182 tables each. M20 each.

Prideaux, E. B. R. Problems in physical chemistry. Constable. 1920. ed. 2. 294 p 18s.

†**Reilly, J.**, and others Physico-chemica methods. Methuen. 1926. 747 p. 30s.

†**Rideal, E. K.** An introduction to surface chemistry. Cambridge U 1926. 346 p. 18s.

Robertson, T. B. See 11A2.

†**Schulze, A.** Die thermische Ausdehnung. Borntraeger. 1926 Appearing in parts. v. 2 relates to metals and alloys.

Smiles, S. The relations between chemical constitution and some physical properties Longm. 1910 583 p *o p.* New ed in preparation.

***Smits, A.** (trans.). Theory of allotropy Longm. 1922. 397 p. $6.50. (Ramsay series.) Not easy reading. Has had some unfavorable reviews.

***Stewart, A. W.** Recent advances in physical and inorganic chemistry. Longm 1926 ed 5 312 p. $6.50. A well-known collection of chapters on individual topics "The present edition is practically a new book."

Stewart, A. W. Some physico-chemical themes Longm 1922. 419 p. $7.50 Well-written essays, not for the specialist

Tammann, G. Lehrbuch der heterogenen Gleichgewichte. Vieweg. 1924 358 p. M17. A digest of Roozeboom's "Lehrbuch."

†**Taylor, W.** A new view of surface forces Toronto U. 1926? 238 p.

Watson, E. R. Colour in relation to chemical composition. Longm. 1918. 210 p. $4 50

***Willows, R. S., and Hatschek, E.** Surface tension and surface energy and their influence on chemical phenomena. Blak 1923. ed. 3. 134 p $2. "A capital introduction."

Young, S. Stoichiometry. Longm. 1919. ed. 2. 377 p. $4 20.

2C9 LABORATORY MANUALS ON PHYSICAL CHEMISTRY

Arndt, K. Handbuch der physikalisch-chemischen Technik fur Forscher und Techniker. Enke. 1923. 886 p. $11.75.

Clark, W. M. See 7F.

****Findlay, A.** Practical physical chemistry Longm 1923. ed 4 298 p. $2 25. Standard.

Klooster, H. S. von. See 2I.

***Ostwald, Wi., and Luther, R. T. D.** Hand- und Hilfsbuch zur Ausfuhrung physiko-chemischer Messungen. Akad. Verlags. 1925. ed. 4. 814 p. M35

Spencer, J. F. An experimental course of physical chemistry. Bell 1921 2 v 548 p. 9s.

†**Thiel, A.** Physikochemisches Praktikum fur Chemiker und andere Naturwissenschaftler. Borntraeger. 1926. 380 p. M16 80.

2D COLLOIDS

†**Alexander, J.** Colloid chemistry, theoretical and applied. Chem. Cat v. 1. 1926. 974 p. $14 50. v. 2 and 3 in prepn.

****Bancroft, W. D.** Applied colloid chemistry. McGraw. 1926 ed 2 490 p. $4.

Bechhold, H. (trans) Colloids in biology and medicine Van Nost 1919. From German ed. 2. 464 p. $3.

****Bogue, R. H.** (ed). Theory and application of colloidal behavior. McGraw. 1924. 2 v. 850 p. $8. Essays covering theory and application, by 34 authorities.

****British Association for Advancement of Science.** Reports on colloid chemistry and its general and industrial applications. H M S Office 1917–23 5 v, with index. "An invaluable colloidal library"

***Burton, E. F.** The physical properties of colloid solutions Longm 1921 ed 2 221 p. $4 50

***Clayton, W.** The theory of emulsions and emulsification. Churchill 1923. 160 p 9s.6d.

****Freundlich, H.** (trans) Colloid and capillary chemistry. Methuen. 1926. From German ed 3 of "Kapillarchemie" 899 p. 50s. "The greatest classic of colloid chemistry."

Freundlich, H. (trans). The elements of colloidal chemistry. Methuen. 1925. 210 p. $3. Abbreviated ed of "Kapillarchemie."

†**Freundlich, H.** Fortschritte der Kolloidchemie. Steinkopff. 1926. 109 p. M5.50. Based on lectures in the U. S. in 1925.

Gibbs, W. E. See 13M.

Hatschek, E. (ed.). The foundations of colloid chemistry. Benn. 1925 173 p. 18s. Reprints of classical papers.

Hatschek, E. Laboratory manual of elementary colloid chemistry. Churchill. 1925. ed 2. 153 p. 7s.6d.

Hatschek, E. An introduction to the physics and chemistry of colloids Churchill. 1925. ed 5 201 p. 7s.6d.

***Holmes, H. N.** A laboratory manual of colloid chemistry. Wiley. 1922. 127 p. $2.

†**Kruyt, H. R.** (trans.) Colloids. Wiley. 1927. 262 p. $3 50.

†**Lecomte du Noüy, P.** Surface equilibria of biological and organic colloids. Chem. Cat. 1926. 212 p $4 50. (A C. S. monograph)

Liesegang, R. E. (ed). Kolloidchemie. Steinkopff 1926. ed. 2. 188 p. M9.50. A record of the more recent advances.

Liesegang, R. E. Kolloide in der Technik. Steinkopff. 1923. 157 p

†**Liesegang, R. E.** (ed) Kolloidchemische Technologie Steinkopff 1926. 2 parts. 160 p. M10.

***Loeb, J.** Proteins and the theory of colloidal behavior. McGraw 1924 ed 2 380 p. $3.50

Lüppo-Cramer, H. See 5.

***Michaelis, L.** The effects of ions in colloidal systems. Williams. 1925. 112 p. $2.50.

†**Michaelis, L.** (trans). Practical, physical and colloid chemistry for students of medicine and biology. Heffer 1925. From German ed 2 205 p 7s 6d.

National symposia on colloid chemistry. Chem. Cat v. 1. 1923. 419 p. $2.75. —v 2. 1925. 308 p. $6.50.—v. 3. 1926 323 p $6 50. —v. 4. 1927. 378p $6 50.

Ostwald, Wo. (trans) An introduction to theoretical and applied colloidal chemistry. Wiley 1922. ed. 2. From German ed 8. 266 p $2 50.

Ostwald, Wo. (trans). A handbook of colloid chemistry. Blak. 1919. ed. 2. From German ed. 3. 300 p. $4.50.

†**Ostwald, Wo.,** and others (trans.). Practical colloid chemistry. Methuen. 1926. From German ed. 4. 207 p. 7s 6d. German ed. 6 ("Kleines Praktikum der Kolloidchemie"), Springer. 174 p. M7.50. A standard beginning lab. manual.

Pauli, W (trans.). Colloid chemistry of the proteins. Blak. 1922. Part 1. 140 p. $2 25.

Rideal, E. K. See 2C8.

†**Schulze, H.,** and others. Klassische Arbeiten uber kolloide Lösungen. Akad. Verlags. 1926. 172 p. M8.80.

****Svedberg, T.** The formation of colloids. Churchill. 1921. 127 p. 7s.6d.

**Svedberg, T. Die Methoden zur Herstellung kolloider Losungen anorganischer Stoffe. Steinkopff. 1922. ed. 3. 508 p. $2.80. Unaltered reprint of earlier ed.

*Svedberg, T. Colloid chemistry Chem. Cat. 1924. 230 p. $4 50. (A C. S. monograph.) Lectures at the Univ. of Wisconsin

*Taylor, W. W. The chemistry of colloids, and some technical applications. Arnold. 1921. ed. 2. 332 p. 10s 6d

*Weimarn, P. P. von. (trans). Die Allgemeinheit des Kolloidzustandes Steinkopff. 1925 ed. 2. v 1. 505 p. M25.

†Weimarn, P. P. von. Dispersoidological investigations. Imperial Industrial Research Inst., Osaka, Japan. 1925. Reports 4 and 5. 208 p.

†Weiser, H. B. The hydrous oxides. McGraw 1926. 452 p. $5

*Zsigmondy, R. Kolloidchemie Ein Lehrbuch. Spamer 1925. ed. 5. v. 1. 242 p M13 50. "Clear and nonmathematical "

*Zsigmondy, R. (trans) Colloids and the ultramicroscope. Wiley. 1909. 245 p. $3.

Zsigmondy, R., and others The chemistry of colloids. Wiley. 1917 288 p. $3. A translation with an added section on applications.

†Zsigmondy, R., and others. Traité de chimie colloidale. Paris. 1926. 550 p. 86 fr.

2E CALCULATIONS

†Fueter, R. Das mathematische Werkzeug des Chemikers, Biologen und Statistikers. O Fussli, Zürich. 1926 v. 3. 268 p. M14 40

†Gay, L. Les mathématiques du chimiste. Hermann 1926. 216 p 25 fr

†Hamilton, L. F., and Simpson, S. G. Calculations of quantitative chemical analysis McGraw. 1927. ed. 2. 239 p. $2 25

Hitchcock, F. L., and Robinson, C. S. Differential equations in applied chemistry. Wiley. 1923. 110 p. $1.50.

Holmes, A. See 8B.

†Jaffe, B. Chemical calculations. World Book Co., Yonkers, N. Y. 1926. 159 p. $1 28.

Knox, J. Physico-chemical calculations. Van Nost. 1912. 190 p. $1.50.

Kuester, F. W. Logarithmische Rechentafeln fur Chemiker. Gruyter. 1925. ed. 30–34. 146 p. M6. Primarily for analysts.

Lacroix, A., and Ragor, C. L. A graphic table combining logarithms and antilogarithms Macmil. 1925. 40 p. $1.40. Novel and labor-saving

Lewis, W. K., and Radasch, A. H. See 13M

*Mellor, J. W. Higher mathematics for students of chemistry and physics. Longm. 1922. ed. 5. 682 p. $7. "Extremely useful."

Miller, E. H. The calculations of analytical chemistry. Macmil. 1921. ed. 3. 201 p. $2.

Nernst, W., and Schoenflies, A. Einfuhrung in die mathematische Behandlung der Naturwissenschaften Oldenbourg. 1922 ed 10. 502 p M12. Calculus, especially for chemists

Partington, J. R. Higher mathematics for chemical students. Methuen. 1920. ed. 2. 272 p. 6s. "Much less adequate than Mellor."

Richards, J. W. See 9A.

†Tuttle, L., and Satterly, J. Theory of measurements. Longm. 1925. 333 p $4 50.

*Wells, H. L. Chemical calculation tables. Wiley. 1919. ed. 2. 43 p. $1.35. Especially for analysts.

2F CONSTANTS

(See also 2G (*Pocketbooks*))

*Comey, A. M., and Hahn, D. A. A dictionary of solubilities—inorganic. Macmil. 1921. ed. 2. 1141 p. $14.

Fowle, F. E. Smithsonian physical tables. Smithsonian Inst , Washington. 1921. ed 7. 450 p. $3 A cheaper and partial substitute for the large works.

Kaye, G. W. C., and Laby, T. H. Tables of physical and chemical constants and some mathematical functions. Longm. 1926. ed 5. 169 p. 14s. A cheaper and partial substitute for the large works.

**Landolt, H., and Börnstein, R. (ed.). Physikalisch-chemische Tabellen. Springer. 1923. ed 5. 2 v. 1695 p. $45. For many years the leader in this field. Less critical than the International tables but indispensable until the latter are completed. See Chap II (p 23).

**Marie, C. (ed.). Tables annuelles de constantes et données numériques de chimie, de physique, de biologie et de technologie. Gauthier (McGraw in U. S.). 5 v. (covering the period 1910–22) out in 1926. $71($52.50 to members of certain societies). See Chap. II (p. 24).

†Segerblom, W. Properties of inorganic substances. Chem. Cat 1927. ed. 2.

226 p. $6. For students of qualitative analysis.

*Seidell, A. Solubilities of inorganic and organic compounds. Van Nost. 1920. ed. 2. 843 p. $7 50.

Société française de physique. Recueil de données numériques. Gauthier Useful "until International critical tables is complete."

**Washburn, E. W. and others (eds.). International critical tables. McGraw. 1926. v 1. 415 p. $12.—1927 v. 2 633 p. $12. To be in 5 v. Covers physics, chemistry and technology. See Chap. II (p 23)

2G POCKETBOOKS

Atack, F. W., and Whinyates, L. (eds.). Chemists' year book. Simpkins, Marshall, Hamilton, Kent and Co, London. 1927. Am. ed. (Chem. Cat) 2 v About 1100 p. $6. Similar to Van Nostrand's annual but revised annually.

*Biedermann, R. (ed. W Roth). Chemiker-Kalender. Springer 1927 (year 48). 3 v. 1462 p. M18 Was for a long time the leading book of this class. See Chap. II (p 24).

Hodgman, C. D., and Lange, N. A. Handbook of chemistry and physics. Chemical Rubber Co, Cleveland. 1926. ed. 11. 1011 p. $5 (to students, $2). Widely used.

†Lefax data sheets Lefax, Inc, Phila Loose-leaf system includes a large number of chemical and engineering sheets.

Liddell, D. M. The metallurgists' and chemists' handbook. McGraw. 1918. ed. 2 656 p. $5.

*Olsen, J. C. (ed). Van Nostrand's chemical annual. Van Nost. 1926 ed. 6. 950 p. $5. See Chap. II (p. 25).

Tycos tables. Taylor Instrument Co., Rochester, N Y. "Small, but very useful"

2H HISTORY OF CHEMISTRY

2H1 GENERAL

Brown, J. C. A history of chemistry from the earliest times till the present day. Churchill 1920. ed. 2. 571 p. 21s. A posthumous arrangement of lecture notes, defective but very readable.

Kopp, H. F. M. Geschichte der Chemie. Braunschweig. 1843–7. 4 v. Of highest historical value; now becoming rare.

Lowry, T. M. Historical introduction to chemistry. Macmil. 1915. 581 p. 10s.6d.

Masson, I. Three centuries of chemistry: phases in the growth of a science. Benn. 1925 191 p. 10s.6d. "Particularly good for Boyle and his period."

**Meyer, E. von (trans.). A history of chemistry. Macmil. 1906. ed. 3 from German ed. 3. 691 p —German ed. 4, Veit. 1914. "Standard."

*Moore, F. J. A history of chemistry. McGraw. 1918 292 p. $2.50. Excellent for class use

Muir, M. M. P. A history of chemical theories and laws. Wiley. 1906. 567 p. $4. For the advanced student.

**Thorpe, T. E. Essays in historical chemistry Macmil. 1911. ed. 3. 601 p. 15s. Mainly lectures and addresses on individual leaders and their work.

Venable, F. P. A short history of chemistry. Heath. 1922. ed. 2. 168 p $1.64. "One of the best small histories."

2H2 SPECIAL TOPICS

Berthelot, M. P. E. Les origines de l'alchimie. Paris. 1885. A well-known book, in which later criticism has discovered a number of errors.

Graebe, C. Geschichte der organischen Chemie. Springer. 1920. 406 p.

Holmyard, E. J. Chemistry to the time of Dalton Oxford U 1925. 128 p $1. Good introduction to early chemistry

*Lippmann, E. O. von. Entstehung und Ausbreitung der Alchimie Springer. 1919 742 p. "The most scholarly book on the subject thus far"

†Lucas, A. Ancient Egyptian materials. Arnold 1926. 242 p. $2.75.

Ramsay, W. See 6C.

Redgrove, H. S. Alchemy; ancient and modern. W. Rider and Son London. 1922. ed. 2 141 p. 7s.6d.

*Smith, E. F. Chemistry in America. Appleton. 1914. 356 p. $3.50. "The best and only work of its kind."

Smith, E. F. See also 2N2.

*Stillman, J. M. Story of early chemistry. Appleton. 1924. 566 p. $4. Specially good on literary sources.

Tilden, W. A. Chemical discovery and invention in the twentieth century. Routledge. 1922. ed. 4. 503 p. 12s.6d. Semipopular.

Tilden, W. A. The progress of scientific chemistry in our own times. London. 1913. ed. 2. 366 p. 8s.6d Semipopular.

2H3 BIOGRAPHIES

Century science series. Macmil. Contains separate biographies of Dalton, Davy, Faraday and Liebig.

Cohen, E. Jacobus Henricus van't Hoff, sein Leben und Wirken. 1912.

Fischer, E. Aus meinem Leben. Springer 1922. 201 p. "Should be read by every chemist."

Grimaux, E. Lavoisier, 1743–1794 Paris 1888.

Harrow, B. Eminent chemists of our time Van Nost. 1927. ed 2. 471 p $3.

***Hofmann, A. W.** Zur Erinnerungen an vorangegangene Freunde. Braunschweig 1888 3 v. "Biographies among the best ever written."

***Memorial lectures** delivered before the Chemical Society. Gurney. 1901, 1914. v. 1. 592 p 10s 6d. v. 2. 297 p 8s. With portraits

Ramsay, W. Essays, biographical and chemical Constable. 1908. 254 p. 10s 6d. *o p.*

Roscoe, H. E. The life and experiences of Sir H. E. Roscoe written by himself Macmil. 1906.

Smith, E. F. The life of Robert Hare Lipp. 1917. Merely one among the author's fine biographies

Tilden, W. A. Famous chemists the men and their work. Routledge. 1921. 296 p. 12s 6d

Vallery-Radot, R. (trans.). The life of Pasteur. Doubleday, Page and Co., Garden City, N Y. 1920. 484 p. $1 (through Chem Foundation).

Volhard, J. Justus von Liebig. Leipzig. 1909. 2v.

2H4 REPRINTS OF CLASSICS

Alembic Club reprints. Chicago U 18 nos. 44¢ to $1.35 Reprints of original articles, chiefly before 1840

Boyle, R. The sceptical chymist. Dutton (Everyman's Library) 70¢

Ostwald, Wi. (ed.). Klassiker der exakten Wissenschaften. Akad. Verlags. 1889– (no. 214 in 1925). Boards.

2K POPULAR CHEMICAL BOOKS

(This list includes general treatments only; some popular books on particular subjects have been entered under the appropriate headings)

Arrhenius, S. A. (trans.). Chemistry in modern life. Van Nost. 1925. 302 p. $3.

Bragg, W. H. Concerning the nature of things. Bell. 1925. 231 p. $3 50. Six lectures before the Royal Institution.

***Duncan, R. K.** The chemistry of commerce. Harper. 1907. 263 p. Duncan's fascinating books still retain their vogue.

Duncan, R. K. The new knowledge. A. S. Barnes and Co., New York. 1914. New ed. 292 p. $3.

Duncan, R. K. Some chemical problems of today. Harper 1911 254 p. $2 25.

Faraday, M. The chemical history of a candle Harper. 1903 158 p 60¢. Classic popular lectures reprinted.

†**Farnham, D. T.,** and others Profitable science in industry Macmil 1925 291 p. $3 50 Data on financial returns from research, contains a section on chemistry

†**Farrell, H.** What price progress? Putnam. 1926. 323 p $2.50 ($1 through Chem. Foundation)

***Flinn, A. D.,** and others. Popular research narratives. Williams. 1924–26. 2 v 326 p $1 50

†**Foster, W.** The romance of chemistry Century. 1927. 468 p. $3

Gregory, R. Discovery, the spirit and service of science. Macmil. 1921. 347 p. $2.

****Hendrick, E.** Everyman's chemistry. Harper 1917. 374 p $3.

****Howe, H. E.** (ed.). Chemistry in industry. Chem Foundation. 1924–25. 2 v. 764 p. $2. A coöperative work.

†**Howe, H. E.** Chemistry in the world's work. Van Nost 1926 224 p. $3

***Martin, G.** Modern chemistry and its wonders. Sampson, Low, Marston and Co., London. 1923 378 p. 7s 6d

***Martin, G.** Triumphs and wonders of modern chemistry. Sampson, Low, Marston and Co., London. 1922. 368 p 7s 6d

Sadtler, S. S. The chemistry of familiar things. Lipp. 1924. ed 4. 320 p $3. "A layman's chemistry."

****Slosson, E. E.** Creative chemistry Century. 1920. 311 p. $3. A most readable and very widely circulated book about the achievements of the science.

***Slosson, E. E.** Chats on science. Century. 1923? 273 p. $2.

Slosson, E. E. Keeping up with science. Harcourt, Brace and Howe, New York. 1924. 355 p. $2.50

2L EDUCATION—TEACHING OF CHEMISTRY

***Benedict, F. G.** Chemical lecture experiments. Macmil. 1901. 436 p. $2 75.

†**Carpenter, W. W.** Certain phases of the administration of high school chemistry.

N. Y. Teachers' College, Columbia U. 1925. 82 p. $1 50.

†**Davison, H. F.** A collection of chemical lecture experiments. Chem Cat. 1926. 139 p. $2 50 With an introduction on the art of lecture table demonstrating

Frank, J. O. Teaching first year chemistry. The Author, Oshkosh, Wis. 1926. ed. 3. 121 p. $1.50.

Jacobson, C. A. A pronouncing chemical formula speller and contest guide. Williams. 1925. 280 p. $4.

Klooster, H. S. van. Lecture and laboratory experiments in physical chemistry Chem Pub 1925. ed. 2. 274 p $3

†**Kostir, M.** Compulsory teaching of chemistry. Bale, John, Sons and Danielsson, London. 1926 1s.

***Newth, G. S.** Chemical lecture experiments. Longm 1923. 354 p. $3

†**Scheid, K.** Vorbereitungsbuch fur den Experimentalunterricht in Chemie Teubner. 1926 ed 3 488 p M20

Smith, A., and Hall, E. H. The teaching of chemistry and physics in the secondary school. New York. 1919. 377 p. $1 75. *o p.*

2M FOREIGN LANGUAGES

Courses in chemical German and French

***Dolt, M. L.** Chemical French Chem Pub. 1920. ed. 2. 413 p $4 Exercises for translation, advanced readings and a vocabulary.

Greenfield, E. V. Introduction to chemical German. Heath 1918 384 p $1 80 A smaller book than Phillips.

***Phillips, F. C.** Chemical German Chem. Pub 1915 ed. 2 252 p $3 50. Similar in plan and format to Dolt

Technical dictionaries

***Cornubert, R.** Dictionnaire anglais-français-allemand de mots et locutions intéressant la physique et la chimie. Dunod. 1922. 297 p. $4 English, French and German in parallel columns.

†**Gordon, A.** French-English medical dictionary. Blak 1921. 161 p. $3.50.

Hellbusch, E. (ed.). Deutsch-englisch-franzosisch-spanisches Fachworterbuch fur den Chemikalienhandel und die anschliessenden Gebiete R. Bredow, Berlin 1921 403 p M10. Chiefly names of substances

Kettridge, J. O. French-English and English-French dictionary of technical terms and phrases. Routledge 1925. 2 v. 1153 p. $14. Emphasizes civil, mechanical, electrical and mining engineering.

Lang (ed. M. K. Meyers). German-English dictionary of terms used in medicine and the allied sciences. Blak. 1924. ed. 3. 613 p. $7. Good in its field.

†**Leon, N. P. de.** Diccionario tecnológico inglés-español y español-inglés. New York. 1893 (reprinted 1920). 2 v. $15.

****Patterson, A. M.** A French-English dictionary for chemists Wiley 1921. 403 p. $3 Includes some common nontechnical words.

****Patterson, A. M.** A German-English dictionary for chemists. Wiley. 1924. ed. 1 with addenda. 343 p. $2.50. Includes some common nontechnical words.

***Schlomann, A.** (ed.). Illustrated technical dictionaries. Oldenbourg (Stechert, New York). 15 v. or more. $2–7 per v. In six languages. Subject arrangement, with illustrative cuts and full indexes. Most of the volumes so far issued relate to mechanical, electrical, etc , engineering.

Willcox, C. D. A French-English military technical dictionary. Govt Printing Office, Washington. 1917. ed. 2. 582 p. Excellent in its field.

General dictionaries

Dutch

Calish. Dictionary of Dutch and English. Campagne and Zoon, Tiel. Dutch-English part, 822 p. $5. 2 v. $9.

†**Van Wely, F. P. H. P.** Van Goor's Handwoordenboek (Dutch and English dictionary) Gouda, Netherlands 1923. 2 v. in 1. 1692 p. $5.

French

Clifton, E. C., and Grimaux, A. A new dictionary of the French and English languages. Garnier, Paris. 1923. Revised ed 1341 p. $6. Satisfactory for nontechnical terms.

Larousse, Nouveau petit, illustré. Larousse, Paris 1925. 1760 p. $2. All French. Good as a small supplement to a French-English work.

†**Larousse** universel. Larousse, Paris. 1922. 2 v. $15. All French.

German

Flügel, F., and others. Wörterbuch der englischen und deutschen Sprache Westermann, Braunschweig. v. 2 (German-English). 1006 p. $4. Satisfactory for ordinary nontechnical terms.

***Muret-Sanders.** Enzyklopädisches englisch-deutsches und deutsch-englisches

Worterbuch. Schoneberg, Berlin. Large edition, part 2. German-English. 2 v. 2400 p. $20. "The best of its kind" Good on technical terms.

Italian

Edgren, H. An Italian-English and English-Italian dictionary. Holt. 1901. 1025 p $4.

Melzi, Il nuovissimo. Dizionario italiano completo. Vallard, Milano $2. All Italian. Similar to the "petit Larousse" listed above

Spanish

***Larousse,** Pequeño, illustrado. Larousse, Paris. 1925 1528 p. $3 All Spanish Counterpart of the French "petit Larousse."

†**Lopes and Bensley.** New Spanish and English dictionary. Spanish-English part. 844 p $4

2N LITERATURE

This list, being on chemical literature (the subject of this book) is relatively more detailed than the lists on the other phases of chemistry.

2N1 TECHNICAL COMPOSITION

Allbutt, T. C. Notes on the composition of scientific papers. Macmil 1923. ed 3 192 p. 6s

†**Hill, J., and Marriott, J. W.** A year's work in technical English. G. G. Harrap and Co., London. 1926. 134 p. 2s.

†**Park, C. W.** English applied in technical writing. Crofts. 1926. 313 p. $2.25.

***Rickard, T. A.** Technical writing. Wiley. 1923. ed. 2. 337 p. $2. "One of the most useful books of its kind"

Trelease, S. F., and Yule, E S. Preparation of scientific and technical papers Williams. 1925 113 p. $1 50. "A style book for the inexperienced"

***University of Chicago.** Manual of style. Chicago U. 1925 ed 8 391 p $3 "A citation from this book carries authority."

***Watt, H. A., and McDonald, P. B.** The composition of technical papers McGraw. 1925. ed. 2. 429 p. $2. "A splendid practical companion."

†**Wood, G. M.** (ed) Extracts from the style manual of the Government Printing Office. U. S. Geol. Survey. 1922. 114 . 10¢. For the use of typewriter operators.

†**Wood, G. M.** (ed.). Suggestions to authors of papers submitted for publication by the United States Geological Survey with directions to typewriter operators. U. S. Geol. Survey. 1916. ed. 3. 120 p. 15¢.

2N2 CHEMICAL LITERATURE AND ITS USE

†**Bolte, H.** Fuhrer durch die chemische Literatur fur Wissenschaft und Praxis. 1927. 158 p. M3 50

Eason, A. B. Where to seek for scientific facts. S. Rentell and Co., London. 1924. 42 p 1s. About books, journals, abstracts, libraries, etc., primarily from the engineering and electrical points of view.

†**Kempf and Wiederholt.** Fuhrer durch die Literatur der Chemie und ihrer Nachbargebiete. Verlag Chemie Announced in 1925 but had not appeared in 1926.

Mason, F. A. An introduction to the literature of chemistry. Oxford U. 1924 42 p. 2s. A very brief survey of the literature, with hints for making searches

***Ostwald, Wi.** Die chemische Literatur und die Organisation der Wissenschaft. Akad Verlags. 1919 $1 75. v. 1 of the Ostwald-Drucker Handbuch (see list 2B1) Discusses the production and distribution of chemical literature, its history and possibilities, a world language, etc.

Ostwald, Wi. Denkschrift uber die Grundung eines internationalen Institutes fur Chemie Akad Verlags. 1912. A pamphlet in which Ostwald proposed a central establishment (in Europe, with a branch in America) with a library, abstracting bureau, card catalogs, collections of preparations, etc Translation in *Science* **40**, 147–58(1914)

Reid, E. E. See 10 E.

†**Smith, E. F.** Old chemistries McGraw. 1927. 89 p. $2.50. Especially about early American books.

***Sparks, M. E.** Chemical literature and its use U. of Illinois, Urbana 1921. ed 2 80 p. $1. Notes on a course of 16 lectures by a chemical librarian An excellent review of the literature in an important American library, and of the way to use it.

2N3 LITERATURE CATALOGS

(For catalogs and indexes covering journal articles (*e. g.* the International Catalogue of Scientific Literature) see the chapter on Indexes (pp 198–202))

****Bolton, H. C.** A select bibliography of chemistry Smithsonian Inst., Washington. 1893–1904. 4 v. in 8 sections. 2697 p. Covers the period 1492–1902. See Chap. II (p. 29).

Borel, P. Bibliotheca chimica, seu catalogus librorum philosaphicorum hermeticorum.

Paris. 1654. About 4000 entries up to 1653.

British Patent Office. Subject list of works on chemistry (including alchemy, electrochemistry and radioactivity). 1911. 200 p.

Chemical Society (London). A catalogue of the library of the Chemical Society, arranged according to authors, with a subject index. Gurney. 1903. 324 p.

Deutsche Chemische Gesellschaft. Bucherverzeichnis der Zeitschriften, Lehrbucher und grösseren Werke der Bibliothek der deutschen chemischen Gesellschaft nach dem Stande vom Jahre 1919. Friedlander und Sohn, Berlin. 1920. 197 p. Issued with the *Berichte* index. Arranged by authors and by subjects.

***Ferguson, J.** Bibliotheca chemica, a catalogue of the alchemical, chemical and pharmaceutical books in the collection of the late James Young of Kelly and Durris. Maclehose, Glasgow. 1906. 2 v. Full descriptions and excellent notes.

Fuchs, G. F. C. Repertorium der chemischen Literatur von 494 Christi Geburt bis 1806 Jena. 1806–11. 2 v 1342 p. Chronological order.

***Gregory, R.**, and others. A catalogue of British scientific and technical books. **British Science Guild** (A. and F Denny, Ltd , London, agents). 1925. ed. 2. 511 p 12s 6d. Contains 9515 classified titles of books in print Dec. 31, 1924, with author and subject indexes —1926. Supplement 166 p. 2s 6d.

Jorissen, W. P., and others Chemisch Jaarboekje D. B. Centen, Amsterdam 1920. Contains a 474-page classified list of chemical books, with author index.

Otto, P. Technischer Literatur-Kalender. 1920 ed 2 441 p. Information about chemical authors, arranged both alphabetically and by fields of activity

****Poggendorff, J. C.** Biographisch-literarisches Handwörterbuch fur Mathematik, Astronomie, Physik, Chemie und verwandte Wissenschaftsgebiete. 1858–1926. 5 v. (v. 5, Verlag Chemie 1925–26. 1423 p. M152.) v. 1–2 cover through 1857, v. 3 1858–83, v. 4 1884–1900, v. 5 1904–22. A very valuable source book, giving biographical and bibliographical data for scientists of all countries.

***Reuss, I. D.** Repertorium commentationum. Göttingen. 1801–21. 16 v., 14 of which are on natural and medical science. Arranged by subjects. Valuable as a source book before 1800. (Authors and titles of their works.)

Trommsdorff, J. B. Versuch einer systematischen Darstellung der gesammten chemischen Literatur. Pp. 93–200 of v. 5, part 1 of his Allgemeine chemische Bibliothek der neunzehnten Jahrhundert. A catalog of chemical works of the period 1800–1894.

***Zeitlinger, H., and Sotheran, H. C.** (eds.). Bibliotheca chemico-mathematica. Sotheran. 1921. 2 v. 964 p. £3 3s. A book dealer's catalog but a valuable reference work.

2N4 BIBLIOGRAPHIES OF BIBLIOGRAPHIES

Cobb, R. Periodical bibliographies and abstracts for the scientific and technological journals of the world. Natl. Research Council. 1920. *Bull* No. 3. 24 p. 40¢. A compilation of information about literature indexes, abstract journals and yearbooks; classified by sciences.

***Courtney, W. P.** A register of national bibliography. Constable. 1905. 2 v. 631 p. Bibliographies of books, classified by subjects (chemistry, p. 110–12), with author index.

****Darrow, K. K.** Classified list of published bibliographies in physics, 1910–1922. Natl. Research Council. 1924. *Bull.* No. 47. 102 p. $2. By subjects.

John Crerar Library. List of bibliographies of special subjects. 1902. 504 p. Many of these are on chemical topics.

Josephson, A. G. S. A bibliography of union lists of serials. John Crerar Library, Chicago.

****Mathews, E. B.** Catalogue of published bibliographies in geology. 1896–1920. Natl. Research Council. 1923. *Bull.* No. 36. 228 p. $2 50. By subjects.

Ogden, E. L., and Hawks, E. B. List of manuscript bibliographies and indexes in the U. S. Department of Agriculture. U. S. D. A. Library Bibliographical Contribution No 11. Jan., 1926. 38 p. (mimeographed).

Sohon, J. A., and Schaaf, W. L. (eds.) Reference list of bibliographies; chemistry, chemical technology and chemical engineering published since 1900. H. W. Wilson, New York. 1924. 100 p. $1.50. Lists about 2200 bibliographies on 647 subjects.

****West, C. J., and Berolzheimer, D. D.** Bibliography of bibliographies on chemistry and chemical technology, 1900–1924 Natl. Research Council. 1925. *Bull* No. 50. 308 p. $2 50. See p. 139.

West, C. J., and Hull, C. Manuscript

bibliographies in chemistry and chemical technology. Natl. Research Council, Reprint and Circular Series No. 36 (1922). 17 p. 25¢. Reprinted from *J. Ind. Eng Chem* **14**, 1075–8, 1148–51 (1922).

2P FORENSIC CHEMISTRY

Lucas, A. Forensic chemistry. Arnold 1921. 268 p. 15s. Deals with the chemical aspects of criminal cases.

***Mitchell, C. A.** Documents and their scientific examination. Griffin. 1922 215 p. 10s.6d. "Indispensable to the document expert."

†**Mitchell, C. A.** The expert witness. Heffer. 1923? 188 p. 7s 6d

2Q PROFESSION OF CHEMISTRY

Bureau of Vocational Information. Women in chemistry; a study of professional opportunities. The Bureau, New York. 1922. 272 p. $1.60. "Very valuable."

†**Pilcher, R. B.** The profession of chemistry. Constable 1919 213 p. 6s.6d.

2X MISCELLANEOUS

†**Contemporary developments** in chemistry. Columbia U. 1927. 25 booklets. 50¢ each or $10 the set (bound, 465 p. $11). Based on lectures in 1926 at Columbia by 25 specialists.

3 SUBATOMIC PHENOMENA AND RADIOCHEMISTRY

(See also 2C6 (*Spectroscopy*))

****Aston, F. W.** Isotopes Arnold. 1924. ed. 2. 182 p. 10s.6d.

†**Birtwistle, G.** The quantum theory of the atom. Cambridge U. 1926. 248 p. 15s

***Bohr, N.** (trans.). The theory of spectra and atomic constitution. Cambridge U 1924. ed. 2. 138 p. $3. Three lectures with appendix.

Bohr, N. On the application of the quantum theory to atomic structure. Cambridge U. 1924? Part 1. 42 p. 3s.6d.

Born, M. (trans.). Constitution of matter. Methuen. 1923. From German ed. 2 80 p. 6s.

†**Born, M.** Problems of atomic dynamics Mass. Inst. Tech. 1926. 2 parts 200 p $3.50. A series of lectures.

Born, M., and Hund, F. Vorlesungen uber Atommechanik (in 2 v.). Springer 1925 v. 1. 358 p. M15.

†**Clark, C. H. D.** Basis of modern atomic theory. Methuen. 1926. 292 p 8s 6d A review of the literature.

†**Clark, G. L.** Applied X-rays. McGraw. 1927. 255 p. $4.

†**Colwell, H. A., and Wakeley, C.** An introduction to the study of X-rays and radium. Oxford U. 1926. 203 p. $3.25.

†**Compton, A. H.** X-rays and electrons. Van Nost. 1926. 418 p $6. "Requires considerable knowledge of mathematics."

†**Compton, K. T., and Mohler, F. L.** Critical potentials. Natl. Research Council. 1924. *Bull.* No. 48. 135 p. $1.60.

†**Crehore, A. C.** Progress of atomic theory. Taylor & Francis, Fleet St., London. 12s.6d. "The author is a very competent mathematician."

Crowther, J. A. Ions, electrons and ionizing radiations. Arnold 1924. ed. 4. 340 p. $4 50. A textbook, well recommended.

Curie, M. Le radium et les radio-éléments. Baillière, Paris. 1925. 354 p. 50 fr.

†**Darrow, K. K.** Introduction to contemporary physics. Van Nost 1926. 462 p. $6. Atomic phenomena from a physicist's viewpoint.

Foote, P. D., and Mohler, F. L. Origin of spectra. Chem. Cat. 1922. 250 p $5 50 Largely experimental.

†**Gerlach, W.** Materie, Elektrizität, Energie. Grundlagen und Ergebnisse der experimentellen Atomforschung. Steinkopff. 1926 ed 2. 302 p M16.50.

†**Harrow, B.** The romance of the atom. Boni and Liveright. New York 1927. 157 p $1 50 Reviews speak highly of the first 11 chapters.

Hevesy, G. von. See 6C.

***Hevesy, G. von, and Paneth, F.** (trans). A manual of radioactivity. Oxford U. 1926. 272 p 15s.

Jeans, J. H. Report to the Physical Society of London on radiation and the quantum theory. Fleetway Press, London. 1924. ed 2 86 p 7s 6d

***Kaye, G. W. C.** X-rays. Longm 1923 ed 4 342 p. $5 50.

Kramers, H. A., and Holst, H. (trans) The atom and the Bohr theory of its structure. A. A. Knopf, New York. 1923. 210 p. $4 Semipopular but authoritative.

Lewis, G. N. Valence and the structure of atoms and molecules. Chem. Cat 1923. 172 p $3.75. A leading chemist's viewpoint

***Lind, S. C.** The chemical effects of alpha-particles and electrons. Chem Cat. 1921. 182 p. $3 75.

***Makower, W., and Geiger, H.** Practical measurements in radio-activity. Longm. 1912. 161 p. $2 20. Laboratory technique.

†Mark, H. Die Verwendung der Rontgenstrahlen in Chemie und Technik Barth 1926. 528 p. M50

***Marx, E.** (ed.). Die Theorien der Radiologie. Akad. Verlags. 1925. 806 p. M40. (v. 6 of the Handbuch der Radiologie)

***Meyer, S., and Schweidler, E. R. von.** Radioaktivität. Teubner 1926. ed. 2. "Standard"

***Millikan, R. A.** The electron. Chicago U. 1924. ed. 2. 239 p. $1.75.

†Mills, J. Within the atom. Routledge. 1922. 215 p. 6s.

Perrin, J. (trans). Atoms. Constable 1923 English ed 2 from French ed. 11. 232 p 8s.6d.

†Pettersson, H., and Kirsch, G. Atomzertrümmerung. Akad. Verlags. 1926. 247 p. M15.

***Richardson, O. W.** Emission of electricity from hot bodies Longm 1921 ed 2 328 p. 16s Confined to the strictly scientific phase

Russell, A. S. Introduction to the chemistry of radio-active substances Murray. 1922. 173 p. 6s.

***Rutherford, E.** Radioactive substances and their radiations. Cambridge U. 1913. 699 p. 20s. "Much out of date but remains the best in the field."

***Siegbahn, M.** (trans.). The spectroscopy of X-rays. Oxford U. 1925. 287 p. 20s. "Highly technical."

Soddy, F. The interpretation of radium and the structure of the atom. Putnam. 1921. ed. 4. 260 p. $3.75. Nontechnical language.

****Sommerfeld, A.** (trans.). Atomic structure and spectral lines. Methuen 1923. From German ed. 3. 639 p. 32s. German ed. 4 (Atombau und Spektrallinien). Vieweg. 1924. 862 p. M25.

†Sommerfeld, A. Three lectures on atomic physics Dutton. 1927 70 p $1 "Altogether too abstruse for the casual reader"

†Stoner, E. C. Magnetism and atomic structure. Methuen 1926 385 p 18s.

***Thomson, J. J.** Rays of positive electricity and their application to chemical analyses. Longm. 1921 ed 2 237 p 16s

Thomson, J. J. Electricity and matter Constable. 1924. ed. 5. 162 p $1 50 By a pioneer authority.

†Van Vleck, J. H. Quantum principles and line spectra. Natl. Research Council, *Bull.* 1926. 316 p. $3.

4 ELECTROCHEMISTRY

Addicks, L. See 9A Cu

****Allmand, A. J., and Ellingham, H. J. T.** Principles of applied electro-chemistry. Arnold. 1924. ed. 2. 739 p 35s.

†Barton, L. J. Refining metals electrically. Penton. 1926. 414 p. $6.

Betts, A. G. See 9A Pb.

***Blum, W., and Hogaboom, G. B.** Principles of electroplating and electroforming. McGraw. 1924. 356 p $4 A working manual.

****Creighton, H. J., and Fink, C. G.** Principles and applications of electrochemistry. Wiley. 2 v. 1924. v. 1. Principles (by Creighton). 446 p. $4.

†Escard, J. Les fours électriques industriels et les fabrications électrothermiques. Dunod. 1924. ed. 2. 674 p. 80 fr.

Faraday Society. Electrode reaction and equilibria. The Society. 838 p. 10s.6d.

Foerster, F. See 2C5.

Hughes, W. E. Modern electro-plating. Frowde. 1923. 165 p. 16s. Useful for works chemists and engineers.

Jansky, C. M., and Wood, H. P. Elements of storage batteries. McGraw. 1923 240 p. $2.50. For nontechnical readers

Laar, J. J. von. Lehrbuch der theoretischen Elektrochemie auf thermodynamischer Grundlage. Engelmann. 1907. 307 p.

***Langbein, G.** (trans.). Electro-deposition of metals. Hodder and Stoughton, London. 1924. ed. 9. 863 p. 37s.6d. With additions by the translator.

Lebeau, P. Le four électrique et la chimie. Presses Univ. 1924. 585 p. 60 fr. An illustrated summary.

****LeBlanc, M.** Lehrbuch der Elektrochemie. Leipzig. 1922 ed. 9–10. The translation from German ed. 4 (Macmil. 1907, 335 p, $3) is now rather out of date.

†Lodge, O. Electrical precipitation. Milford. 1925 40 p. 3s.6d. (v. 3 of Physics in industry).

***Moissan, H.** (trans.). The electric furnace. Chem. Pub. 1920. ed. 2. 313 p. $3 50. Describes a famous series of experiments at high temperatures.

†Monkhouse, A. Electrical insulating materials. Pitman. 1926. 208 p. 21s.

*Müller, E. Elektrochemisches Praktikum. Steinkopff 1924. ed. 4. 264 p. M10. A laboratory manual.

Pring, J. N. The electric furnace. Longm 1921. 485 p. $10 50.

Rodenhauser, W., and Schoenawa, J. See 9A Fe.

†**Schering, H. von** (ed.). Die Isolierstoffe der Elektrotechnik. Springer 1924. 392 p. M16 By nine authors.

Sisco, F. T. See 9A Fe.

***Stansfield, A.** The electric furnace. McGraw. 1914. ed. 2. 415 p. $5 The part on iron has been rewritten and called "The electric furnace for iron and steel" (McGraw, 1923, 456 p., $5).

***Thompson, M. D.** Theoretical and applied electrochemistry Macmil. 1924. New ed 551 p $4 50. Very complete references.

***Vinal, G. W.** Storage batteries. Wiley. 1924. 402 p $4 50 "The most complete reference work" on batteries

Watt, A. The electro-plating and electro-refining of metals. Lockwood 1911. ed 2 704 p. 14s A revision of "Electro-deposition"

Watts, O. P. Laboratory course in electrochemistry McGraw. 1914. 148 p $1 25

5 PHOTOGRAPHY

Barnard, J. E., and Welch, F. V. Practical photomicrography. Arnold 1925 ed 2 316 p. 18s.

***Conrady, A. E.,** and others. Photography as a scientific implement Van Nost 1923 558 p. $9 A collective work

****Eder, J. M.** Ausfuhrliches Handbuch der Photographie Knapp. 1912–22 ed. 3. 4 v (in several parts). In 1926. ed. 4 began to appear (v. 4, part 2, 600 p. M29 50).

***Faraday Society.** Physical chemistry of the photographic process The Society 1924 166 p 12s.6d.

Jones, B. E. Cassell's cyclopædia of photography. Cassell and Co., London. 1911. 572 p *o p*

†**Lüppo-Cramer, H.** Die Grundlagen der photographischen Negativverfahren 1927. ed 3 824 p. M41

†**Lüppo-Cramer, H.** Kolloidchemie und Photographie Steinkopff. 1921. ed 2. 112 p M3 50 (paper).

***Mees, C. E. K.,** and others. Monographs on the theory of photography from the research laboratory of the Eastman Kodak Company. Van Nost 5 v 1921–24. $2 50 per v

†**Neblette, C. B.** Photography, its principles and practice. Van Nost 1927. 644 p $6 50.

Sheppard, S. E., and Mees, C. E. K. Investigations on the theory of the photographic process. Longm. 1907. 352 p. $2 75 *o p*

****Wall, E. J.** History of three-color photography Am. Photog Pub. Co., Boston. 1925 757 p $15

†**Wall, E. J.** Photographic facts and formulas Am Photog. Pub Co, Boston 1924 386 p

†**Wall, E. J.** Practical color photography Am Photog. Pub Co, Boston 1922 248 p $3 Deals with the technical side

†**Wall, E. J., and Mortimer, F. J.** The dictionary of photography and reference book for amateur and professional photographers. Iliffe and Sons, London. 1926. ed. 11 681 p. 10s 6d

†**Wentzel, F.** Die photographisch-chemische Industrie Steinkopff 1926 363 p. M20.

6 INORGANIC CHEMISTRY

6A TREATISES

***Abegg, R., and Auerbach, Fr.** (eds). Handbuch der anorganischen Chemie Hirzel 1905–. 4 v, subdivided Still incomplete. See Chap. II (p 17).

Dammer, O. Handbuch der anorganische Chemie. Enke 1892–1903 4 v. Supplement 1905. "Old but good." See Chap. II (p. 17).

***Evans, U. R.** Metals and metallic compounds Arnold 1923. 4 v. 1484 p. 71s. Intermediate between a short and an exhaustive treatise. Has had very favorable reviews See Chap II (p 17)

****Friend, J. N.** (ed). A textbook of inorganic chemistry. Griffin. 1919– . 12s. 6d to 20s per v A 10-v work by various authors, appearing on the "Handbuch" plan See Chap II (p. 17).

***Gmelins** Handbuch der anorganischen Chemie. Verlag Chemie, Leipzig and Berlin 1924– . ed 8 To be in 22 v. comprising 70 parts See Chap II (p. 16). Of the earlier ed. 7, v. 6 Abt. 1 was still appearing in 1926–7.

***Hoffmann, M. K.** Lexikon der anorgan-

ischen Verbindungen. 1910–19. 3 v. in 4 bindings 3136 p M216 Arranged by formulas. See Chap. II (p. 21)

****Mellor, J. W.** Comprehensive treatise on inorganic and theoretical chemistry. Longm. 1922–27. 7 v. 6962 p 63 s. per v. ($20 per v.). See Chap. II (p. 17).

Moissan, H., and others Traité de chimie minérale. 1904–6 5 v. See p 18.

***Molinari, E.** (trans.). Treatise on general and industrial inorganic chemistry. Blak 1920 ed 2 from Italian ed 4 750 p $12 Italian ed 5. 1924–25. (Milan, 85 lire)

***Roscoe, H. E., and Schorlemmer, C.** A treatise on chemistry Macmil. v 1. Nonmetals 1920. ed 5 968 p. $9 v 2 Metals 1923 ed. 6 1565 p $15. Shorter and more popular than Abegg, Friend, etc Vol 3 is organic, it has not been kept up to date

6B COLLEGE TEXTS

(For advanced students or for reference in beginning courses)

***Ephraim, F.** (trans.) A textbook of inorganic chemistry Gurney 1926 817 p 28s From German ed 3

Hofmann, K. A. Lehrbuch der anorganischen Chemie Vieweg ed. 5. 761 p M17 50

Holleman, A. F. (trans.) A textbook of inorganic chemistry Wiley. 1927 ed 7. 528 p. $3 50 Presupposes a good general course and some calculus

Kipping, F. S., and Perkin, W. H. Inorganic chemistry W and R Chambers, Edinburgh 1923 2 v. 751 p 8s 6d

†Lowry, T. M. Inorganic chemistry. Macmil 1922 943 p 28s

***Mellor, J. W.** Modern inorganic chemistry Longm 1925 New ed. 1103 p 12s 6d. Prized as a small reference book as well as textbook

Ostwald, Wi. (trans.) The principles of inorganic chemistry. Macmil. 1914 ed 4 from German ed 3 836 p 21s Now rather old German ed 5, 1922 (Grundlinien der anorganischen Chemie, Steinkopff). Physico-chemical viewpoint

***Partington, J. R.** A textbook of inorganic chemistry for university students. Macmil. 1925. ed. 2 1079 p. 25s.

***Smith, A.** (ed J. Kendall). Inorganic chemistry Century. 1926. New ed 1014 p $4

†Swarts, F. Cours de chimie inorganique Hermann. 1926. ed. 4. 786 p. 60 fr.

6C SPECIAL TOPICS

***Browning, P. E.** Introduction to the rarer elements. Wiley. 1917. ed. 4. 250 p $2 50.

†Claude, G. Air liquide, oxygène, azote, gaz rares Dunod. 1926. New ed. 424 p 32 fr.

†Hevesy, G. von. Die seltenen Erden vom Standpunkte des Atombaues. 1927. 148 p M10 20

Hopkins, B. S. Chemistry of the rarer elements Heath 1923 382 p. $4.

†Kraus, C. A. The properties of metallic substances Chem. Cat. 1926. 416 p. $4.50. (A C S. monograph)

***Levy, S. I.** The rare earths their occurrence, chemistry and technology. Arnold. 1924 ed 2 362 p 18s.

***Ramsay, W.** The gases of the atmosphere and the history of their discovery. Macmil 1916 ed. 4 306 p. $2 75. Popular language

Spencer, J. F. The metals of the rare earths. Longm 1919 289 p. 13s.

Stewart, A. W. See 2C8.

Thomas, W. Complex salts. Blackie 1924. 133 p. 10s. Included, on the basis of favorable reviews, as an English substitute for Weinland

Venable, F. P. Zirconium and its compounds Chem Cat 1922. 173 p. $4 (A C S monograph)

***Weinland, R.** Einfuhrung in die Chemie der Komplexverbindungen. Enke. 1924. ed 2 559 p M24. A presentation of the Werner coordination theory.

6D LABORATORY MANUALS

(No laboratory manual of advanced inorganic chemistry in English has been rated sufficiently high to be included.)

Bender, A. Anleitung zur Darstellung anorganischer chemischer Praparate. Stuttgart. 1893 v. 1 of Bender and Erdmann's Chemische Präparatenkunde *o p*

†Bornemann, G. Anorganische Praparate Voss. 1926 270 p. M11 40.

***Stähler, A.** (ed.) Handbuch der Arbeitsmethoden in der anorganischen Chemie Veit. 1913– . 4 v. Not completed in 1926.

†Tiede, E., and Richter, F. (eds.). Handbuch der Arbeitsmethoden in der anorganischen Chemie. Gruyter. 1925. v. 2, part 2. M54.—1926. v. 4, part 2. M14 50

†Vanino, L. Handbuch der präparativen Chemie Enke. 1925. v 1. (Inorganic) ed. 3. 852 p. M39 60.

7 ANALYTICAL CHEMISTRY

For *applied analysis* see 8D, 9A7, 11B, 12F, etc. See also 10H (*Organic analysis*), 2E (*Calculations*), 2G (*Pocketbooks*).

There are also many Government bulletins of value for analytical work, a few of these are listed in appropriate connections.

7A GENERAL

***Classen, A.** Handbuch der analytischen Chemie. Enke. 1922. part 1. eds 8–9. Qualitative.—1920. part 2 ed 7. Quantitative.

***Margosches, B. M.** (ed). Die chemische Analyse. Enke. 1907–24 24 v. A series of monographs by various authors.

Ostwald, Wi. (trans). The scientific foundations of analytical chemistry. Macmil. 1908. ed 3 from German ed. 4. 247 p. 7s 6d.—German ed 7, 1920 (Steinkopff, 238 p.). Elementary treatment.

****Rüdisüle, A.** Nachweis, Bestimmung und Trennung der chemischen Elemente M. Drechsel, Bern. 1912–18 5 v

****Scott, W. W.,** and others Standard methods of chemical analysis. Van Nost 1925. ed 4 2 v. 1805 p. $12 A general reference book for analytical chemists.

****Treadwell, F. P., and Hall, W. T.** Analytical chemistry. Wiley. v. 1 Qualitative. 1921. ed 5. 573 p $4 50. v 2 Quantitative. 1924 ed 6. 811 p. $5 A much used manual

7B QUALITATIVE

Baskerville, C., and Curtman, L. J. A course in qualitative chemical analysis. Macmil. 1916. ed 3. 223 p. $2.20.

***Böttger, W. C.** Qualitative Analyse und ihre wissenschaftliche Begrundung. Engelmann. 1925. ed. 4–7. 644 p. M22 Revision of "Qualitative Analyse vom Standpunkte der Ionenlehre," with added material.

***Fresenius, T. W.** (trans). Introduction to qualitative analysis. Churchill. 1921 From German ed. 17 of the very well-known manual founded by C R Fresenius 954 p 36s

Gutbier, A. Lehrbuch der qualitativen Analyse K Wittwer, Stuttgart 1920? 592 p

****Noyes, A. A.** Qualitative chemical analysis Macmil. 1922. ed. 9 190 p $2 25. Includes questions on the experiments.

***Noyes, W. A.** The elements of qualitative analysis. Holt. 1923 ed. 7. (rev. J. H. Reedy.) 128 p. $1 90.

***Prescott, A. B., and Johnson, O. C.** Qualitative chemical analysis. Van Nost. 1916. ed. 7. 440 p. $4

†**Rosenmund, K. W.** Hilfsbuch zur Ausfuhrung der qualitativen Analyse. Urban. 1926 88 p. M4 20.

****Stieglitz, J.** The elements of qualitative chemical analysis. Century. 1914. 2 v. 463 p $3 70. Vol 1 is highly valued for its presentation of principles, vol. 2, a laboratory manual, is of less importance.

7C QUANTITATIVE

Bassett, H. Theory of quantitative analysis and its practical application Routledge 1925. 308 p. 15s.

Blasdale, W. C. Principles of quantitative analysis. Van Nost. 1917. ed 2 414 p $3 "Important for its theory "

†**Classen, A.** (with Cloeren, H) Ausgewahlte Methoden der analytischen Chemie Braunschweig 1901–03 2 v 1871 p. M43 50.

***Fales, H. A.** Inorganic quantitative analysis. Century. 1925 493 p $3 50 Physico-chemical standpoint

***Fresenius, C. R.** (trans.) Quantitative chemical analysis. Wiley 1903 From German ed. 6, with additions 2 v 2035 p. $12 50 An authority since its first appearance in 1846

***Gooch, F. A.** Methods in chemical analysis. Wiley. 1912. 536 p $4 Results of work at Yale.

***Gooch, F. A.** Representative procedures in quantitative chemical analysis. Wiley 1915. 262 p. $2 50.

***Mahin, E. G.** Quantitative analysis McGraw 1924. ed. 3. 585 p. $4. Includes some industrial applications.

***Mellor, J. W.** A treatise on quantitative inorganic analysis. Griffin. 1913. 778 p. $9 Special reference to clay and silicates. It was announced as v. 1 of a Treatise on the ceramic industries. New ed. in prepn.

Olsen, J. C. Textbook of quantitative chemical analysis. Van Nost. 1916. ed. 5. 576 p. $4.

Talbot, H. P. Quantitative chemical analysis. Macmil. 1921. ed. 6. 203 p. $2.25.

†**Weinland, R.** Gewichtsanalyse. Dresden 1925. ed. 3 132 p

7C1 VOLUMETRIC

†**Beckurts, H.** Die Methoden der Massanalyse. Vieweg. 1913. 1112 p. "A complete compilation, of very great value in looking up the literature."

*Classen, A. Theorie und Praxis der Massanalyse. Leipzig. 1912.

Jamieson, G. S. Volumetric iodate methods. Chem. Cat. 1926. 96 p $2 50

Knecht, E., and Hibbert, E. New reduction methods in volumetric analysis Longm. 1925 ed. 2. 134 p. 8s 6d.

†Kolthoff, I. M. Die Massanalyse Springer 1927 Part 1. Theoretical 266 p. M11.70

**Sutton, F. A systematic handbook of volumetric analysis Churchill 1924 ed 11 (rev W L Sutton and A E Johnson). 648 p 35s. The standard treatise in English

7C2 ELECTROANALYSIS

*Classen, A., and Cloeren, H. (trans.) Quantitative analysis by electrolysis Wiley. 1919. From German ed 5 with revision. 346 p. $3 50. *o p* German ed 6 in 1920 (Springer). *o p*

†Fischer, A. Elektroanalytische Schnellmethoden Enke. 1926. ed. 2 (by A. Schleicher). 430 p. M26.40. "Will, I think, unquestionably be the best book on the subject"

†Kolthoff, I. M. Konduktometrische Titrationen. Steinkopff. 1923 94 p. M2.75.

**Kolthoff, I. M., and Furman, N. H. Potentiometric titrations. Wiley. 1926. 357 p. $4 50. Theory and practice.

†Müller, E. Die Elektrometrische (potentiometrische) Massanalyse. Steinkopff 1926 ed. 4. 246 p M14.

*Smith, E. F. Electro-analysis. Blak. 1918. ed 6 344 p $3.50.

7D BLOWPIPE

Plattner, K. F. (trans.). Manual of qualitative and quantitative analysis with the blowpipe New York. 1912. ed 8 463 p $4—German ed 8. (Kolbeck, ed.) 1927. 516 p. M24.

7E REAGENTS

Cohn, A. I. Indicators and test papers. Wiley. 1909 ed. 2. 267 p $2 50.

*Kolthoff, I. M. (trans.) Indicators. Wiley. 1926 From German ed. 2 with additions, by N. H. Furman. 269 p. $3.50. German ed. 3. 1926 (Der Gebrauch von Farbenindikatoren, Springer, 297 p. M13 20).

Krauch, C. Chemical reagents, their uses, methods of testing for purity and commercial varieties. Scott. 1919. ed. 2. 375 p. $7.

*Prideaux, E. B. R. The theory and use of indicators. Constable. 1917. 390 p. 12s 6d New ed in prepn.

7F MISCELLANEOUS TOPICS

Calculations See 2E.

Spectroscopy See 2C6.

American Society for Testing Materials. See 13C

Behrens, H., and Kley, P. D. C. Mikrochemische Analyse. Voss. 1921. ed. 4. 380 p and a folio atlas of 136 p. M28

Chamot, E. M. Elementary chemical microscopy. Wiley. 1921. ed. 2 479 p $4 25.

*Clark, W. M. The determination of hydrogen ions. Williams 1922. ed 2. 480 p. $5. With 2000 references.

*Dennis, L. M. Gas analysis. Macmil. 1913. 434 p. $2.75.

†Ehrlich, P., and others. Enzyklopädie der mikroskopischen Technik. Urban. 1926. ed 3 v. 1 739 p. M43 50. v 2. 849 p. M49.50.

†Emich, F. Lehrbuch der Mikrochemie. J F Bergmann, Munchen 1926. ed. 2. 273 p. M18 60.

Hanausek, T. F. (trans.). Microscopy of technical products. Wiley 1907. 471 p. $5.

Michaelis, L. (trans.) Hydrogen-ion concentration. Its significance in the biological sciences and methods for its determination. Williams. 1926 v. 1. Principles and theory. From German ed 2. 304 p. $5

Snell, F. D. Colorimetric analysis. Lockwood. 1922 158 p. 10s 6d

Thomson, J. J. See 3.

Wallis, T. E. Analytical microscopy; its aims and methods. Arnold 1923. 149 p 6s. Not a complete handbook, strong on preliminary treatment.

Woker, G. See 2C2.

8 MINERALOGICAL AND GEOLOGICAL CHEMISTRY

8A MINERALOGY

*Brush, G. J. Manual of determinative mineralogy. Wiley. 1911. ed. 16 (rev. S. L. Penfield). 312 p. $3.50.

**Clarke, F. W. The data of geochemistry. U. S. Geol. Survey. 1924. *Bull.* 770. ed. 5. 841 p. $1. As a source book worth several times its price.

**Dana, E. S. System of mineralogy of James Dwight Dana, 1837–1868. Wiley. 1909. ed 6, with appendixes 1 and 2. 1323 p. $15. Appendix 3. 1915. $2.

Needs revision badly but is still the universally standard reference work

****Dana, E. S.** Text-book of mineralogy. Wiley. 1922. ed 3 (rev. W E Ford). 720 p $5 A useful supplement to the "System."

†**Doelter, C., and Leitmeier, H.** (eds.) Handbuch der Mineralchemie Steinkopff. 4 v 1912–. Still appearing in parts in 1927. An elaborate summary of the chemistry of minerals

†**Hintze, C.** Handbuch der Mineralogie Gruyter. 1926 v 1 Appearing in parts

***Lewis, J. V.** Manual of determinative mineralogy. Wiley 1921 ed 3 298 p $3 "Not quite so thorough [as Brush] but up to date."

***Niggli, P.** Lehrbuch der Mineralogie Borntraeger ed 2 1924 v 1 Allgemeine 712 p —1926. v. 2. Spezielle 713 p M33 "Includes more of the modern developments than American texts."

8B PETROLOGY

Boeke, H. E. Grundlagen der physikalisch-chemischen Petrographie Borntraeger 1923 ed. 12 (rev. W Eitel) 589 p

Eitel, W. Physikalisch-chemische Mineralogie und Petrologie Steinkopff 1925 174 p M7

***Holmes, A.** Petrographic methods and calculations T Murby and Co London 1923 3 parts in 1 v 516 p 31s 6d "The discussion of graphs should be read by every chemist"

Johannsen, A. Manual of petrographic methods. McGraw. 1918. ed. 2 649 p $7 Valuable also in cement research

***Wright, F. E.** Methods of petrographical microscope research Carnegie Inst., Washington 1911 *Pub* 158 $2 *o p* Valuable also in cement research.

8C GEOLOGY

†**Rastall, R. H.** Physico-chemical geology 1927 15s

Ries, H. Economic geology of the United States Wiley. 1916 ed. 4. 856 p $5

†**Twenhofel, W. H.** Treatise on sedimentation Williams. 1926 661 p. $7 50

8D ANALYSIS

Davy, W. M., and Farnham, C. M. Microscopic determination of the ore minerals McGraw 1920 154 p $2 50

****Hillebrand, W. F.** Analysis of silicate and carbonate rocks U S Geol Survey 1919. *Bull* 700 285 p 25¢ Revised ed of *Bull* 422 "Absolutely indispensable"

†**Moore, R. B.,** and others. U S Bur Mines. *Bulls* 70 (1913) and 212 (1923) on analysis of uranium, cerium, etc 15¢ and 40¢

Schoeller, W. R., and Powell, A. R. The analysis of the minerals and ores of the rarer elements Lipp 1919 239 p $6 50

***Washington, H. S.** Manual of the chemical analysis of rocks Wiley 1919 ed 3 271 p $2 50 "The methods of calculation are antiquated"

8E MINERAL INDUSTRY

Crook, T. Economic mineralogy Longm 1921 192 p $8 50

†**Dammar, B., and Tietze, O.** Die nutzbaren Mineralien mit Ausnahme der Erze und Kohlen 1927 ed 2 2 v 574 p M35 10

Federation of British Industries. See 13C

Kraus, E. H., and Hoiden, E. F. Gems and gem materials McGraw. 1925 222 p $3

Ladoo, R. B. Nonmetallic minerals McGraw 1925 686 p. $6

***Lindgren, W.** Mineral deposits McGraw 1923 ed 2 957 p $6 "Including modern ideas, such as the rôle of colloids"

Roush, G. A. Mineral industry McGraw Annual See pp 135–6

8F MINING

Whitaker, J. W. Mining physics and chemistry Arnold 1922 268 p 9s

9 METALLURGY AND METALLOGRAPHY

9A METALLURGY

(See also 4 (*Electrometallurgy*))

†**Austin, L. S.** Metallurgy of the common metals. Wiley. 1926. ed. 6 615 p $7. Covers routine operations for gold, silver, iron, copper, lead and zinc.

***Brearley, A. W., and Brearley, H.** Ingots and ingot moulds. Longm 1918 234 p $6

Dean, R. S. Theoretical metallurgy Wiley. 1924 ed 2 253 p $3. With 2000 references

Evans, U. R. See 6A

***Gowland, W.** The metallurgy of the non-ferrous metals Griffin. 1921. ed 3 663 p. $12

Hadfield, R. A. Metallurgy and its in-

fluence on modern progress. Chapman. 1925 404 p 25s. Reliable and fascinating.

*Hofman, H. O. General metallurgy McGraw 1918 909 p. $7

†"Hütte." Taschenbuch der Stoffkunde Ernst 1926. ed. 25 2v M40 50 Issued by the Akad. Verein Hutte

†Liddell, D. M. (ed). Handbook of nonferrous metallurgy McGraw. 1926 2 v 1440 p $12

Prost, E. La métallurgie des métaux autres que le fer Ch Béranger, Paris 1924 ed 2 1249 p. $8

Rand metallurgical practice, Textbook of Griffin. 1926 ed. 3 v 1. 564 p. 30s.

**Richards, J. W. Metallurgical calculations. McGraw. 1918. 671 p. $6 In 3 parts also bound separately

Roberts-Austen, W. C. An introduction to the study of metallurgy Griffin 1923 ed 7. 493 p 21s

Schnabel, C. (trans) Handbook of metallurgy Macmil 1921 v 1 ed 3 1171 p 40s —1905 v 2 ed 2 867 p 25s. (ed 3 in prepn)

†Stoughton, B., and Butts, A. Engineering metallurgy, a textbook for users of metals McGraw 1926 452 p $4 "Elementary "

9A1 ORE DRESSING

*Megraw, H. A. The flotation process McGraw 1918 ed 2 359 p $4

†Richards, R. H. Ore dressing McGraw 1903-09 4 v. 2052 p. $20. Peculiar arrangement, v 1 and 3 being on processes, etc , and v 2 and 4 on plants

**Richards, R. H., and others A textbook of ore dressing McGraw 1925 ed. 2 570 p $5 50

Rickard, T. A. Concentration by flotation Wiley. 1921 692 p $7

*Simons, T. Ore dressing McGraw 1924 300 p $3 50

Truscott, S. J. A textbook of ore dressing Macmil. 1923 689 p 40s

9A2 METALS AND ALLOYS

(See also 9B (*Metallography*))

Aitchison, L., and Barclay, W. R. Engineering nonferrous metals and alloys. Frowde. 1923 300 p 21s.

Desch, C. H. Intermetallic compounds Longm. 1914. 122 p $1 80. *o p*

*Giua, M., and Giua-Lollini, C. (trans). Chemical combinations among metals. Churchill 1918 342 p 21s Purely scientific standpoint.

Howe, H. M. Iron, steel and other alloys. McGraw. 1906. 495 p $5

†Martens, A. Handbuch der Materialienkunde fur den Maschinenbau Berlin Part 2, half A in 1926. (506 p. M42)

Regelsberger, F. Chemische Technologie der Leichtmetalle und ihrer Legierungen Spamer 1926 385 p. M29. Of value as an index to the patents.

†Reinglass, P. Chemische Technologie der Legierungen mit Ausnahme der Eisen-Kohlenstoff-Legierungen. Spamer 1926 ed 2. 538 p M40.

Schulze, A. See 2C8.

Vickers, C. Metals and their alloys. Lockwood 1923. 800 p. 50s Partly based on ed 3 of Brannt's "Metallic alloys "

9A3 METAL WORKING

Founding, see 9A Fe (*Hall, Moldenke*).

†Bablik, H. (trans). Galvanizing. Spon 1925 176 p 12s 6d.

Brannt, W. T. Metal workers' handy book of receipts and processes Baird. 1919. New ed 582 p $3

Buchner, G. Die Metallfarbung Krayn. 1924? ed 6 383 p $4

Field, S., and Bonney, S R. Chemical colouring of metals and allied processes Chapman 1925 264 p 10s 6d. Recipes for experienced workers.

†Geiger, C. von. Handbuch der Eisen- und Stahlgiesserei. 1927. ed 2. 2 v. 594 p M57.

†Turner, T. H., and Budgen, N. F. Metal spraying. Griffin 1926 189 p 15s

9A4 WELDING

Davies, J. H. Modern methods of welding. Van Nost 1922 281 p $6

Owens, J. W. Fundamentals of welding gas, arc and thermit. Penton 1924 659 p $10

†Wills, P. F. Oxy-acetylene welding and cutting Henley Pub Co , New York 1922 ed 6. 254 p $1 50

Wilson, L. B. Electric welding Pitman 1925. 106 p $1 50

9A5 CORROSION

(See also 13C (*Materials*))

†Calcott, W. S., and others Corrosion tests and materials of construction for chemical engineering apparatus. Van Nost 1923 182 p $3. Two papers, with discussions. "Of great value "

Cushman, A. S., and Gardner, H. A. The corrosion and preservation of iron and steel McGraw. 1923. 375 p $5

*Evans, U. R. Corrosion of metals. Arnold.

1924. 225 p. 14s. "Contains a wide variety of references"

Friend, J. N. The corrosion of iron. Iron and Steel Inst. 1922. 161 p 16s. (Carnegie scholarship memoirs, v. 11). A series of papers.

Hamlin, M. T., and Turner, F. M. See 13C.

†**Speller, F. N.** Corrosion causes and prevention. McGraw. 1926 621 p. $6. Deals especially with iron and steel.

****Whittaker, H. F.** Research information surveys on corrosion of metals Natl. Research Council, Washington. 1923-24. Six papers (on Ni, Al, Cu, Zn, Sn and Pb).

9A6 CYANIDE PROCESS

Clennell, J. E. The cyanide handbook. McGraw. 1915. ed. 2 601 p $6.

Hamilton, E. M. Manual of cyanidation. McGraw. 1920 260 p $3.

***Julian, H. F., and Smart, E.** (rev. A. W. Allen). Cyaniding gold and silver ores. Griffin. 1921. ed 3 417 p. 36s.

9A7 ANALYSIS

***Arnold, J. O., and Ibbotson, F.** Steel works analysis. Pitman. 1919. ed. 4. 419 p. 12s 6d. A practical handbook.

***Blair, A. A.** The chemical analysis of iron. Lipp. 1918. ed 8. 318 p. $5. Was long the standard.

†**Camp, J. M.** (ed) Methods of the chemists of the United States Steel Corporation for the sampling and analysis of iron and manganese ores. Carnegie Steel Co, Pittsburgh. 1926. ed. 3 148 p. $2.

***Fulton, C. H.** Manual of fire assaying. McGraw. 1911. ed. 2. 219 p. $2.50.

Hall, W. T., and Williams, R. S. Chemical and metallographic examination of iron, steel and brass McGraw. 1921. 501 p. $5.

Ibbotson, F. Chemical analysis of steel-works materials. Longm. 1920. 296 p 21s.

Ibbotson, F., and Aitchison, L. Analysis of non-ferrous alloys. Longm. 1922 ed. 2. 238 p. 12s 6d. "Most reliable." Not much changed since 1914 ed.

Johnson, C. M. Rapid methods for the chemical analysis of special steels, steel-making alloys, their ores and graphites. Wiley. 1920 ed. 3. 552 p. $6. Excellent matter, unfortunate style.

***Lord, N. W., and Demorest, D. J.** Metallurgical analysis. McGraw. 1924. ed 5. 474 p. $4. An excellent textbook for superior students.

***Low, A. H.** Technical methods of ore analysis for chemists and colleges. Wiley. 1922. ed. 9. 348 p. $3.50. Well recommended textbook and reference work.

***Phillips, F. C.** Methods for the analysis of ores, iron and steel, in use at the laboratories of iron and steel works in the region about Pittsburgh, Pa. Chem. Pub. 1920 170 p $1 50

***Price, W. B., and Meade, R. K.** The technical analysis of brass and the non-ferrous alloys. Wiley. 1917. ed. 2. 376 p $3

Schaeffer, J. A., and White, B. S. (rev. J. H Calbeck). Chemical analysis of lead and its compounds. Eagle-Picher Lead Co, Chicago. 1923. ed 2. 160 p. $1 A practical manual.

***Scott, W. W.** Technical methods in analysis of metallurgical and allied products Lockwood 1923 900 p. 42s. Broader than the title indicates.

White, C. H. Methods in metallurgical analysis. Van Nost 1921. ed 2. 356 p. $3.

9A Ag SILVER

†**Eissler, M.** The metallurgy of silver. Lockwood 1901. ed 5. 381 p. 12s.6d.

9A Al ALUMINUM

†**Aluminum** and its light alloys. Bur. of Standards. 1919 *Circ* No. 76, 120 p. 20¢ "Excellent summary and bibliography."

***Anderson, R. J.** Metallurgy of aluminium and aluminium alloys. Baird. 1925. 913 p $10 "Comprehensive survey: to be read with discrimination."

†**Berge, A.** Die Fabrikation der Tonerde. Knapp. 1926. ed. 2.

†**Borchers, W.** Aluminium. Knapp 1921. 243 p.

†**Corson, M. G.** Aluminum: the metal and its alloys Van Nost. 1926. 311 p. $8.

†**DeBar, R.** Die Aluminiumindustrie. Vieweg 1925 ed. 2. 338 p M22.50. "General treatise with special reference to German practice."

Goldschmidt, K. Aluminothermie. Hirzel. 1925. 174 p. M12.

Krause, H. Das Aluminium und seine Legierungen. Hartleben. 1923. ed. 2 2 v. Production, properties and uses.

Regelsberger, F. See 9A2.

Reinglass, P. See 9A2.

†**Rosenhain, A., and Hanson.** Alloys Research Committee—Report 11. Inst. Mech. Engineers, London. 1921. 256 p. "Valuable report of original research on the

constitution and properties of aluminum alloys susceptible of heat treatment."

9A Au GOLD

***Rose, T. K.** The metallurgy of gold. Griffin. 1915. ed. 6. 621 p. 25s

9A Cd CADMIUM

****Budgen, N. F.** Cadmium: its metallurgy, properties and uses. Griffin. 1924. 239 p. 21s. "A comprehensive digest."

Hofman, H. O. See 9A Zn.

9A Cu COPPER

***Addicks, L.** Copper refining. McGraw. 1921. 206 p. $3. Electrolytic method only.

Altmayer, M., and Guillet, L. Métallurgie du cuivre et alliages de cuivre. Baillière, Paris 1925. 714 p 75 fr.

***Hofman, H. O.** Metallurgy of copper. McGraw. 1924. ed 2 419 p. $5. "Covers the whole subject."

Peters, E. D. Practice of copper-smelting. McGraw. 1911. 693 p. $5 The Peters books were formerly leaders but are now rather old.

Peters, E. D. Principles of copper smelting. McGraw. 1907. 612 p $5.

†Watson-Davis, C. E. The story of copper. Century. 1926? 385 p. $3.

9A Fe IRON AND STEEL

Aitchison, L. Engineering steels. Macdonald & Evans, London. 1921. 348 p. 25s.

Backert, A. O. (ed). The A B C of iron and steel. Penton. 1925 ed. 5. 415 p. $6. A good, comprehensive, popular description of the industry.

Barton, L. J. See 4

***Bullens, D. K.** Steel and its heat treatment. Wiley. 1917. ed. 2. 483 p. $4. With 285 figures.

***Camp, J. M., and Francis, C. B.** Making, shaping and treating of steel. Carnegie Steel Co., Pittsburgh. 1925. ed. 4 1203 p. $7.50. "Particularly good from a practical standpoint."

Coutagne, A. Fabrication des ferro-alliages. Baillière, Paris. 1924. 650 p. 60 fr.

†Dichmann, K. Der basische Herdofenprozess. Springer 1921. ed. 2. 278 p. There is an English translation of ed. 1 (Van Nost., 1911).

Forsythe, R. (rev. C. A. Meissner and J. A. Mohr). The blast furnace and the manufacture of pig iron. U. P. C. Book Co, New York. 1922. ed. 3. 371 p. $4. "Primarily for beginners."

†Geiger, C. (ed.). Handbuch der Eisen- und Stahlgiesserei. Springer. 1925? ed. 2. v. 1. 661 p. M49.50.

Gillett, H. W., and Mack, E. L. Molybdenum, cerium and related alloy steels. Chem. Cat. 1925. 299 p. $5.50. (A. C. S. monograph.)

Giolitti, F. (trans.). Heat treatment of soft and medium steels. McGraw. 1921. 374 p. $5.

Giolitti, F. (trans.). The cementation of iron and steel. McGraw. 1915. 407 p. $5.

†Hadfield, R., and others. The physical chemistry of steel-making processes. Gurney. 1926? 127 p. 8s.6d.

***Hall, J. H.** The steel foundry. McGraw. 1922. ed. 2. 334 p. $4.

***Harbord, F. W., and Hall, J. W.** Metallurgy of steel. Griffin. 1923. ed. 7. 2 v. 1098 p. 42s. each. The standard book on British practice, but not entirely up to date.

†Hurst, J. E. Metallurgy of cast iron. Pitman. 1926. 327 p. 15s.

***Johnson, J. E., Jr.** The principles, operation and products of the blast-furnace. McGraw. 1918 566 p. $6.

***Johnson, J. E., Jr.** Blast-furnace construction in America. McGraw. 1917. 415 p. $5.

†Ledebur, A. Handbuch der Eisenhüttenkunde. Leipzig. 1926. ed. 6. 500 p. M25.

Mars, G. Die Spezialstahle. Stuttgart. 1922. ed. 2. 675 p. M28.20.

***Moldenke, R.** The principles of iron founding. McGraw. 1917. 517 p. $5

†Monypenny, J. H. G. Stainless iron and steel. Chapman 1926. 304 p. 21s. Has had sevcral favorable reviews.

Rodenhauser, W., and Schoenawa, J. (trans.) Electric furnaces in the iron and steel industry. Wiley. 1920. ed. 3 460 p. $4.50.

Schwartz, H. A. American malleable cast iron. Penton. 1922. 434 p. $7.

***Sisco, F. T.** The manufacture of electric steel. McGraw. 1924. 296 p. $3.

Stansfield, A. See 4.

***Stoughton, B.** The metallurgy of iron and steel. McGraw. 1923. ed. 3. 519 p. $4.

†Stoughton, B. Manufacture of iron and steel International Textbook Co., Scranton, Pa. 348 p. $3.

***Tiemann, H. P.** Iron and steel. McGraw 1919. ed. 2 514 p. $4. "A pocket encyclopedia."

†**Walker, J. B.** The story of steel. Harper. 1926. 208 p. $4. "Untechnical but accurate."

9A Mg MAGNESIUM

***American Magnesium Corporation.** Magnesium. The Corporation, Niagara Falls 1923. 177 p. $2.50.

9A Ni NICKEL

White, F. B. H. Nickel. Pitman 1923 138 p 3s Semipopular, includes mining, metallurgy and uses.

9A Pb LEAD

Betts, A. G. Lead refining by electrolysis. Wiley. 1908. 394 p. $4.

Collins, H. F. The metallurgy of lead. Griffin 1910. ed 2 558 p. 25s.

Harn, O. C. Lead, the precious metal Century 1924. 323 p. $3 A good popular book

***Hofman, H. O.** Metallurgy of lead McGraw. 1918 604 p. $7 United States and Canadian practice especially.

***Smythe, J. A.** Lead, its occurrence in nature, the modes of its extraction, its properties and uses, with some account of its principal compounds. Longm 1923. 352 p 16s

Smythe, J. A. Lead including lead pigments and the desilverization of lead Pitman 1920 128 p 3s A popular summary

9A Pt PLATINUM

Smith, E. A. Platinum metals Pitman 1925. 123 p. 3s. Popular.

9A Sb ANTIMONY

Wang, C. Y. Antimony. Griffin. 1919 ed 2 227 p 15s

9A Sn TIN

Louis, H. Metallurgy of tin McGraw. 1911. 138 p. $2 50.

†**Mundey, A. H.** Tin and the tin industry Pitman. 1926 143 p. 3s Popular.

9A Zn ZINC

****Hofman, H. O.** Metallurgy of zinc and cadmium. McGraw. 1922 341 p $4

***Ralston, O. C.** Electrolytic deposition and hydrometallurgy of zinc McGraw. 1921. 201 p. $3

Smith, E. A. The zinc industry. Longm. 1918 232 p $3 75 Fairly comprehensive

9B METALLOGRAPHY

(See also 9A2 (*Metals and alloys*).)

†**Benedicks, C.** Metallographic researches McGraw 1926. 307 p $4. Based on a course of lectures delivered in the United States in 1925

***Desch, C. H.** Metallography. Longm 1922. ed 3 452 p. 16s "Very good and practical"

†**Goerens, P.** Einfuhrung in die Metallographie Knapp 1926 ed 5 372 p M18 50

***Guillet, L., and Portevin, A.** (trans.) Introduction to the study of metallography and macrography. Bell. 1922 289 p 30s. Good as a textbook

***Gulliver, G. H.** Metallic alloys their structure and constitution Griffin 1922. ed. 5 439 p. 15s.

Howe, H. M. The metallography of steel and cast iron. McGraw. 1916 641 p $10. "Rather old"

***Hoyt, S. L.** Metallography McGraw 1920. v 1 Principles. 256 p $3 — 1921. v 2. The metals and common alloys. 462 p. $5. "Good textbooks"

****Jeffries, Z., and Archer, R. S.** The science of metals McGraw 1924. 500 p $5

***Rosenhain, W.** An introduction to the study of physical metallurgy Constable 1919. ed. 2. 390 p. 12s 6d "Needs revision"

****Sauveur, A.** The metallography and heat treatment of iron and steel McGraw 1926 ed 3 528 p $8. "Best textbook on this subject"

***Tammann, G.** (trans.). Textbook of metallography Chem. Cat 1925. From German ed 3. 385 p. $7

†**Woodward, W. E.** Metallography of steel and cast iron. Lockwood 1926 155 p 15s Reviews vary rather widhly.

10 ORGANIC CHEMISTRY

10A GENERAL TREATISES

For industrial organic chemistry see 13, 17, 21, 22, 23, 25, etc

****Beilstein, F.** Handbuch der organischen Chemie. Springer 1918– . ed. 4 v. 1–9 at the end of 1926 M835 to members of the Deut Chem. Gesellschaft See Chap II (p. 18)

Friedländer, P. See 25B

****Meyer, V., and Jacobson, P.** Lehrbuch der organischen Chemie Gruyter 1902– ed. 1–2. 2v in 6 parts. M194.

Vol. 2 not yet completed. Some inferior reprints are on the market. A standard text that serves as an excellent medium-sized reference book. Now under the auspices of the Deut Chem Gesellschaft. The original authors are both deceased.

Molinari, E. (trans.) Treatise on general and industrial organic chemistry Blak 1921–24 ed. 2 from Italian ed 3 2 parts. $8 each "Much information interestingly written"

***Richter, M. M.** Lexikon der Kohlenstoffverbindungen Leipzig 1910–12. ed 3 4 v 4751 p. M216 ($54) A formula index See Chap II (p 20).

***Richter, V. von** (trans.) Organic chemistry or chemistry of the carbon compounds Kegan Paul, Trench, Trubner & Co., London (Blak. in U. S.). 1919–23 English ed. 1–2 3 v 1821 p 85s ($21) From German ed. 11 (ed. Anschutz and Schroeter) Successor to Dr Smith's American ed 3. "An old-established and authoritative work of reference" much used by advanced students. It is not as nearly up to date as could be wished

***Stelzner, R.** Literatur-Register der organischen Chemie Verlag Chemie, Leipzig, and Berlin 1913–26 5 large v (covering the period 1910–21) M265 (to members of the Deut. Chem Gesellschaft) See Chap II (p 20)

10B COLLEGE TEXTS

***Bernthsen, A.** (ed. J J. Sudborough). A textbook of organic chemistry Blackie 1922. New ed. 908 p. 12s 6d Well known as an accurate text and reference book in compact form

†**Braun, J. von.** Lehrbuch der organischen Chemie Hirzel 1925. 508 p M24

Holleman, A. F. (ed A J Walker and O E Mott). A textbook of organic chemistry. Wiley 1924 ed 6 581 p $3 50. Additional space is given to physico-chemical methods in this ed

Moureu, C. (trans.). Fundamental principles of organic chemistry Bell 1921. From French ed 6 399 p 12s 6d – French ed. 8, Gauthier, 1925, 553 p "Novelty of presentation"

Norris, J. F. The principles of organic chemistry McGraw 1922. ed. 2 631 p. $3. Contains many problems

†**Noyes, W. A.** Organic chemistry. Holt 1926 New ed. 677 p. $3 50. Successor to "A textbook of organic chemistry" The order is original Contains many tables and references

Perkin, W. H., and Kipping, F. S. Organic chemistry. W and R Chambers, Edinburgh 1922. New ed. 681 p. 8s.6d. A long and favorably known British text.

†**Porter, C. W.** The carbon compounds. Ginn. 1926. New ed. 509 p $4 "Practically a reprint of the 1924 ed with new questions and problems."

†**Read, J.** A textbook of organic chemistry, historical, structural and economic. Bell 1926 692 p. 12s 6d.

†**Schmidt, J.** (trans.) A textbook of organic chemistry. Gurney. 1926 822 p. 25s Useful as a small reference work, as well as a text

†**Wade, J.** Introduction to the study of organic chemistry Allen & Unwin. London 1925 646 p 8s 6d —1926 New ed 665 p 8s 6d

10C ELEMENTARY TEXTS

Barrett, W. H. Elementary organic chemistry. Oxford U. 1922. 256 p 4s 6d

Lowry, T. M., and Austin, P. C. Organic chemistry. Macmil. 1925 184 p. 3s. (Part 5 of Donnington's class book of chemistry)

†**Worrall, D. E.** The principles of organic chemistry. Longmans 1927 312 p $2 50.

10D SPECIAL TEXTS

(This class includes texts for students of agriculture, medicine, etc It has not seemed wise to make selections.)

10E ADVANCED TEXTS

†**Arnall, F., and Hodges, F. W.** Theoretical organic chemistry. Churchill 1926. Part 1. 384 p. 10s 6d.

***Cohen, J. B.** Organic chemistry for advanced students Arnold. 1923. ed 4. 3 v. (1) Reactions, 423 p., (2) structure 461 p; (3) synthesis, 412 p 18s each. "The best résumé of modern theories and advances"

***Henrich, F.** (trans.). Theories of organic chemistry Wiley 1922. ed. 3 from German ed 4. 620 p $6. German ed 5. Vieweg 1924. 515 p. M19 50. The English ed. has been enlarged by the translators, Profs T. B Johnson and D A. Hahn

Reid, E. E. Introduction to organic research. Van Nost. 1924. 351 p. $4 50. Of wider interest than its title indicates. Includes 5 chapters on chemical literature

***Stewart, A. W.** Recent advances in organic chemistry. Longm. 1920. ed. 4. 370 p. 21s ($7.50). New ed. in 2 vols. in prepn.

Chapters on terpenes, rubber, alkaloids, polypeptides, etc.

10F SPECIAL TOPICS

(See also 11A2 (*Special biochemical topics*) and 11D (*Plant chemistry*))

Armstrong, E. F. The simple carbohydrates and the glucosides. Longm 1924 ed 4 304 p. 16s A well-known monograph of the biochemistry series.

†**Bate, S. C.** The synthesis of benzene derivatives. Benn. 1926. 229 p. 21s.

†**Brockman, C. J.** Electro-organic chemistry Wiley. 1926. 2 parts. 381 p. $5. Electrolytic reactions (1) at the anode, (2) at the cathode. "Invaluable as a reference book in this field."

Brooks, B. T. Chemistry of the non-benzenoid hydrocarbons and their simple derivatives. Chem Cat. 1922. 612 p. $9. "A pioneering work "

Cain, J. C. The chemistry and technology of the diazo compounds. Arnold 1920. ed. 2. 199 p $4 50. A well-known book first published in 1908

†**Cramer, M.** Les sucres et leurs dérivés. Doin. 1927 367 p 28 fr unbound.

Fischer, E. (ed M Bergmann). Gesam melte Werke Springer. 1906–24. 6 v. The assembled writings of a master.

Grasser, G. See 29A

Leathes, J. B., and Raper, H. S. See 11A2.

†**Levene, P. A.** Hexosamines and muco-proteins. Longm 1925. 163 p $3.75. "Excellent monograph."

†**Lloyd, D. J.** Chemistry of the proteins, and its economic applications. Churchill. 1926. 291 p. 10s 6d

Morgan, G. T. Organic compounds of arsenic and antimony Longm. 1918. 396 p. $5 80. Contains a bibliography, 1760–1917

Robertson, T. B. See 11A2.

†**Schmidt, J.** Synthetisch-organische Chemie der Neuzeit. Vieweg. 1926 ed 2 328 p M20

†**Sørensen, S. P. L.** Proteins The Fleischmann Laboratories, New York. 1925. 142 p. Lectures given in the U. S in 1924.

Walden, P. Chemie der freien Radikale. Hirzel. 1924. 351 p M11.

Whitmore, F. C. Organic compounds of mercury. Chem. Cat 1921. 397 p $7.50. (A. C. S. monograph)

10G LABORATORY MANUALS

10G1 GENERAL

***Adams, R.,** and others. Organic syntheses. Wiley. 1921– . Annual, $1.50 per v. 6 v. in 1926, with cumulative indexes. Gives satisfactory checked methods for preparing organic compounds. Detailed directions.

Barnett, E. deB. The preparation of organic compounds. Churchill. 1920 ed. 2 288 p. 10s.6d. Rather brief directions, with condensed discussions.

†**Coleman, J. B., and Arnall, F.** The preparation and analysis of organic compounds. Churchill 1926. 372 p 15s.

Fischer, E. (trans). Introduction to the preparation of organic compounds. Williams and Norgate, London. 1922. From German ed. 8. 175 p. 5s —German ed. 10 (Anleitung zur Darstellung organischer Präparate), Vieweg. 1922 118 p M2 50.

***Gattermann, L.** (rev H. Wieland). Die Praxis des organischen Chemikers Gruyter. 1927 ed 20 393 p M15. Am. ed 3 (The practical methods of organic chemistry) from German ed 11, Macmil. 1914 401 p $2 "Gattermann" is a standard book of organic preparations The new German ed. is said to be far superior to earlier ones

***Lassar-Cohn.** Arbeitsmethoden fur organisch-chemische Laboratorien. Voss. 1923 ed 5 2 v. 1528 p. M50. Vol 1 deals with extraction, distillation, etc., vol 2 with special methods such as acylation and oxidation Some prefer L.-C. to Weyl and Vanino.

Vanino, L. Handbuch der praparativen Chemie Enke 1923. v 2 (Organic). ed 2. 904 p. M29 30.

***Weyl, T.** (ed. J Houben). Methoden der organischen Chemie G Thieme, Leipzig v. 1. 1925. ed 3. 1340 p. M66 — v 2. 1925. ed 3. 1431 p. M84 — v 3 1922. ed 2. 1117 p —v. 4 1924 ed 2 1046 p M48. By some regarded as indispensable

10G2 INTRODUCTORY

Adkins, H., and McElvain, S. M. An introduction to the practice of organic chemistry in the laboratory. McGraw. 1925 288 p $2.25.

Cohen, J. B. Practical organic chemistry. Macmil. 1924. ed. 3. 520 p. 6s 6d. "By far the best in any language."

Cumming, W. M., and others. Systematic organic chemistry Constable. 1923. 535 p. 25s "Well known and excellent."

Fisher, H. L. Laboratory manual of organic chemistry. Wiley 1924. ed 2. 331 p. $2 25. Minute directions.

†**Lowy, A., and Baldwin, W. E.** A laboratory book of elementary organic chemistry. Wiley. 1926. 182 p. $3.

†**Moore, F. J.** (rev. H. W. Underwood, Jr.). Experiments in organic chemistry. Wiley. 1927. ed. 3. 133 p. $1.25.

Norris, J. F. Experimental organic chemistry. McGraw. 1924. ed 2. 215 p. $1.50

Noyes, W. A. Organic chemistry for the laboratory. Chem Pub. 1926. ed. 5. 329 p. $4.

10H ANALYSIS

*__Allen, A. H.__ (ed. S S. Sadtler and others). Commercial organic analysis Blak. (Churchill.) v. 1–5. 1923–27. ed 5 3710 p. $7 50 (30s.) each. v. 6–9 in prepn.—ed 4. 1909–17 9 v. (v 9 is a supplementary one). An international work, the latest ed. of which maintains the high standard of earlier ones

†**Clarke, H. T.** A handbook of organic analysis. Longm 1926. ed 4 375 p. $3. Qualitative and quantitative.

Lunge, G. See 13D.

*__Meyer, H.__ Analyse und Konstitutionsermittlung organischer Verbindungen. Springer. 1922 ed. 4 1191 p

Mulliken, S. P. A method for the identification of pure organic compounds. Wiley. 1922. 4 v. 1103 p. $21. v. 3 (on commercial dyestuffs) was *o.p.* in 1926. Tables of compounds classified by function, physical properties, etc.

*__Pregl, F.__ (trans.). Quantitative organic microanalysis Blak. 1924. From German ed. 2. 190 p. $4. "A model of completeness."

Rosenthaler, L. Der Nachweis organischer Verbindungen. Enke. 1923. ed. 2 1028 p. M42 60. (v. 19–20 of the Margosches series on analysis.) "Truly a masterwork."

Sherman, H. C. Methods of organic analysis. Macmil 1912. ed. 2. 407 p. $3.

†**Thorpe, J. F., and Whiteley, M. A.** A student's manual of organic chemical analysis, qualitative and quantitative Longm 1926 New ed. 9s. This reissue contains an appendix on combustion analysis.

10K MISCELLANEOUS

†**Underwood, H. W., Jr.** Problems in organic chemistry McGraw 1926. 233 p. $2

Winther, A. See 25B

11 BIOLOGICAL CHEMISTRY

11A1 GENERAL

*__Abderhalden, E.__ Biochemisches Handlexikon. Springer. 1911–24. 12v. Gives the physical, chemical and physiological properties of all substances occurring in nature. See Chap. II (p.19).

*__Abderhalden, E.__ Lehrbuch der physiologischen Chemie. Berlin. 1922–23. ed. 5 2 v. The English translation (Wiley, 1908) is good but now out of date.

†**Bodansky, M.** Introduction to physiological chemistry. Wiley. 1926 440 p $4. For students of medicine, dentistry, etc.

†**Deters, H.** Handbuch der Dr. Schusslerschen Biochemie. Allgemeinverstandliche moderne Lebens- und Heillehre. Radeburg. 1926. 336 p. M20.

Fürth, O. See 11G1.

Halliburton, W. D. Essentials of chemical physiology. Longm. 1922. ed. 11. 343 p. 8s.6d.

**__Hammarsten, O., and Hedin, S. G.__ (trans.). A textbook of physiological chemistry. Wiley. 1914 ed. 7. From German ed. 8. 1026 p $5. German ed. 11 (Bergmann, Munich, 1926, 843 p., M32 40) is much more up to date but the trans. is still considered by many the best reference book in English.

†**Hugounenq, L.** Précis de chimie biologique. Paris 1925.

**__Mathews, A. P.__ Physiological chemistry. W Wood and Co , New York. 1925 ed. 4. 1168 p. $6 50. A textbook and manual for students. "Readable, sound, most suggestive, not so much of a reference book as Hammarsten "

†**Morse, W.** Applied biochemistry. Saunders 1926 950 p. $7. Textbook, with laboratory exercises.

*__Oppenheimer, C.__ Handbuch der Biochemie der Menschen und der Tiere. Fischer. 1924–. ed. 2. To be in 9 v. See Chap. II (p. 20).

Parsons, T. R. Fundamentals of biochemistry in relation to human physiology. Heffer. 1925. ed. 2. 307 p. 10s.6d. "Elementary but gives adequate references."

*__Plimmer, R. H. A.__ Practical organic and biochemistry. Longm. 1925. 647 p. 21s. A new ed. of "Practical physiological chemistry."

Robertson, T. B. Principles of biochemistry

for students of medicine, agriculture and related sciences. Baillière, London. 1924. ed. 2. 796 p. 35s Physico-chemical point of view.

Schüssler. See Deters, H

†**Sumner, J. B.** Textbook of biological chemistry. Macmil. 1927. 320 p. $3.50.

11A2 SPECIAL

(See also 10F (*Special organic topics*).)

†**Dale, H. H.,** and others. Lectures on certain aspects of biochemistry, given in the University of London, summer term 1925. London U. 1926. 321 p. 12s 6d

***Höber, R.** Physikalische Chemie der Zelle und der Gewebe. Engelmann. 1926 ed 6 2 parts 955 p. M42. "A treasurehouse of unexplained facts."

***Jones, W.** Nucleic acids Longm. 1921. ed 2 150 p 9s.

****Leathes, J. B., and Raper, H. S.** The fats Longm 1925 ed 2 242 p. 12s.6d

†**Lepeschkin, W.** Kolloidchemie des Protoplasmas. Berlin 1924.

Loeb, J. (trans). Artificial partheno genesis and fertilization. Chicago U. 1913 318 p $2.50. Loeb's books summarize his own important work.

Loeb, J. Regeneration from a physico-chemical viewpoint. McGraw. 1924. 143 p. $2

***Maclean, H., and MacLean, I.** Lecithin and allied substances, the lipins. Longm 1927. ed. 2. 227 p

†**Maxwell, I.** Clinical biochemistry W Ramsay, Melbourne 1925 124 p 12s 6d.

****Meyerhof, O.** Chemical dynamics of life phenomena Lipp. 1924. 110 p $3. "A true romance of science."

Michaelis, L. See 7F.

Palmer, L. S. Carotinoids and related pigments, the chromolipoids Chem Cat. 1922. 316 p. $6. (A. C. S monograph.)

†**Pryde, J.** Recent advances in biochemistry Churchill. 1926. 356 p. 12s 6d.

***Robertson, T. B.** The physical chemistry of the proteins Longm. 1920 New ed. 498 p $5. "Some of his viewpoints are open to question."

†**Stieglitz, J.** Chemistry and recent progress in medicine. the Dohme lectures for 1924. Williams. 1924. 62 p. $1 50

11A3 ENZYMES

Abderhalden, E. Die Abderhaldensche Reaktion Berlin. 1922 ed. 5. Formerly called "Die Abwehrfermente des tierischen Organismus"

***Bayliss, W. M.** Nature of enzyme action. Longm. 1925. ed 5. 200 p. 9s. Rev. by the author up to April, 1923.

***Euler, H.** (trans). General chemistry of the enzymes. Wiley. 1912. 323 p. $3. —German ed 3 ("Allgemeine Chemie der Enzyme," J F. Bergmann, Munchen, 1925, 422 p, M28, being part 1 of "Chemie der Enzyme" in 3 parts).

***Falk, K. G.** The chemistry of enzyme actions. Chem. Cat. 1924. ed. 2. 249 p. $5. (A. C. S. monograph.)

Oppenheimer, C. Die Fermente und ihre Wirkungen. G Thieme, Leipzig 1925–26 ed 5. 12 parts. "By far the most complete yet published" (The English trans of an earlier ed is now too old—1906)

†**Oppenheimer, C., and Kuhn, R.** Lehrbuch der Enzyme. Chemie, Physikalische Chemie und Biologie Georg Thieme, Leipzig 1927. ed 5 669 p M36 A textbook based on the larger work just above.

†**Schoen, M.** Le problème des fermentations Les faits et les hypothèses Masson 1926. 199 p 2 fr. A monograph by the director of the Pasteur Institute.

†**Waksman, S. A., and Davison, W. C.** Enzymes properties, distribution, methods and applications. Williams. 1926. 364 p. $5 50 A key to the literature and a summary of current views.

†**Waldschmidt-Leitz, E.** Die Enzyme Vieweg 1926 248 p M16.

11B LABORATORY METHODS AND APPARATUS

Hydrogen-ion measurement. See 7F.

***Abderhalden, E.** Handbuch der biologischen Arbeitsmethoden Urban. 1910– . In several v Still appearing in parts (Lieferung 226 in 1927) See Chap. II (p 19)

Cole, S. W. Practical physiological chemistry Heffer. 1925. ed. 7. 493 p 16s

Conn, H. J., and others Biological stains A handbook on the nature and uses of the dyes employed in the biological laboratory. Commission on the Standardization of Biological Stains, Geneva, N Y. 1925. 151 p. $2 50.

Cramer, W. Directions for a practical course in chemical physiology. Longm. 1920 ed. 4. 137 p. 4s 6d.

***Folin, O.** Laboratory manual of biological chemistry Appleton. 1925. ed. 4,

309 p $3 "Limited practically to methods devised in Folin's laboratory."

†**Fränkel, S.** Deskriptive Biochemie J F Bergmann, Munchen. 1907. 640 p *o.p.* "A little Beilstein for biochemical substances. Should be brought up to date and translated"

***Hawk, P. B., and Bergeim, O.** Practical physiological chemistry. Blak 1926. ed. 9. 949 p. $6 50. "Excellent practical manual." "A very good compendium of methods with some interpretation of results."

Hoppe-Seyler, F. Handbuch der physiologisch- und pathologisch-chemischen Analyse. 1909. ed. 8 (ed. Thierfelder). "Somewhat out of date—a good book for background."

Lee, A. B. (ed. J. B. Gatenby). The microtomist's vade mecum. Churchill. 1921. ed. 8 604 p 28s *o p* New ed. promised.

****Myers, V. C.** Practical chemical analysis of blood. C. V Mosby Medical Book and Pub Co, St Louis. 1925. ed 2. 232 p $5.

†**Norton, J. F., and Falk, I. S.** Laboratory outlines in bacteriology and immunology. Chicago. 1926 122 p. $2.

†**Rona, P.** Praktikum der physiologischen Chemie. Springer To be in 3 parts, of which the first (331 p., M15) appeared in 1926.

11C BACTERIOLOGY

(See also 11G (*Pathology*).)

†**Bergey, D. H.** Manual of determinative bacteriology. Williams. 1923. 442 p. $5.50. "Merely a classification, giving the new names"

Fowler, G. J. An introduction to bacteriological and enzyme chemistry Arnold. 1920. 336 p. 8s.6d. "Elementary but good, especially as a supplementary text for students."

†**Hiss, P. H., Jr., and Zinsser, H.** A textbook of bacteriology Appleton. 1922. ed. 5. 1207 p. $7 50. Completely rewritten from the original text.

***Jörgensen, A.** (trans). Microorganisms and fermentation. Griffin. 1925 ed. 5. 467 p. 30s

Jordan, E. O. General bacteriology. Saunders. 1924. ed. 8. 752 p. $5. "One of the best-written books on the subject"

Marshall, C. E. Microbiology. Blak. 1922. ed. 3. 1043 p. $4. "General."

Orla-Jensen (trans.). Dairy bacteriology. Churchill 1921. ed. 2. 180 p. 18s.

†**Park, W. H., and Williams, A. W.** Pathogenic microórganisms Lea. 1925. ed. 4 670 p. $3.75.

†**Stitt, E. R.** Practical bacteriology, blood work and animal parasitology. Blak. 1923. ed. 7. 781 p. $5. New ed. in prepn. "A very good practical manual."

Tanner, F. W. See 12F.

11D BOTANY

(See also 10F (*Special organic topics*))

***Czapek, F.** Biochemie der Pflanzen Fischer 1922–25 ed 3 3 v 2261 p. M70

†**Fuchs, W.** Die Chemie des Lignins. Springer. 1926 327 p M19 50.

Guilliermond, A. (trans) The yeasts. Wiley. 1920. 424 p. $6.

****Haas, P., and Hill, T. G.** An introduction to the chemistry of plant products. Longm. 1921–22. ed. 3. 2 v. 554 p. 23s 6d. Vol 1 treats of the commoner organic compounds in plants and vol. 2 of metabolic processes.

Molisch, H. Mikrochemie der Pflanze Fischer. 1923. ed. 3. 450 p. M10

Onslow, M. W. Practical plant biochemistry. Cambridge U. 1923. ed 2 194 p. 12s.6d.

****Osborne, T. B.** Vegetable proteins. Longm 1924. ed. 2. 168 p. 9s. "An indispensable vade mecum"

†**Palladin, V. I.** (trans.) Plant physiology. Blak. 1923. American ed 2 from Russian eds. 6–7. 360 p. $3 50 "Emphasizes the chemical aspects"

†**Spoehr, H. A., and McGee, J. M.** Studies in plant respiration and photosynthesis. Carnegie Inst., Washington. *Pub* 325. 1923.

Stiles, W. Photosynthesis; the assimilation of carbon by green plants Longm 1925 268 p. 16s A critical survey

†**Sucharipa, R.** Die Pektinstoffe Dr. Serger und Hempel, Braunschweig 1925. 188 p. M6. "More than a compilation"

†**Trier, G.** Chemie der Pflanzenstoffe Borntraeger. 1924. 605 p. $7 80. A reference work, differing from Wehmer in being purely chemical. Two other vols promised on plant metabolism and chemical analysis. "Probably best because most recent."

†**Tunmann, O.** Pflanzenmikrochemie. Borntraeger. 1913? 631 p M18.50.

Wehmer, C. Die Pflanzenstoffe botanisch-systematisch gearbeitet. Fischer. 1911. 937 p. Covers phanerogams only. "First to be consulted for physiological action."

11E NUTRITION

(See also 12 (*Foods*).)

†**Achard, C.** Troubles des échanges nutritifs. Masson. 1926 1220 p 110 fr.

Armsby, H. P. The principles of animal nutrition. Wiley. 1917. ed. 3. 614 p. $4.50.

Armsby, H. P., and Moulton, C. R. The animal as a converter of matter and energy. Chem. Cat. 1925 236 p. $4 50. (A C. S. monograph) "Contains an immense amount of data"

†**Barker, L. F.**, and others. Endocrinology and metabolism. Appleton. 1923. 5 v. $50.

†**Benedict, F. G.**, and others. Lectures on nutrition. Saunders. 1925 243 p. $2 50. Auspices of the Mayo Foundation.

Carter, H. S. and others. Nutrition and clinical dietetics. Lea. 1923. ed. 3. 731 p. $7.50.

***Cathcart, E. P.** The physiology of protein metabolism. Longm. 1921. ed 2. 184 p. 12s 6d.

†**Chittenden, R. H.** The nutrition of man. F. A. Stokes, New York. 1907. $3

†**Chittenden, R. H.** Physiological economy in nutrition. F. A. Stokes, New York. 1904 $3.

†**Du Bois, E. F.** Basal metabolism in health and disease Lea. 1924. 372 p. $4.75.

Emerson, W. R. P. Nutrition and growth in children. Appleton. 1922 342 p. $2.50.

Funk, C. (trans.). Vitamines. Williams 1922. ed. 2 from German ed. 2. 502 p. $5.50.

†**Keegan, L. M.** Food values. Macmil 1926. 128 p $1 60. Tables of food values and other data.

****Lusk, G.** Elements of the science of nutrition. Saunders 1917 ed. 3 641 p. $6 50. "The standard reference text"

*****McCollum, E. V., and Simmonds, N.** The newer knowledge of nutrition. Macmil. 1925. ed. 3. 675 p. $4 25 "A comprehensive work based largely on the authors' own investigations" "Unbiased."

†**McCollum, E. V., and Simmonds, N.** Food, nutrition and health. The Authors, Box 250, East End Station, Baltimore. 1925. 143 p. $1.50. For everybody.

†**McLean, S., and Fales, H. L.** Scientific nutrition in infancy and early childhood. Lea. 1925. 420 p. $3.75.

†**Macleod, J. J. R.** Carbohydrate metabolism and insulin Longm. 1926. 357 p. 18s.

†**Mayrhofer, E., and Pirquet, C.** Lexikon der Ernährungskunde Springer. Appearing in parts in 1926.

***Mendel, L. B.** Nutrition, the chemistry of life. Yale U. 1923. 150 p. $3. "An interesting book by a very eminent author." A series of lectures.

***Rose, M. S.** Feeding the family. Macmil. 1924 ed. 2. 387 p. $2 40. "Authoritative and thoroughly scientific while at the same time readable and practical."

Rose, M. S. A laboratory handbook for dietetics Macmil. 1921 ed. 2 156 p. $2 10. "The best book for dietary calculations and reference tables on food values."

***Sherman, H. C.** Chemistry of food and nutrition Macmil. 1926. ed 3 636 p $3 25. Widely used as a text and reference book

***Sherman, H. C., and Smith, S. L.** The vitamins Chem Cat. 1922. 270 p. $5 50 (A C S. monograph.) "Clear and critical."

11F PHYSIOLOGY

†**Babkin, B. P.** Die äussere Sekretion der Verdauungsdrüsen. Springer. 1914

†**Bandler, S. W.** The endocrines. Saunders. 1920 486 p. $7.

†**Barcroft, J.** The respiratory function of the blood. Cambridge U. 1925 ed 2. 320 p. 18s —1926. Part 1. New ed. 215 p. 12s 6d.

Bayliss, W. M. Interfacial forces and phenomena in physiology. Dutton 1923 196 p. $3 Based on the Herter lectures.

Bayliss, W. M. Principles of general physiology. Longm. 1924. ed 4. 910 p $8 50. "Unusually good for orienting the student in the relation between physiology and biological chemistry"

†**Cushny, A. R.** The secretion of the urine. Longm. 1926 ed. 2. 295 p $5 50.

****Dakin, H. D.** Oxidations and reductions in the animal body. Longm. 1922. ed. 2. 176 p. 6s.

†**Grimmer, W.** Lehrbuch der Chemie und Physiologie der Milch. Parey. 1926. ed. 2. 326 p. M25.

Haldane, J. S. Respiration. Yale U. 1922. 427 p.

†**Krogh, A.** The respiratory exchange of animals and man. Longm. 1916. 173 p. 6s.

†**Loeb, J.** The organism as a whole; from a

physicochemical viewpoint. Putnam. 1916 389 p $2 50

MacLeod, J. J. R. Physiology and biochemistry in modern medicine. C V. Mosby Co., St. Louis. 1926. 1086 p. $11. "More physiology than biochemistry."

†**Richet.** Dictionnaire de physiologie. 1900–. "About 20 vols have appeared. A very valuable book"

***Robertson, T. B.** Chemical basis of growth and senescence Lipp. 1923. 389 p. $3. "A dauntless, if naïve, contribution of an imaginative mind to statistical biology"

Underhill, F. P. The physiology of the amino acids. Yale U. 1915. 169 p. $1 50.

Vincent, S. Internal secretion and the ductless glands. Arnold. 1922. ed. 2. 422 p. 25s.

11G PATHOLOGY

(See also 11C (*Bacteriology*).)

11G1 GENERAL

***Fürth, O.** Lehrbuch der physiologischen und pathologischen Chemie. Vogel. ed. 2. 1925–7. v.I. M45.

Macleod, J. J. R., and Campbell, W. R. Insulin· its use in the treatment of diabetes. Williams. 1925 257 p $4

Osterhout, W. J. V. Injury, recovery and death in relation to conductivity and permeability. Lipp. 1922. 259 p. $2 50.

Schade, H. Die physikalische Chemie in der inneren Medizin. Leipzig 1923 ed. 3. 605 p. $3 70. For students and physicians

Vedder, E. B. See 13L.

****Wells, H. G.** Chemical pathology. Saunders. 1925 ed 5. 750 p. $8 50. Prof. Wells is an outstanding authority.

Wells, H. G., and others Chemistry of tuberculosis Williams 1923. 447 p. $5. "The only book on the subject."

11G2 IMMUNITY

Coca, A. F. Essentials of immunology for medical students. Williams. 1925. 194 p. $3.50.

Herelle, F. d' (trans). Immunity in natural infectious disease. Williams. 1925? 399 p $5.

†**Herelle, F. d'** (trans.). The bacteriophage and its behavior. Williams. 1926 643 p. $8.

Karsner, H. T., and Ecker, E. E. The principles of immunology. Lipp. 1921. 326 p. $5.

***Kolmer, J. A.** Practical textbook of infection, immunity and biological therapy. Saunders. 1923 ed. 3. 1210 p. $12.

****Wells, H. G.** Chemical aspects of immunity. Chem. Cat. 1925. 254 p. $5.50. (A. C. S. monograph)

***Zinsser, H.** Infection and resistance. Macmil. 1923. ed. 3. 666 p. $5.

11H PHARMACOLOGY

(For *analysis* see also 17C (*Pharmaceutical analysis*).)

11H1 GENERAL

****Cushny, A. R.** A textbook of pharmacology and therapeutics or the action of drugs in health and disease. Churchill. 1924. ed. 8. 707 p. 24s. "Accepted as the book of choice in English-speaking countries."

†**Cushny, A. R.** Biological relations of optically isomeric substances. Williams 1926. 86 p. $2. Dohme lectures "Authoritative monograph"

Dixon, W. E. A manual of pharmacology. Arnold. 1925. ed. 6 478 p. 18s. More condensed than Cushny. "Little used in America."

Fränkel, S. See 17A.

****Heffter, A.** (ed). Handbuch der experimentellen Pharmakologie. Springer. 1920– 3 v. (not completed in 1926). By many authors. Recommended as the best reference book.

Hewitt, F. W. Anaesthetics and their administration Oxford U. 1922. ed. 5. "The best in English."

Jackson, D. E. Experimental pharmacology. C. V. Mosby Medical Book and Pub. Co., St. Louis. 1917. 536 p. $4. "The most comprehensive of books in English. Especially good for experimental methods."

†**Kopaczewski, W.** Pharmacodynamie des colloïdes. Doin. 1923–25. 2 v. 607 p.

***Meyer, H., and Gottlieb, R.** (trans.). Experimental pharmacology. Lipp. 1926. From German ed. 7. 656 p. 35s. "A high-class book which attempts to cover the whole field of pharmacology."

Oswald, A. Chemische Konstitution und pharmakologische Wirkung. Borntraeger. 1924. 892 p. M42.

Poulsson, E. (trans.). Textbook of pharmacology and therapeutics. Williams. 1923. 519 p. $6. "The leading German textbook." "A great book by a great man."

Schmeidsberg, O. Grundriss der Pharmakologie Vogel 1913 ed 7 "The classic textbook in Germany."

Seifert, O. Nebenwirkungen der modernen Arzneimittel Kabitzsch, Leipzig 1924? ed. 2 427 p Alphabetic arrangement of drugs.

***Sollmann, T. H.** A manual of pharmacology and its applications to therapeutics and toxicology Saunders 1922. ed 2 1066 p. $7 New ed in prepn

Wehmer, C. See 11D.

11H2 TOXICOLOGY

Blyth, A. W., and Blyth, M. W. Poisons: their effects and detection. Griffin. 1920. ed 5. 779 p 36s "The most comprehensive of books in English."

Gadamer, J. Lehrbuch der chemischen Toxikologie und Anleitung zur Ausmittelung der Gifte. Vandenhoeck, Gottingen. 1924 ed 2 713 p. "A recognized authority"

Hamilton, A. Industrial poisons in the United States. Macmil. 1925. 590 p $5. "Authoritative monograph"

Kobert. Lehrbuch der Intoxication. Enke 1902. ed 2. "Especially well known."

†**Mannheim, E.** Toxikologische Chemie Gruyter 1926 ed 3 135 p. M1.50 "Syllabus of tests."

Phisalix, M. Animaux venimeux et venins. Masson. 1922. 2 v. 1520 p. "At last." Good indexes

Underhill, F. P. Toxicology—the effects of poisons Blak. 1924. 292 p. $2.25 "Very condensed."

12 FOODS

(See also 11E (*Nutrition*))

12A GENERAL

Bailey, E. H. S. Food products: their source, chemistry and use. Blak. 1922. ed 2. 551 p $2.50. A manual for students

Bailey, E. H. S., and Bailey, H. S. Food products from afar Century 1922. 287 p $3 Popular but accurate.

***Buchka, K. H. von** (ed). Das Lebensmittelgewerbe Akad Verlags. 1914–19. 4 v.

†**Fuhrmann, F.** Die Chemie der Nahrungs- und Genussmittel Ein Lehrbuch fur Chemiker und Mediziner 1927. 621 p. M27

†**Jolles, A.** Die Nahrungs- und Genussmittel und ihre Beurteilung F Deuticke, Leipzig 1926. ed 2 463 p. M20

***König, J.** Chemie der menschlichen Nahrungs- und Genussmittel. Tauchnitz. 1903–23 ed 4–5 3 v. with supplements

Plimmer, R. H. A. Analyses and energy values of foods H M. S. Office. 1921. 255 p 6s.

†**Röttger, H.** (ed. E Spaeth and A. Grohmann). Lehrbuch der Nahrungsmittelchemie. Barth 1926 ed. 5 2 v. 1182 p M101. First appeared in 1884.

****Sherman, H. C.** Food products. Macmil. 1924 ed. 2 687 p. $3. Textbook and reference work, also suitable for the general reader.

†**Strohecker, R.** Chemische Technologie der Nahrungs- und Genussmittel. Spamer. 1926 252 p. M26.

Thom, C., and Hunter, A. C. Hygienic fundamentals of food handling. Williams 1924 228 p $3

Tinkler and Masters. See 2B4.

Wiley, H. W. Foods and their adulteration. Blak 1917. ed 3. 661 p. $6. Encyclopedic information on the composition and use of foods.

12B BREAD AND FLOUR

†**Amos, P. A.** (rev. J. Grant) Processes of flour manufacture. Longm. 1925. ed 3 324 p 9s

***Bailey, C. H.** Chemistry of wheat flour Chem. Cat 1925 324 p. $6. (A C S monograph)

Grant, J. The chemistry of bread making Arnold. 1924. ed. 4. 232 p. 6s.

†**Hasterlik, A.** Die Herstellung des Brotes und die Triebmittel im Backerei-Gewerbe 1927 255 p M16 50.

Jago, W., and Jago, W. C. The technology of bread-making Northern Pub. Co., Liverpool 1921. 638 p 32s.6d. Includes testing of materials used

Kent-Jones, D. W. Modern cereal chemistry. Northern Pub. Co., Liverpool. 1924. 324 p 25s. Deals with wheat, wheat flour and bread.

†**Maurizio, A.** Die Nahrungsmittel aus Getreide Parey 1926 ed. 2. v. 2. 226 p. M18.

***Neumann, M. P.** Brotgetreide und Brot. Parey. 1923. ed. 2. $3.

Phillips, C. L., and Shollenberger, J. H. Flour milling and bread making. U. S. Dept. Agr., Washington. 1925. Agricultural Economics Bibliography No. 2.

12C. PRESERVED FOODS

†**A complete course** in canning. Canning Trade, Baltimore. 1924 ed. 5. 372 p

***Cruess, W. V.** Commercial fruit and vegetable products. McGraw. 1924. 530 p. $4.50.

†**Handbuch** fur die Konserven-Industrie, Konserven-Fabriken und den Konserven-Grossbetrieb Parey. 1926 2 v. 1347 p M124.

†**Knox, C.** Office and factory manual for fruit and vegetable canners The Author, San Francisco 1924 700 p

†**Powell, O.** Successful canning and preserving Lipp 1926 ed 4 450 p $3

Rector, T. M. Scientific preservation of food. Wiley. 1924. 213 p. $2. "For the general public"

Savage, W. G. Canned foods in relation to health Cambridge U 1923 146 p 8s.6d. The Milroy lectures for 1923

12D DAIRY

Hunziger, O. F. The butter industry. The Author, La Grange, Ill 1920 710 p. $5 75

†**Hunziger, O. F.** Condensed milk and milk powder. The Author, La Grange, Ill 1926. ed 4 668 p $6 50

†**Knoch, C.** Handbuch der neuzeitlichen Milchverwertung. Parey 1926 576 p M24.

Lane-Claypon, J. E. Milk and its hygienic relations Longm 1916 356 p $3 25.

McKay, G. L., and Larsen, C. Principles and practice of butter-making Wiley. 1922. ed 3 405 p. $3.

Milk and its relation to public health. Hygienic Lab. *Bull* 56, Washington 1909. 834 p A collection of articles by various authors. "Still standard."

Orla-Jensen. See 11C

†**Palmer, L. S.** Laboratory experiments in dairy chemistry. Wiley. 1926 97 p. $1 50

Richmond, H. D. Dairy chemistry. Griffin. 1920. ed. 3 502 p. 25s

†**Rievel, H.** Handbuch der Milchkunde M. and H. Schaper, Hanover. 1926. ed. 3. 432 p. M26.

Scherer, R. (trans.). Casein, its preparation and technical utilization. Scott. 1921. ed 3. 216 p. 10s 6d.

Stocking, W. A., Jr. Manual of milk products. Macmil. 1917. 578 p. $2.75.

†**Sutermeister, E.** Casein and its industrial applications. Chem. Cat. 1927. 296 p $5. (A. C. S. monograph)

†**Tague, E. L.** Casein: its preparation, chemistry and technical utilization. Van Nost. 1926 218 p. $3.

12E MISCELLANEOUS

Fats and oils. (See also 27A)

Vinegar. See 16 (*Brannt, Mitchell*).

Cheney, R. H. Coffee. New York U. 1925. 244 p. $5. A monograph on the economic species of the genus *Coffea* L.

Clarke, A. Flavoring materials, natural and synthetic Frowde. 1922. 166 p. 8s 6d "Remarkably comprehensive for its size"

Clayton, W. Margarine Longm 1920. 183 p 14s.

†**Die Deutsche Oelmühlen-Industrie.** Junckers, Berlin 1925. 275 p. M26.

†**Elsdon, G. D.** The chemistry and examination of edible oils and fats Benn 1926 543 p 45s

Grant, J. Confectioners' raw materials Arnold. 1921 173 p 8s 6d.

†**Henry, W. A.** (rev. F B Morrison) Feeds and feeding Henry-Morrison Co, Madison, Wis 1922 ed 18 770 p

***Institute of American Meat Packers.** The packing industry Chicago U 1924 357 p $3 Lectures by leading authorities

Jacoutot, A. (rev R Whymper) Manufacture of confectionery. Van Nost 1924 265 p $5

***Mitchell, C. A.** Edible oils and fats. Longm 1918 172 p 7s 6d

***Pott, E.** Handbuch der tierischen Ernahrung und der landwirtschaftlichen Futtermittel. 1910 or earlier. 3 v

Whymper, R. Cocoa and chocolate their chemistry and manufacture. Churchill 1921. ed. 2 590 p 42s.

Wiley, H. W. Beverages and their adulterations. Blak. 1922 421 p $5

12F ANALYSIS

A. O. A. C. methods. See Doolittle, R. E. under 15E

Beythien, A., and others. Handbuch der Nahrungsmitteluntersuchung. Tauchnitz 1914–20 4 v. and supplement

Bolton, E. R., and Revis, C. Fatty foods their practical examination. Churchill. 1913 371 p $4 50. New ed. in prepn.

Cox, H. E. The chemical analysis of foods Churchill. 1926. 323 p 18s. Much information in small compass.

Cruess, W. V., and Christie, A. W. Laboratory manual of fruit and vegetable products McGraw 1922. 109 p $1 50.

†**Gaehtgens, W.** Methoden der bakterio-

logischen Untersuchung von Nährungsmitteln. Urban. 1926? 506 p.

Greenish, H. G. The microscopical examination of foods and drugs. Churchill. 1923. ed. 3. 386 p. 18s. Not much change from the 1910 ed. Compact and reliable.

†**Grossfeld, J.** Anleitung zur Untersuchung der Lebensmittel. 1927. 421 p M24.

König, J. (Vol 3 is on analysis.) See 12A.

***Leach, A. E., and Winton, A. L.** Food inspection and analysis. Wiley 1920. ed. 4. 1090 p. $8.50. "Standard."

Tanner, F. W. Bacteriology and mycology of foods. Wiley. 1919 592 p. $6. A textbook.

***Winton, A. L.,** and others. The microscopy of vegetable foods. Wiley. 1916. ed. 2. 717 p. $6 50.

***Woodman, A. G.** Food analysis. McGraw. 1924. ed. 2 529 p $3 50. Covers less ground than Leach, with more discussion. Primarily for students.

12F1 DAIRY ANALYSIS

American Public Health Association. Standard methods for the bacteriological and chemical examination of milk. Boston. 1923. ed. 4. 40¢.

†**Farrington, E. H., and Woll, F. W.** Testing milk and its products. Mendota Book Co, Madison, Wis. 1924. ed. 26. 280 p. $1 25.

Mojonnier, T., and Troy, H. C. Control of dairy products. C N Caspar, Milwaukee. 1926. ed. 2. 936 p. $12 50.

Richmond, H. D. The laboratory book of dairy analysis Griffin 1925. ed. 3. 126 p 5s. Not a textbook.

†**Teichert, K.** Methoden zur Untersuchung von Milch und Milcherzeugnissen. 1927. ed 2. 468 p. M32.10.

Van Slyke, L. L. Modern methods of testing milk and milk products. Orange Judd Co., New York. 1913. ed. 2 286 p

13 GENERAL INDUSTRIAL CHEMISTRY

13A GENERAL

For *encyclopedias and dictionaries* of applied chemistry, see 2A.

Blücher, H. Auskunftsbuch für die chemische Industrie. Gruyter. 1926 ed. 13. 2 v. 1400 p. M70. "Useful to anyone interested in the chemical nature and uses of substances known by trade names, especially German trade names." Alphabetic arrangement.

†**Dammer, O.** (ed F Peters) Chemische Technologie der Neuzeit. Enke 1925–. ed. 2. To be in 5 v v. 1, 1925. 852 p. M43.50. Other vols appearing in parts.

†**Gérard, J.** (ed). 1914–1924. Dix ans d'efforts scientifiques industriels et coloniaux. Chimie & Industrie, Paris. 1926. 2 v. 3000 p $12.

†**Herzog, R. O.** Chemische Technologie der organischen Verbindungen. Carl Winters, Heidelberg. 1927. ed. 2. 1010 p. M70.

Lange, O. Chemisch-technische Vorschriften. Spamer 1923–24. ed. 3. 4 v 1011 p. $9. "Appears to consist of a very complete and classified survey of the patent literature."

†**Levy, S. I.** Introduction to industrial chemistry. Bell 1926. 288 p. 15s. "Should become a standard textbook."

***Liddell, D. M.** (ed.). Handbook of chemical engineering. McGraw. 1922. 2 v. 1008 p. $8. A highly valued collaborative work of somewhat uneven quality.

***Martin, G.,** and others. Industrial and manufacturing chemistry. Lockwood. Part 1. Organic. 1925. ed 6. 750 p. —Part 2. Inorganic. 2 v. v 1. 1922. ed. 4. 496 p.—v. 2. 1920. ed. 2. 482 p. 28s. each.

†**Moldenhauer, W.** Chemisch-technisches Praktikum. Borntraeger. 1925. ed. 2. 264 p. M14.25.

Molinari, E. See 6A, 10A.

†**Neumann, B. von.** Chemische Technologie der anorganischen Industriezweige. 1926 Part 2. 300 p M19

Ost, H. Lehrbuch der chemischen Technologie. Janecke 1926. ed 15. 828 p. M16.80. "A slightly modified reprint of the 14th ed." The leading German textbook on the subject

†**Rogers, A.** Elements of industrial chemistry Van Nost 1926. ed. 2. 680 p. $4 50. An abridgment of Rogers and others' "Industrial Chemistry."

***Rogers, A.,** and others (eds). Industrial chemistry. Van Nost. 1925. ed. 4. 2 v. 1267 p. $10. v. 1. Inorganic. v. 2. Organic. College ed. in 1 v. $8. "The standard American manual of technical chemistry" A collaborative work also called "Manual of industrial chemistry."

***Sadtler, S. P., and Matos, L. J.** Industrial organic chemistry. Lipp. 1923.

ed. 5. 691 p. $8. A textbook for advanced students and reliable reference work.

Society of Chemical Industry. Annual reports. See Chap. V (pp. 134–5).

Walker, W. H., and others. See 1F1.

13B PROCESSES

Because plant processes and equipment are so intimately connected, this list has been combined with plant equipment as List 1F, which see.

13C MATERIALS

(See also 1F (*Plant equipment and processes*); 9A5 (*Corrosion*); 13K (*Directories*); 20C (*Building materials*).)

***American Society for Testing Materials.** A. S. T. M. standards 1924. The Society, Phila. 1219 p. $10. Is issued triennially and contains all the specifications adopted by the Society.

***American Society for Testing Materials.** A. S. T. M. standards adopted in 1925 and 1926. The Society, Phila. 120 and 102 p. $1 50 each. Supplements to the 1924 triennial publication.

***American Society for Testing Materials.** A. S. T. M. tentative standards 1926. The Society, Phila. 1100 p. $8 50. Revised annually. This ed. gives 227 tentative standards, published to elicit criticism.

†**Chemical Specifications** Yearbook, 1927. Chem. Specifications, Inc, 110 W 42d. St, N. Y. $5.

†**Erdmann-König** (ed E. Rennenosky). Grundriss der allgemeinen Warenkunde unter Berucksichtigung der Technologie und Mikroskopie. Barth 1925 ed. 17–19. 2 v. 1244 p. M40.

†**Federation of British Industries.** Resources of the Empire Benn. 1924–. 12 v. $7.50 each. A business man's guide. Vol. 7 is on chemicals, and others are on food, timber, textiles, fuel, rubber, leather, metals, etc.

Hamlin, M. L., and Turner, F. M., Jr. The chemical resistance of engineering materials. Chem. Cat. 1923. 267 p. $5. "Representative, rather than exhaustive."

Johnson, J. B. (ed. M. O. Withey, and J B. Aston). Materials of construction. Wiley. 1925. ed. 6. 865 p. $6.

†**Kloes, J. A. van der.** Onze Bouwmaterialen. L. J. Veen, Amsterdam. 1926. 6 parts. 50 guldens.

Leighou, R. B. Chemistry of engineering materials. McGraw. 1925. ed. 2. 538 p. $4. "Intended as a text." "A leader in its field."

†**Memmler, K.** (ed.). Das Materialprüfungswesen. Enke. 1924. ed. 2. 660 p. M25.50.

Mills, A. P. (ed. H. W. Hayward). Materials of construction; their manufacture and properties. Wiley. 1926. ed. 3. 419 p. $4. "A well-received text."

National Directory of Commodity Specifications. Bur. of Standards, Miscellaneous Pub. No. 65. 1925. 379 p. $1.25. A list of about 27,000 specifications, with the authoritative ones starred.

†**Rüst, E.** Warenkunde und Industrielehre. Zurich. 1926. 394 p. M17.60.

Tungay, S. J. Acid-resisting metals. Benn. 1925. 136 p. 6s. Rather uncritical, but useful as a concise summary.

13D ANALYSIS

(See also 7 (*Analytical chemistry*), especially 7E (*Reagents*), 9A7 (*Metallurgical analysis*), 10H (*Organic analysis*); 12F (*Food analysis*), etc.)

†**Elsner, F.** Die Praxis des Chemikers bei Untersuchung von Nahrungs- und Genussmittel, etc., etc. Voss. 1924. ed. 9. 868 p. M30. "A masterwork."

Griffin, R. C. Technical methods of analysis as employed in the laboratories of Arthur D. Little, Inc., Cambridge, Mass. McGraw. 1927. ed. 2. $7.50.

***Lunge, G.** (ed. E. Berl). Chemischtechnische Untersuchungsmethoden. Springer. 1921–24. ed 7. 4 v. 5011 p. M168 "A collection of comprehensive treatises." "Excellent in every particular." The old "Lunge" revised, and now usually referred to as "Lunge-Berl."

***Lunge, G.** (ed. C. A. Keane, and P. C. L. Thorne). Technical methods of chemical analysis. Gurney. 1924. v. 1. ed. 2. 704 p. 63s. The old "Lunge" so revised in accordance with British practice as to be a distinct book, with a high standard of its own.

13E WASTES

†**Bruttini, A.** Uses of waste materials. P. S. King and Son, London. 1923. 367 p. 12s. Especially for foods and fertilizers.

†**Rolants, E.** Les eaux usées. Baillière, Paris. 1926. 744 p. 70 fr.

13F PATENTS

(For a fuller list see p. 121.)

†**Hoar, R. S.** Patents. What a busidess

executive should know about patents Ronald Press Co., New York. 1926. 232 p. $4.50. "Nontechnical language." "Unique."

†**Robb, J. F.** Patent essentials Funk and Wagnalls Co., New York 1922 436 p "The best general book for the layman"

Thomas, E. Chemical patents and allied problems J. Byrne and Co., Washington. 1917. 58 p. $2 50

†**Thomas, E.** The law of chemical patents Van Nost. 1927. 420 p. $6.

***Walker, J. E., and Foster, R. B.** Patents for inventions. Pitman 1922 377 p 21s. Subject matter 166 p., reprints of statutes, rules etc., 178 p Strictly legal but not too technical.

13G ORGANIZATION

(See also 14A (*General sanitation*))

†**Candiani, A.** L'assurance des industries chimiques Dulac Frères, Paris 1926. 506 p

†**Gibbs, W. E.** Dust hazard in industry. Benn. 1925. 168 p 6s "An exhaustive and timely review"

Hamilton, A. See 11H2

Mees, C. E. K. Organization of industrial scientific research McGraw 1920. 170 p $2

†**Norrenberg, H.** Die Organisation der chemisch-technischen Klein- und Nebenbetriebe und die Herstellung der wichtigsten Handverkaufsartikel des täglichen Bedarfs R Muller, Berlin 1926 464 p M15

†**Tyler, C.** Chemical engineering economics McGraw 1926 271 p $3 50

Weiss, J. M., and Downs, C. R. The technical organization—its development and administration. McGraw 1924 197 p $2.50

13H PLANT DESIGN

†**Projektierungen** und Apparaturen fur die chemische Industrie Gruppe 1 Nitrocellulose, synthetischer Campher, Pulver Spamer. 1926. 165 p. 18s.

13K DIRECTORIES

British chemicals. Their manufacture, and uses (Official directory of the Assocn. of British Chemical Manufacturers) Benn 1927 10s 6d "Valuable for the lists of uses of chemicals, the list of trade names, and the index in five foreign languages"

***Chemical Engineering Catalog.** Chem Cat 1926. ed. 11. 1190 p. $10, leasing fee $2 (hereafter, customers may use free or purchase for $3). Annual. Arranged alphabetically by firms, with an index of products A list of about 1000 technical and scientific books is included

Chemical engineering and chemical catalogue. Leonard Hill, London. 1926 (D M. Newitt, ed) ed 2. 354 p. 21s A compilation of the catalogs of British manufacturers

Chemical manufacturers' directory of England, Wales and Scotland for 1926 Simpkin, Marshall, Hamilton, Kent and Co., London 1926 229 p 4s 6d Annual

Chemical reference and industrial directory of sources of production, distribution and supply of the most used chemicals and industrial raw products, including appurtenances, apparatus, machinery, materials, analytical laboratory furniture and appliances, etc New York Commercial 1925 308 p $3 "In part a directory but even more valuable for the concise information regarding properties and uses of products"

Dana, J. C., and others Mailing list directory and classified index to trade directories McGraw. 1924 727 p $10. A directory of mailing lists and directories, many of which are of interest to the chemist

"Drug and chemical markets" guide book 3 Park Place, New York 1926 $2 (free to subscribers) "Regional, classified and firm name sections, also prices, statistics and list of trade associations"

International handbook of the world's chemical industry and trade, 1913/14–1919/20. ed E v 1. 1921 Wiegandt und Grieben, Berlin "Cyclopedic arrangement, under German titles. Industrial and economic rather than technical List of German, British and French companies, p 670–752"

MacRae's blue book and Hendricks' commercial register consolidated 18 E. Huron St., Chicago 1926 v. 17. $12. Annual "Similar to Thomas. Has classified, firm name and trade name indexes"

"Oil, Paint and Drug Reporter" green book who's who 12 Gold St., New York 1926 14th year 740 p Paper. $2 50 (free to subscribers) American manufacturers of chemicals, dyes, drugs, apparatus, etc., classified by products.

Thomas' register of American manufacturers and first hands in all lines. 461 8th Ave., New York 1925–6. ed. 16. 4500 p. $15 Annual. "General, but of interest

to the chemist. Primarily a classified list, but other valuable features are (1) indication of capitalization, (2) alphabetical list of firms, (3) list of trade names, (4) list of trade journals."

13L WARFARE

Faber, H. B. Military pyrotechnics. Government Printing Office, Washington 1919 3 v.

****Fries, A. A., and West, C. J.** Chemical warfare McGraw. 1921. 445 p. $3 50 "Authoritative." "Written with great frankness"

Haldane, J. B. S. Callinicus: a defense of chemical warfare. Dutton. 1925. 84 p. $1.

***Lefebure, V.** The riddle of the Rhine W Collins Sons and Co, London. 1922. 292 p. 2s 6d Popular.

Meyer, J. Der Gaskampf und die chemischen Kampfstoffe. Hirzel 1925 470 p M20.

Moureu, C. La chimie et la guerre Masson 1920 377 p. 10 fr

†**Vedder, E. B.** Medical aspects of chemical warfare. Williams. 1925. 327 p $6.50. With a chapter on the naval aspects. Complements the Fries-West book.

13M MISCELLANEOUS

Bräuer, A., and D'Ans, J. (eds). Fortschritte in der anorganisch-chemischen Industrie an Hand der deutschen Reichspatente dargestellt. Springer. 1921–26. 2 v. v. 1 covers 1877–1917, v. 2 1918–1923. Very expensive.

Bunbury, H. M., and Davidson, A. The industrial application of coal tar products. Benn. 1925. 296 p. 42s. Reference and textbook. "A comprehensive survey"

***Gibbs, W. E.** Clouds and smokes. Churchill. 1923. 253 p 10s 6d. "A very complete review" "Highly interesting."

***Kent, W.** (ed. R. T Kent) Mechanical engineers' handbook Wiley. 1923. ed. 10. 2247 p. $7. "The leader in its field."

Kremann, R. (trans.). The application of physico-chemical theory to technical processes and manufacturing methods. Van Nost 1914 215 p $3

†**Lange, O.** Bluchers Auskunftsbuch fur die chemische Industrie Gruyter 1926? ed 13. 2v 1400 p. M70 "Voluminous cyclopedia of chemical substances." "A very thorough revision"

†**Lewis, W. K., and Radasch, A. H.** Industrial stoichiometry McGraw 1926 175 p $2 50 Chemical calculations of manufacturing processes

Marks, L. S. (ed) Mechanical engineers' handbook McGraw 1924 ed 2 2000 p. $6. "Has long been recognized by engineers as well-nigh indispensable"

Reilly, J., and others See 2C8

14 WATER, SEWAGE AND SANITATION

14A GENERAL

(For industrial sanitation, see also 13G)

Baskerville, C. (ed) Municipal chemistry. McGraw 1911 526 p $5 By various authors

Capes, W. P., and Carpenter, J. D. Municipal housecleaning Dutton 1918 232 p. $7.

Goodrich, W. F. Modern destructor practice Lipp. 1912 278 p. $4 75.

†**Gruenberg, B. C.** (ed.) Modern science and people's health W W Norton & Co., New York. 1926 250 p $2 50 Seven nontechnical but authoritative essays.

Havard, V. Manual of military hygiene for the military services of the United States W. Wood and Co, New York. 1917 ed. 3. 833 p $5 Bibliography of works on hygiene on pp 787–93

***Hering, R., and Greeley, S. A.** Collection and disposal of municipal refuse. McGraw. 1921. 653 p $7.

Hooker, A. H. Chloride of lime in sanitation. Wiley 1913 231 p $3

***Kober, G. M., and Hayhurst, E. R.** Industrial health Blak 1924 1256 p. $15.

***Phelps, E. B.** Public health engineering Macmil. 1925 264 p $3

Richards, E. H. Conservation by sanitation Wiley 1911 305 p $2 50. "Stimulating rather than complete"

***Rideal, S., and Rideal, E. K.** Chemical disinfection and sterilisation. Arnold. 1921. 313 p. 21s.

14B WATER

****American Water Works Association.** Water works practice Williams 1925. 790 p $5. A manual.

***Ellms, J. W.** Water purification. McGraw. 1917. 148 p $6 New ed in prepn.

***Flinn, A. D.**, and others Waterworks

handbook. McGraw. 1926. ed. 3. 871 p. $7.

Foulk, C. W. Industrial water supplies of Ohio. Geol. Survey, Columbus, O 1925 *Bull.* 29. 385 p $1. Contains much material of general interest.

Mason, W. P. Water supply. Wiley 1916 ed. 4. 528 p $5. A standard authority now growing old

Paul, J. H. Boiler chemistry and feed water supplies. Longm 1923 ed 2 252 p. 14s. Technical language avoided.

****Race, J.** Chlorination of water. Wiley. 1918. 158 p $1.50.

Read, W. T. Boiler waters, their chemical composition, use and treatment. Texas U., Austin. 1917. *Bull* 1752 $1

***Stein, M. F.** Water purification plants and their operation. Wiley. 1926 ed. 3 312 p. $3

Turneaure, F. E., and Russell, H. L. Public water supplies. Wiley 1924 ed 3. 770 p $6.

14C SEWAGE

†Activated sludge process of treatment, The General Filtration Co, Inc, Rochester, N Y 1926 88 p "The best résumé at the time of its publication"

***Babbitt, H. E.** Sewerage and sewage treatment. Wiley. 1925. ed. 2. 516 p $5

†Flood, G. M. Sewage treatment and disposal. Blackie. 1926. 171 p. 10s

****Fuller, G. W.** Sewage disposal. McGraw 1912. 767 p $7. Now rather old See the new book by Fuller and McClintock.

†Fuller, G. W., and McClintock, J. R. Solving sewage problems. McGraw. 1926. 548 p $6 "Will be excellent" (advance comment)

International conference on sanitary engineering. Am. Public Health Assocn., New York. 1924 383 p $4 Collected papers

Kershaw, G. B. Sewage purification and disposal. Cambridge U. 1925. ed. 2. 364 p. 18s. Not greatly changed from the 1915 ed.

***Kinnicutt, L. P., and others.** Sewage disposal Wiley. 1919. ed. 2. 547 p. $5.

****Metcalf, L., and Eddy, H. P.** Sewerage and sewage disposal. McGraw. 1922. 598 p. $5. An abridgment of a 3-vol. work by the same authors ("American sewerage practice." McGraw. 1914–15). Vol 3 of the large work, on sewage disposal, has been revised (ed 2. 878 p. $7).

****Porter J. E.** The activated sludge process of sewage treatment General Filtration Co., Rochester, N Y. 1921 ed 2. 117 p $1. An invaluable bibliography complete to its date

14D ANALYSIS

(Valuable material on water analysis is also found in some of the books on water supply and in various bulletins of the U. S. Geol Survey and Public Health Service)

****American Public Health Association.** Standard methods for the examination of water and sewage. New York. 1925. ed. 6. 119 p. $2

†Gotschlich, E. Handbuch der hygienischen Untersuchungsmethoden. Jena. 1926. v. 1. 1088 p. M54.

Leffmann, H. Examination of water for sanitary and technical purposes. Blak 1922. ed. 7. $1 75.

Levine, M. Bacteria fermenting lactose and their significance in water analysis Iowa State College of Agr. (Ames, Iowa.) 1921. *Bull.* 62.

***Mason, W. P.** Examination of water Wiley. 1917. ed. 5. 186 p. $1 50

***Prescott, S. C., and Winslow, C.-E. A.** Elements of water bacteriology. Wiley 1924. ed. 4. 211 p. $2.25.

Thresh, J. C., and Beale, J. F. The examination of waters and water supplies. Churchill. 1925. ed. 3. 590 p. 25s. British practice.

****Whipple, G. C.** The microscopy of drinking water. Wiley. 1914. ed. 3. 409 p. $4.25. New ed. in prepn.

15 SOILS, FERTILIZERS AND AGRICULTURAL POISONS

15A GENERAL

***André, G.** Chimie agricole. Baillière, Paris. 1921. ed. 3. 2 v. 902 p.

†Chamberlain, J. S., and Browne, C. A. (eds) Chemistry in agriculture. Chem. Foundation. 1926. 440 p. $1. A story of achievements written in popular style by 20 specialists.

†Collins, S. H., and Redington, G. Plant products and chemical fertilizers. Baillière, London. 1926. ed. 2. 276 p. 10s 6d "Virtually a new work"

Fraps, G. S. Principles of agricultural chemistry. Chem. Pub. 1917. ed. 2 501 p. $5.

****Storer, F. H.** Agriculture in some of its relations to chemistry. Sampson Low, Marston and Co, London. 1917. ed. 7. 3v.

15B SOILS

*Ehrenberg, P. Die Bodenkolloide. Steinkopff. 1922. ed. 3 717 p. M27.

†Emerson, P. Soil characteristics: a field and laboratory guide. McGraw. 1925. 222 p. $2.50.

*Hall, A. D. The soil. Murray. 1920. ed. 3. 352 p. 8s.

Halligan, J. E. Soil fertility and fertilizers. Chem. Pub. 1912. 398 p. $4. Elementary.

*Harris, F. S. Soil alkali. Wiley. 1920. 258 p. $2.50.

**Hopkins, C. G. Soil fertility and permanent agriculture. Ginn. 1910. 653 p. $3.60.

*King, F. H. The soil Macmil. 1907 303 p. $2.25

Lyon, T. L. Soils and fertilizers Macmil 1917. $1.60. Elementary.

**Lyon, T. L., and Buckman, H. O. Nature and properties of soils. Macmil. 1922. 588 p. $3.25. A college textbook.

Murray, J. A. The science of soils and manures. Constable. 1925. 312 p. 12s.6d.

**Russell, E. J. Soil conditions and plant growth. Longm. 1927. ed. 5. 524 p. $6 50. (Rothamsted monograph) "Shows much rewriting"

†Stoklasa, J., and Doerell, E. G. Handbuch der biophysikalischen und biochemischen Durchforschung des Bodens. Parey. 1926. 812 p. M34.

Whitney, M. Soil and civilization. Van Nost. 1925. 287 p $3. A particular point of view, presented attractively

15C FERTILIZERS

(See also 15B (*Soils*))

Fritsch, J. (trans) The manufacture of chemical manures. Van Nost. 1920 ed. 2. 395 p. $6

†Mossner, C. von, and Mossner, J. Handbuch der Stickstoff- und Superphosphat-Industrie. 1927. v. 1 528 p. M40.

†Verein Deutscher Dünger-Fabrikanten (ed.). Die Fabrikation des Superphosphates mit Berucksichtigung der anderen gebrauchlichen Dungemittel nach dem Handbuch von Ludwig Schucht. Vieweg. 1926. ed 4. 372 p. M30.

†Voorhees, E Fertilizers. Macmillan. 1926. ed. 2 (rev. S. B. Haskell). 329 p. $2.50. "Standard work, first published in 1898, now thoroughly revised."

*Wheeler, H. J. Manures and fertilizers. Macmil. 1913. 389 p. $2.50.

15D AGRICULTURAL POISONS

Anderson, O. G., and Roth, F. C. Insecticides and fungicides, spraying and dusting equipment. Chapman. 1923. 349 p. 15s.

Bourcart, E. (trans). Insecticides, fungicides and weed killers. Scott. 1925. ed 2. 443 p. 15s.

15E ANALYSIS

†Doolittle, R. E., and others. Official and tentative methods of analysis of the Association of Official Agricultural Chemists. The Assocn., Washington. 1925 ed. 2. 510 p. $5. Revised to July, 1924 A reference book well known to analysts, formerly issued by the Government as Chemistry Bull 107.

†Gedroiz, K. K. (trans.). Chemische Bodenanalyse Methoden und Anleitung zur Untersuchung von Boden im Laboratorium. Borntraeger 1926. 245 p. M12. From the Russian.

†König, J. Die Untersuchung landwirtschaftlich und landwirtschaftlich-gewerblich wichtiger Stoffe. Parey. 1923–6. ed 5 2 v. 1935 p. About M96.

Mahin, E. G., and Carr, R. H. Quantitative agricultural analysis. McGraw. 1923. 329 p. $2.75.

†Metge, G. Laboratoriumsbuch für Agrikulturchemiker. Knapp. 1926. ed. 2. 232 p. M17.

†Wiegner, G., and Jenny, H. Anleitung zum quantitativen agrikulturchemischen Praktikum. Borntraeger. 1926? 364 p. M21.

†Wiessmann, H. Agrikulturchemisches Praktikum. Parey. 1926. 329 p. M18.

*Wiley, H. W. Principles and practice of agricultural analysis. Chem Pub. 1926. ed. 3. v. 1. Soils. 699 p. $7.50.—1914. ed. 2. v. 2. Fertilizers and insecticides. 684 p. $4.50.—1914. ed. 2. v. 3. Agricultural products. 846 p. $6.

16 FERMENTATION INDUSTRIES

Allen, P. W. Industrial fermentations. Chem. Cat. 1926. 421 p. $6. Has been criticized for attempting to cover a very broad field too briefly.

A. O. A. C. methods of analysis. See Doolittle, R. E., under 15E.

Boullanger, E. Distillerie agricole et industrielle. Baillière, Paris. 1924–5. 2 v.

Brannt, W. T. A practical treatise on the manufacture of vinegar. Van Nost. 1914. ed. 3. 567 p $6.

†**Fritsch, J.** Nouveau traité de la fabrication des liqueurs d'après les procédés les plus récents. Amédée Legrand, Paris. 1926. 530 p. 45 fr

†**Fuhrmann, F.** Einführung in die Grundlagen der technischen Mykologie Fischer 1926. ed. 2. 554 p M28

****Harden, A.** Alcoholic fermentation. Longm. 1923 ed 3. 194 p 6s 6d. Theory and biochemistry (not industry), by an authority.

***Hayduck, F.** (ed). Chemische Technologie der Garungsgewerbe, Nahrungs- und Genussmittel Vieweg. 1915–22. 2 v One of the supplements to Muspratt's Encyklopadisches Handbuch. A collective work

†**Jacobsen, E.** Handbuch fur die Getränke-Industrie. Parey. 1925 1251 p

Jörgensen, A. See 11C.

***Lafar, F.** Handbuch der technischen Mycologie. Fischer 1904–14 5 v. Vols 1, 2, 4 and 5 M77.50 (paper); vol. 3 *o p* There is an English trans. of the first 2 vols. ("Technical mycology," Griffin. 1910. 2 v. 870 p.)

M'Intosh, J. G. Industrial alcohol. Scott. 1923. ed. 2. 412 p. 12s. 6d.

Mitchell, C. A. Vinegar; its manufacture and examination. Griffin. 1926. ed. 2. 227 p 10s 6d.

Monier-Williams, G. W. Power alcohol: its production and utilisation. Frowde. 1922. 320 p. 21s. Very favorably reviewed.

†**Mündler, K.** Physikalisch - chemisches Praktikum für Brauer. Enke 1926. 221 p M12 40.

†**Petit, P.,** and others. Brasserie et malterie. Gauthier. 1926. New ed 2 v. 1026 p. 120 fr

Simmonds, C. Alcohol Macmil. 1919 574 p. $8.40 For scientific or industrial users.

†**Thom, C., and Church, M. B.** The Aspergilli. Williams. 1926. 272 p. $5

†**Wagner, A.** Die Spiritusfabrikation und ihre Nebenprodukte. Serger und Hempel, Braunschweig. 1925. 719 p M40.

Wagner, A. See also 18A.

17 PHARMACEUTICAL CHEMISTRY

17A GENERAL

American Drug Manufacturers' Association. Origin and history of all the pharmacopœial vegetable drugs, chemicals and preparations, with bibliography. The Assocn , Washington. 1921. v. 1 (by J U Lloyd) 449 p. $6. "Delightful to read—technically important."

***American Medical Association.** Useful Drugs. The Assocn , Chicago. 1925. ed. 6. 180 p Information about a selected list of drugs.

†**American Medical Association.** New and nonofficial remedies. The Assocn , Chicago 1927. 473 p. $1.50. Revised annually

American Pharmaceutical Association The national formulary. Chem Cat. 1926. ed 5. 545 p $3.50 (leather $7).

†**Arny, H. V.** Principles of pharmacy. Saunders 1926. ed. 3. 1078 p. $8. "A practical text and reference book." Favorably reviewed.

Barrowcliff, M., and Carr, F. H. Organic medicinal chemicals (synthetic and natural). Baillière, London. 1920. 344 p 15s

British Pharmacopœia, The. Constable 1914. 633 p. 10s.6d

†**Buckley, J. P.** Modern dental materia medica, pharmacology and therapeutics. Blak. 1926 ed 5. 597 p $6.

Deutsches Arzneibuch. Deckers Verlag, Berlin 1926. 909 p. M35.

Dieterich, E. (ed. W. Kerkhof) Neues pharmazeutisches Manual. Springer 1924 ed. 14. 825 p. $5. Includes formulas for all sorts of prepns.

***Fränkel, S.** Die Arzneimittelsynthese. Springer. 1921. ed. 5. 906 p. $11 50 The best-known book on synthetic medicinals

Fuller, H. C. The story of drugs Century 1922 343 p. $3 An excellent popular book

†**Gehes.** Codex der Bezeichnungen von Arzneimitteln, kosmetischen Praparaten und wichtigen technischen Produkten. Schwarzeck-Verlag., Dresden. 1926. ed. 4 1136 p. M18.50.

Hager, H. Handbuch der pharmazeutischen Praxis. Springer. 1925. New ed. v. 1. A-J 1573 p. M57.

†**Houben, J.** Fortschritte der Heilstoffchemie. Gruyter. 1926. Part 1. Das deutsche Patentschriftwesen. v. 1. 1877–1900. 1027 p. M80.

Lloyd, J. U. See American Drug Mfrs Assocn , above.

Martindale, W. H., and Westcott, W. W.

The extra pharmacopœia. H. K. Lewis and Co., London 1924–25 ed. 18. 2 v. 1891 p. 47s 6d. "Complete epitome"

May, P. The chemistry of synthetic drugs Longm 1921. ed. 3 248 p 12s 6d

Pharmaceutical Society of Great Britain. British pharmaceutical codex. Pharmaceutical Press, London. 1923. ed 3 1669 p. 30s.

***The Pharmacopeia of the United States.** Lipp. 1925 ed 10 626 p $4.

†**Real-enzyklopädie** der gesamten Pharmazie Urban. 1904–14 ed 2

Remington, J. P., and Cook, E. F. The practice of pharmacy. Lipp. 1926 ed. 7. 1987 p $10.

***Schmidt, E.** Ausfuhrliches Lehrbuch der pharmazeutischen Chemie Vieweg. 1919. v. 1 (inorganic) ed 6 1404 p M42 50.—1922–23. v 2 (organic) 2548 p. In 2 parts M93

Thoms, H. Handbuch der praktischen und wissenschaftlichen Pharmazie Urban 1924– . 6 v (v. 1 and 2 out, v 3 appearing in parts).

Wood, H. C., and others United States dispensatory. Lipp 1926 ed 21. 1822 p $15 A commentary on drugs, official and unofficial First appeared in 1833.

Wren, R. C., (ed. E. M. Holmes) Potter's cyclopædia of botanical drugs and preparations. J. D. Potter, London 1923. ed. 3. 392 p 5s.

17B ESSENTIAL OILS, PERFUMERY AND COSMETICS

Cohn, G., and Richter, F. Die Riechstoffe Vieweg. 1924 ed 2 216 p. M12

†**Finnemore, H.** The essential oils. Benn. 1926. 896 p. 70s.

****Gildemeister, E., and Hoffman, F.** (trans.). The volatile oils Wiley 1913–22. ed. 2. 3 v. 2140 p $10 per v. "A kind of dictionary," with many references.

†**Hampton, F. A.** The scent of flowers and leaves. its purpose and relation to man. Dulau and Co. London. 1925. 135 p 6s

***Parry, E. J.** The chemistry of essential oils and artificial perfumes. Scott 1921–22. ed. 4. 2 v 918 p 51s

Parry, E. J. Cyclopedia of perfumery Churchill. 1925. 2 v. 840 p 36s. A summary of information on the raw materials of perfumery.

Poucher, W. A. Perfumes, cosmetics and soaps, with special reference to synthetics. Chapman 1925 ed. 2 2 v. 726 p. 37s Vol 1 treats of raw materials, and vol 2 of practical perfumery.

***Semmler, F. W.** Die atherischen Öle. Veit 1906–7. 4 v.

†**Winter, F.** Handbuch der gesamten Parfumerie und Kosmetik Springer 1927 955 p M69

17C ANALYSIS

(See also 11H2 (*Toxicology*); 12F (*Food analysis*))

Autenrieth, W. (trans.). The detection of poisons and powerful drugs Blak 1921. ed 5. 357 p $3 50 German ed 5. 1923 (Die Auffindung der Gifte, Steinkopff, 628 p)

***Fuller, H. C.** Chemistry and analysis of drugs and medicines Wiley 1920 1072 p. $10

***Kraemer, H.** Scientific and applied pharmacognosy. Wiley. 1920 ed 2 857 p $6.

Schneider, A. The microanalysis of powdered vegetable drugs. Blak. 1922 ed. 2 548 p. $5

***Tschirch, A.** Handbuch der Pharmakognosie. Tauchnitz. 1909– . A monumental work, still appearing in parts.

†**Wallis, T. E.** Practical pharmacognosy. Churchill. 1926. 115 p. 7s 6d.

18 ACIDS, ALKALIES, SALTS AND SUNDRIES

****Lunge, G., and Cumming, A. C.** The manufacture of acids and alkalis. Gurney. 1923–25. English ed. 5.

v. 1. **Wyld, W.** Raw materials for the manufacture of sulphuric acid and the manufacture of sulphur dioxide. 1923. 571 p. 36s.

v. 2. **Wyld, W.** The manufacture of sulphuric acid. 1924. 424 p. 31s.6d.

v. 3. **Parkes, J. W.** The concentration of sulphuric acid. 1924. 406 p. 31s.6d.

v. 4. **Miles, F. D.** Manufacture of sulphuric acid (contact process). 1925. 427 p. 36s.

v. 5. **Cumming, A. C.** The manufacture of hydrochloric acid and saltcake. 1923. 438 p. 31s.6d.

v 6. **Cottrell, A.** The manufacture of nitric acid and nitrates. 1924. 469 p. 36s.

"Lunge" is an old and well-known work that has been greatly enlarged in the

course of time Founded by Prof. Georg Lunge of the U. of Zurich

18A ACIDS

*Sullivan, T. J. Handbook of sulphuric acid. McGraw. 1918. 239 p. $2 50. Contains the tables adopted by the Manufacturing Chemists' Assocn.

†Technical Records of Explosives Supply. No. 5. Manufacture of sulphuric acid by contact. H M. S. Office. 1921. 128 p 25s.

†Wagner, A. Die Herstellung von Essigsaure, Garungsessig, Buttersaure, Zitronensäure und Milchsaure. Hartleben 1926. v. 1. 312 p. M7.

Webb, H. W. Absorption of nitrous gases Arnold. 1923. 372 p. 25s. Theory and practice well balanced.

†Wells, A. E., and Fogg, D. E. The manufacture of sulfuric acid in the United States Bur Mines. 1920. *Bull.* 184 216 p. 40c.

18B BASES

Knibbs, N. V. S. Lime and magnesia Benn. 1924. 306 p 30s Chemistry, manufacture and uses.

Parrish, P. Design and working of ammonia stills Benn 1924. 313 p 40s. Practice in British gas works

Partington, J. R. The alkali industry Baillière, London 1925. ed 2. 356 p. 12s 6d "A bird's-eye view." Includes mineral acids.

18C SALTS

Turrentine, J. W. Potash a review, estimate and forecast Wiley. 1926 188 p $3 Presents the world situation.

18D GASES

†Claude, G. Air liquide, oxygène, azote, gaz rares. Dunod 1926 ed 2 424 p 32 fr.

Greenwood, H. C. Industrial gases. Van Nost. 1919 371 p $5 Deals with air, O_2, N_2, rare gases, O_3, H_2, CO, CO_2, SO_2, and N_2O.

Taylor, H. S. Industrial hydrogen. Chem Cat. 1921. 210 p. $4.50. (A. C S monograph)

18E NITROGEN FIXATION

Knox, J. The fixation of atmospheric nitrogen. Gurney. 1921. ed. 2. 124 p. 4s.

*Partington, J. R., and Parker, L. H. The nitrogen industry. Constable. 1922. 336 p. 21s.

Waeser, B. (trans.). The atmospheric nitrogen industry. Churchill. 1926. 2 v. 773 p. 42s. Progess in Germany during and immediately after the War.

18F SUNDRIES

Casein. See 12D (*Dairy chemistry*).

Cellulose derivatives. See also 23A, 25D2.

Rare earths. See 6D

Clément and Rivière. Matières plastiques; soies artificielles. Baillière, Paris. 1924. 528 p. 65 fr.

*Ellis, C. Synthetic resins and their plastics. Chem. Cat. 1923. 514 p $8. "Stimulating and practical."

†Fritz, F. Das Linoleum und seine Fabrikation mit besonderer Berucksichtigung seiner Geschichte, Eigenschaften und Verwendung Alfred Weber, Nachf., Berlin 1926 377 p. M25

Gibson, C. S. Chemistry of dental materials. Benn 1922 176 p 12s 6d.

†Hackspill, L., and Rémy-Genneté, P. Petite industrie chimique (industrie des métalloïdes). Baillière, Paris. 1926. 834 p. 95 fr.

†Michel, H. Die kunstlichen Edelsteine. Diebener. Leipzig. 1926. ed. 2. 477 p. M25.

†Michel, H. Nachahmungen und Verfalschungen der Edelsteine und Perlen und ihre Erkennung U. Moser, Graz 1926. 142 p. M13 40.

†Ryschkewitsch, E. Graphit 1926. 335 p M16 50.

Tressler, D. K., and others Marine products of commerce. Chem. Cat. 1923. 760 p. $12. "An encyclopedia of the products of the sea."

18G RECEIPT BOOKS

Brannt, W. T., and Wahl, W. H. Technochemical receipt book Baird. 1919. New ed 516 p. $2.50. "All too compact"

Hiscox, G. D. (ed). Henley's twentieth century formulas, recipes and processes. Lockwood. 1925. New ed 807 p. 21s Over 10,000 receipts.

*Hopkins, A. A. Scientific American cyclopedia of formulas Sci. Am. Pub. Co, New York. 1923. 1077 p. $5 50. Partly based on ed. 28 of the Sci. Am. Cyclopedia of receipts, notes and queries. 15,000 formulas.

Lange, O. See 13A.

Lucas, E. W., and Stevens, H. B. The book of receipts. Churchill. 1924. ed. 12. 473 p. 10s.6d.

†Recipes for the colour, paint, varnish, oil, soap and drysaltery trades. Srott. 1926. ed. 3. 365 p. 10s.6d. Somewhat wider than the title indicates.

19 GLASS, CLAY PRODUCTS, REFRACTORIES AND ENAMELED METALS

(See also "*A selected bibliography*," *J Ind Eng Chem* **13**, 476–7(1921).)

Koerner, J. Sprechsaal-Kalender fur die Keramischen, Glas und verwandten Industrien. Muller & Schmidt, Coburg. Published annually. v. 16 in 1927. 308 p. M2. 50.

19A GLASS

****Dralle, R.** (ed G. Keppele) Die Glasfabrikation Oldenbourg. 1926. ed 2. v. 1. Allgemeines. 778 p. M64. v. 2, Einzelzweige, is to appear in 1927. "The standard work of the glass industry."

****Hodkin, F. W., and Cousen, A.** Textbook of glass technology Constable. 1925. 574 p 42s. "The best on the glass industry in the English language"

Hovestadt, H. (trans) Jena glass. Macmil. 1902 $7 20. Contains fundamental data. "Of very great value"

***Rosenhain, W.** Glass manufacture Constable. 1919. ed 2 273 p. $4 A readable book giving a good general view of the industry without too much detail

Salvetat, H. See 20A

***Wright, F. E.** Manufacture of optical glass and of optical systems. Govt. Printing Office. 1921. 309 p "The best book available in English on this subject"

Zschimmer, E. Theorie der Glasschmelzkunst als physikalisch-chemische Technik. Thuringer Verlagsanstalt, Jena. 1925? 2 v. "An interesting discussion of the art and science of glass making from a theoretical standpoint."

19B CERAMICS

Binns, C. F. The potter's craft Constable (Van Nost). 1922 ed 2 206 p. 13s. ($2 50). For an advanced student or a practical worker interested in the scientific side.

Binns, C. F. (ed). The manual of practical potting. Scott (Van Nost.). 1922. ed. 5. 204 p. 17s.6d. ($8).

***Bourry, E.** (trans). A treatise on ceramic industries. Scott. 1911. 488 p. $6. "Comprehensive treatment of the whole subject according to European practice."

Clay products cyclopedia. Industrial Publications. 1926. ed. 3. 336 p. $3. Includes definitions, statistics and catalogs of equipment. "Unusual reference value."

†Dümmler, K., and Loeser, K. Handbuch der Ziegel-Fabrikation. Knapp. 1926. ed. 3. 545 p. M29.

†Linger, F. Die Keramik im Dienste von Industrie und Volkswirtschaft. 1923. 1044 p. M50.

****Lovejoy, E.** Burning of clay wares T. A. Randall and Co, Indianapolis 1920. 232 p. $7.50. "Very thorough—large amount of space given to kilns."

Mellor, J. W. See 7C

***Orton, E., Jr., and Worcester, W. G.** The manufacture of roofing tile. Ohio Geol. Survey. 1910. "Applicable to a wider range of wares than is indicated by the title."

****Pottery industry,** The. U. S. Dept. of Commerce, Misc. Publications Series No. 21 (1915) "Wealth of material, largely statistical"

†Rauls, F. Die Ziegelfabrikation. Voigt, Leipzig 1926. 430 p. M30

Salvetat, H. See 20A.

Sandeman, E. A. The manufacture of earthenware. A practical treatise. Lockwood. 1917. 384 p. 12s. "A non-technical book in which English methods are fully described."

****Searle, A. B.** The chemistry and physics of clays and other ceramic materials. Benn. 1924 708 p. 55s. Reviewers' opinions of this book vary considerably. It probably requires a discriminating reader.

Searle, A. B. Clays and clay products. Pitman 1915 ed 2. 172 p. 3s. "A good elementary treatment according to English practice."

Searle, A. B. The clayworker's handbook Griffin. 1921. ed. 3. 381 p 21s "For the reader who has some knowledge of the subject or who wishes more detailed information regarding the materials and their properties."

Searle, A. B. Modern brickmaking. Scott. 1921. ed. 2. 510 p. 17s.6d

****Seger, H. A.** (trans.). Collected writings on the manufacture of pottery Chem. Pub. 1902. 2 v. 1157 p. $7.50 per v.

19C ENAMELS

†Danielson, R. R. Wet process enamels for cast iron. Bur of Standards. 1922. *Tech Paper* No. 246. 10¢

****Gruenwald, J.** (trans.). The theory and practice of enameling on iron and steel. Griffin. 1910. 131 p. Reprint, 1919, 178 p. 7s.6d.

*Gruenwald, J. (trans.) Raw materials for the enamel industry and their chemical technology. Griffin. 1914 225 p. 10s.6d.

†Landrum, R. D. Enamels. 1918 106 p. For libraries only.

†Millenet, L. (trans). Enameling on metal Van Nost. 1926. 126 p. $2. For jewelry, etc.

*Shaw, J. B. Enamels for sheet iron and steel. Bur. of Standards. 1926. *Tech. Paper* No. 165 88 p. 15¢

**Staley, H. F. Materials and methods used in the manufacture of enameled cast iron wares. Bur. of Standards 1919. *Tech. Paper* No. 142. 158 p. 20¢

19D REFRACTORIES

†Havard, F. T. Refractories and furnaces McGraw. 1912. 380 p. $5. Treats especially of metallurgical refractories

**Ross, D. W. Silica refractories—factors affecting their quality and methods of testing the raw materials and finished ware Bur. of Standards 1919. *Tech. Paper* No. 116 84 p. 20¢. "Gives a good description of the chemistry and manufacturing methods."

Searle, A. B. Refractories for furnaces, crucibles, etc Pitman 1923. 170 p. 5s. An introduction to the larger work below

Searle, A. B. Refractory materials, their manufacture and uses. Griffin 1924. ed. 2. 746 p 42s. A summary of the record and of an expert's experience. "Deals more particularly with British practice."

20 CEMENT AND OTHER BUILDING MATERIALS

*Bureau of Standards technologic papers Washington. 1911– . Nos 3, 5, 12, 16, 18, 29, 42, 43, etc. By Bates, Klein and others

*Eckel, E. C. Cements, limes and plasters. Wiley. 1922. ed 2. 655 p $6 50. Not up to date but the best of its kind.

**Geophysical Laboratory Publications Carnegie Inst., Washington. 1906– . Nos. 8, 11, 41, 61, 197, 218, 244, 253, 295. 338, etc By A. L Day, G. A. Rankin, E. S. Shepherd and others.

†Probst, E. Handbuch der Zementwaren- und Kunststeinindustrie. 1927. ed 3 865 p. M24 50.

*Structural Materials Research Laboratory bulletins. 1918–26. Portland Cement Assocn., Chicago.

20A CEMENT

Bleininger, A. V. Manufacture of hydraulic cements. Ohio Geol. Survey, 1904. Series 4, *Bull.* 3. "Fundamental information."

Blount, B., and others Cement. Longm 1920. 284 p 18s. By a well-known British authority

Desch, C. H. The chemistry and testing of cement. Arnold 1911. New ed. in prepn. Primarily theoretical.

Johannsen, A. See 8B.

LeChatelier, H. (trans.). Experimental researches upon the constitution of hydraulic mortars. McGraw. 1905. 128 p. $2. "Almost a classic."

*Lesley, R. W., and others. History of the portland cement industry in the United States. International Trade Press, Chicago. 1924. 330 p $3. By manufacturers of long experience "The best book of its kind."

**Meade, R. K. Portland cement, its composition, raw materials, manufacture, testing and analysis. Chem Pub. 1926. ed. 3. 707 p $10. The standard book on this subject

*Portland Cement Association Fellowship publications at the Bureau of Standards. Scattered, reprints obtainable of the Fellowship office at the Bureau.

Redgrave, G. R., and Spackman, C. Calcareous cements. Griffin. 1924. ed. 3. 411 p. 25s Manufacturing experience.

†Salvetat, H. Produits hydrauliques-céramique-verrerie Bougault, Paris. 1920 535 p.

Wright, F. E. See 8B.

20B CONCRETE

*American Society for Testing Materials. Standard specifications for concrete and reinforced concrete The Society, Phila. 1924. 152 p. $1.50. Second report of the Joint Committee on this subject.

†Gaye, J. Der Gussbeton und seine Anwendung im Bauwesen Ernst. 1926. 215 p. M16 80.

†Grün, R. Der Beton. Springer. 1926. 186 p. M15. Deals mainly with physical and chemical influences affecting concrete.

Harris, W. R. Concrete products: their manufacture and use. International Trade Press, Chicago. 1924. ed. 2 640 p. $3. Of value to the practical manufacturer or to anyone wishing to

learn some of the main features in limited time

Hool, G. A., and Johnson, N. C. Concrete engineers' handbook. McGraw 1918. 800 p. $6. A standard book.

†**Kleinlogel, A.** Einflusse auf Beton Ernst 1924. 331 p. M21.6. Very favorably reviewed.

***Taylor, F. W.,** and others. Concrete, plain and reinforced Wiley 1925 ed 4 v. 1. 969 p $8 A standard book

20C BUILDING MATERIALS

(See also 13C (*General industrial materials*).)

†**Blake, E. G.** Roof coverings Van Nost. 1925. 275 p. $3.50. British practice.

†**Blake, E. G.** Damp walls Lockwood 1926. ed. 2 270 p 8s 6d

†**Warnes, A. R.** Building stones, their properties, decay and preservation Benn 1926 260 p. 16s For the general reader.

***Weiss, H. F.** The preservation of structural timber. McGraw. 1916 ed 2 361 p. $3.50.

†**Weniger, K. A.** Die Asbest-Zement-schiefer-Fabrikation. Krayn. 1926. ed. 2 258 p. M17.

20D PAVING

(See also 22D (*Asphalt*).)

Barton, W. H., Jr., and Doane, L. H. Sampling and testing of highway materials. McGraw. 1925. 355 p. $3.50. "A complete manual"

Besson, F. S. City pavements McGraw 1923. 421 p. $5.

†**Blanchard, A. H.** American highway engineers' handbook Wiley 1919. 1658 p $6

***Hubbard, P.** Dust preventives and road binders. Wiley 1910 416 p $4

Hubbard, P. Laboratory manual of bituminous materials Wiley. 1916 153 p. $1.50.

21 FUELS, GAS, TAR AND COKE

21A GENERAL

****Bacon, R. F., and Hamor, W. A.** American fuels. McGraw. 1922 2 v. 1257 p. $12. Articles written from the practical standpoint by 22 specialists.

Best, W. N. Burning liquid fuel. U. P C Book Co., New York 1922 384 p $4 Practical

Bjorling, P. R., and Gissing, F. T. Peat. its uses and manufacture Griffin 1907 173 p. $2.50

Brownlie, D. Boiler plant testing. Chapman. 1922 168 p. 10s 6d Suggestions for an improved code

***Dunn, J. T.** Pulverized and colloidal fuel. Benn. 1923. 196 p. 25s

Ellis, C., and Meigs, J. V. See 22B2.

†**Grebel, A., and Bouron, H.** Gaz et cokes. Dunod. 1924 700 p 67.50 fr.

†**Gwosdz, J.** (ed.). Kohle, Koks, Teer Abhandlungen zur Praxis der Gewinnung, Veredelung und Verwertung der Brennstoffe Knapp. 1924– . A series, of which 7 v had appeared up to Jan., 1927.

Haanel, B. F. Final report of the Peat Committee appointed jointly by the governments of the Dominion of Canada and the Province of Ontario, 1925 Ottawa. 1926. (Mines Branch No. 641) 298 p 50¢

Harvey, L. C. Pulverised fuel, colloidal fuel, fuel economy and smokeless combustion. Macdonald and Evans, London. 1924. 466 p 42s. Very comprehensive but somewhat noncritical

****Haslam, R. T., and Russell, R. P.** Fuels and their combustion. McGraw. 1926. 807 p. $7.50. Unusually favorably reviewed.

†**Hermanns, H.** Taschenbuch fur Brennstoffwirtschaft und Feuerungstechnik. Knapp. 1926. 268 p M6.50.

****Leslie, E. H.** Motor fuels, their production and technology. Chem Cat. 1923 681 p. $11. "Really monumental" "Chapter IV is about the best discussion of fractional distillation available"

Lewes, V. B. (ed. J. B. C. Kershaw). Liquid and gaseous fuels. Constable. 1921 ed 2. 353 p 12s 6d

Moore, H. Liquid fuels for internal combustion engines Lockwood. 1921. ed. 2 206 p. 15s.

†**Shaw, N., and Owen, J. S.** The smoke problem of great cities Constable. 1926. 317 p. 22s 6d. A summary of 11 annual committee reports.

Stillman, A. L. See 1F12.

†**Strache, H., and Ulmann, H.** Leitfaden der Technologie der Brennstoffe. 1927. 481 p. M24.40.

Taylor, H. S. Fuel production and utilization. Van Nost. 1920. 296 p. $3.50.

21B COAL

***Bone, W. A.** The scientific uses of coal. Longm. 1919. 507 p. $7.50.

†**Borchardt, K., and Bonikowsky, K.** Handbuch der Kohlenwirtschaft. Berlin 1926. 866 p. M45.

First general report of the Lignite Utilization Board of Canada The Board, Montreal 1924. 263 p. $1.50. Covers Oct. 1, 1918 to Jan. 1, 1924.

†Fischer, F. (trans.). Conversion of coal into oils. Benn. 1925. 297 p. 36s. A critical survey.

†**Fischer, F.** (ed.). Gesammelte Abhandlungen zur Kenntnis der Kohle. Borntraeger. 1917-25. 7 v. Contains some previously unpublished papers.

†**Fürth, A.** Braunkohle und ihre chemische Verwertung. Steinkopff. 1926. 135 p. M8.20. Low-temperature distillation.

†Lander, C. H., and McKay, R. F. Low temperature carbonisation. Benn. 1924. 284 p. 35s. "Far and away the best."

McCulloch, A., and Simpkin, N. Low temperature carbonisation of bituminous coal. Witherby and Co., London 1923. 248 p. 18s.

Moore, E. S. Coal: its properties, analysis, classification, geology, extraction, uses and distribution. Wiley. 1922 462 p. $5. "One of the best texts on coal "

†Porter, H. C. Coal carbonization. Chem. Cat. 1924. 442 p $8. (A. C. S monograph.) "No other book so complete." "American practice, of high temperatures and large capacity ovens, is dealt with exclusively."

Potonié, R. Einfuhrung in die allgemeine Kohlenpetrographie. Borntraeger. 1924. 285 p. 13s.2d. Botanical standpoint.

***Stoek, H. H.** The storage of bituminous coal. Illinois U , Urbana. 1918. 192 p. 40¢.

***Stopes, M. C., and Wheeler, R. V.** Monograph on the constitution of coal. H. M. S. Office. 1918. 62 p. 2s.6d.

***Strache, H., and Lant, R.** Kohlenchemie. Akad. Verlags. 1924. 599 p. M26. "Prominence given to German practice."

Wellington, S. N., and Cooper, W. R. Low temperature carbonisation. Lipp. 1924. 238 p. $11. "An unbiased review."

***White, D., and Thiessen, R.** Origin and constitution of coal. U. S. Bur. Mines. 1914. *Bull.* 38. 390 p. 80¢.

21C COKE

Christopher, J. E., and Byrom, T. H. Modern coking practice, including analysis of materials and products. Lockwood. 1921. ed. 3. 2 v. 290 p. 10s.6d. each. "A serviceable epitome."

Simmersbach, O. Grundlagen der Koks-Chemie. Springer. 1914. 314 p. $5.

†**Spilker, A.** Kokerei und Teerprodukte der Steinkohle. Knapp 1923 ed. 4. 135 p. M3.60.

21D GAS

American Gas Association. Combustion. The Assocn , New York. 1925. 74 p. $3 ($1.50 to members). See also 21F.

†**Ineson, W. I.** Gas works laboratory handbook. Churchill. 1926. 183 p. 9s.6d.

†**Krüger, K., and Poschardt, G. R.** Die Erdöl-Wirtschaft der Welt. Stuttgart. 1926. 2 parts. 524 p. M30.

***Levy, L. A.** Gaswork recorders. Van Nost. 1922. 257 p. $10.

***Meade, A.** Modern gas works practice. Benn. 1921. ed 2. 815 p. 55s. British practice. Better on engineering than on theory.

†**Morgan, J. J.** Manufactured gas A textbook of American practice. v. 1. Production. The Author, New York 1926. $7. "The present state of the art is excellently summarized."

***Rambush, N. E.** Modern gas producers. Benn. 1923. 568 p. 55s "An admirable résumé."

†**United States Bureau of Mines.** *Bull* 203 (1924) and *Tech. Papers* 284 (1921), 10¢. and 335 (1925). On water-gas generator fuel.

Wagner, F. H. Coal gas residuals McGraw. 1918. ed. 2. 214 p. $2 50.

Weyman, G. Modern gasworks chemistry. Benn. 1922. 194 p. 25s. "Exceedingly useful and practical."

21E TAR

(See also 22D (*Asphalt*).)

Bunbury, H. M., and Davidson, A. See 13M.

Langton, H. M. See 26B1.

***Lunge, G.** Coal-tar and ammonia. Gurney. 1916. ed. 5. 3 v. 1718 p. 75s. A standard authority.

***Spielmann, P. E.** Constituents of coal tar. Longm. 1924. 219 p. 12s.6d. Treats of the substances and their use, not a works manual.

***Warnes, A. R.** Coal-tar distillation and working up of tar products. Benn. 1923. ed. 3. 511 p. 45s. "It is now an exhaustive treatise."

Whitehead, S. E. Benzol, its recovery, rectification and uses. Benn. 1920. 223 p. 12s. 6d.

21F ANALYSIS

***American Gas Association.** Gas chemists'

handbook. The Assocn., New York. 1922. ed. 2. 608 p. $6. Official methods of analysis of all materials connected with the gas industry.

Dennis, L. M. See 7F.

†**Gould, G. B.** Judging coal values. Fuel Engineering Co., New York. 1926. ed. 2 56 p. $3.

Illingworth, S. R., and Griffiths, J. Analysis of coal and its by-products. "Colliery Guardian," London. 1921. 372 p. 21s.

Parr, S. W. Analysis of fuels, gas, water and lubricants. McGraw. 1922. ed. 3. 250 p. $2.50.

†**Remenovsky, E.** Bewertung der Brennstoffe. Urban 1926. 250 p. M12.

United States Steel Corporation. Methods of the chemists of the U. S. Steel Corp. for the sampling and analysis of coal, coke and by-products. Carnegie Steel Co, Pittsburgh. 1923. ed. 2. 184 p. $3. "Best modern practice."

White, A. H. Technical gas and fuel analysis. McGraw. 1920. ed. 2. 319 p. $3. Gas analysis chiefly.

22 PETROLEUM, LUBRICANTS, ASPHALT AND WOOD PRODUCTS

22A GENERAL

*Cross, R. Handbook of petroleum, asphalt and natural gas. Kansas City Testing Laboratory. 1924. *Bull.* No. 17. New ed. 750 p $7.50. "A complete reference book."

Kissling, R. Chemische Technologie des Erdols und der ihm nahestehenden Naturerzeugnisse Erdgas, Erdwachs und Erdpech(Asphalt). Vieweg. 1924? ed. 2. 804 p. M27.50.

†**Southcombe, J. E.** Chemistry of the oil industries. Constable. 1926. ed. 2. 236 p. 12s. 6d.

22B PETROLEUM

†**American Institute of Mining and Metallurgical Engineers**—Petroleum division. Petroleum development and technology in 1925. The Institute, New York. 1925. 784 p. $5.

***Bacon, R. F., and Hamor, W. A.** The American petroleum industry. McGraw. 1916. 2 v. 975 p. $12.

Battle, J. R. Handbook of industrial oil engineering. Griffin. 1923. ed. 2. v. 1. Lubrication and industrial oils. 1108 p. 45s. v. 2 (Liquid fuels) in prepn.

***Bell, H. S.** American petroleum refining. Van Nost. 1923. 475 p. $5.

Campbell, A. Petroleum refining. Griffin. 1922. ed. 2. 313 p. 25s.

****Day, D. T.** (ed). Handbook of the petroleum industry. Wiley. 1922. 2 v. 1970 p. $15. "A petroleum library."

****Engler, C., and Höfer, H. von** (eds.). Das Erdöl, seine Physik, Chemie, Geologie, Technologie und sein Wirtschaftsbetrieb. Hirzel. 1913–26. 6 v. (1) Chemistry and physics, (2) geology, drilling, etc., (3) technology, (4) testing and use, (5) economics, (6) supplements and index.

****Gurwitsch, L.** Wissenschaftliche Grundlagen der Erdölverarbeitung. Springer. 1924? ed. 2. 399 p. M18 —English ed. (The scientific principles of petroleum technology, Chapman. 1926 468 p., 25s.). Contains material gathered by the translator, H Moore

Lilley, E. R. The oil industry production, transportation, resources, refining, marketing. Van Nost. 1925. 558 p. $6. Contains a little technology.

****Redwood, B.** A treatise on the geographical distribution, geological occurrence, chemistry, production and refining of petroleum. Griffin. 1922. ed. 4. 3 v. 1353 p. 105s. "Monumental." "Classic."

†**Schwarz, R.** Petroleum-vademecum. International petroleum tables. Verlag für Fachliteratur, Wien. 1926. ed. 3. 308 p. M15.

†**Skinner, W. E.** (ed.). Oil and petroleum manual. Skinner, Thomas & Co., London. 1926. 390 p. 7s 6d.

22B1 NATURAL GAS

Westcott, H. P. Handbook of casinghead gas. Metric Metal Works, Erie, Pa. 1922 ed. 3. 642 p. $3.75.

22B2 GASOLINE

***Burrell, G. A.** Recovery of gasoline from natural gas. Chem. Cat. 1925. 600 p. $10. (A. C. S. monograph.) "The most authoritative and complete book on the subject."

Ellis, C., and Meigs, J. V. Gasoline and other motor fuels. Van Nost. 1921. 728 p. $10. "A substantially complete survey."

Leslie, E. H. See 21A.

22B3 SHALE OIL

***McKee, R. H.,** and others. Shale oil. Chem. Cat. 1925. 326 p. $6. (A. C. S. monograph). "Authoritative."

22B4 MINERAL WAXES

(No books rated sufficiently high for inclusion.)

22B5 FUEL OIL

***Butler, E.** Oil fuel. Lipp. 1921. ed 4 328 p. $5.

***Sibley, R., and Delany, C. H.** Elements of fuel oil and steam engineering. McGraw. 1921. ed. 2. 466 p $5.

22C LUBRICANTS

****Archbutt, L., and Deely, R. M.** Lubrication and lubricants. Griffin. 1922 ed. 5. 599 p. $12. A reprint of ed. 3 (1912). Includes testing of lubricants.

†Ettele, C. Lubricating oil salesman's primer. Chem. Pub. 1926. 118 p. $3 A general primer on lubricants and lubrication.

†Hurst, G. H. Lubricating oils, fats and greases. Scott. 1925. ed. 4. 422 p. $5

Lockhart, L. B. American lubricants from the standpoint of the consumer. Chem Pub. 1920. ed. 2. 341 p. $4.

***Thomsen, T. C.** The practice of lubrication. McGraw. 1926. ed. 2. 616 p. $6.

†Van Patten, N., and Lewis, G. S. Selective bibliography of the literature of lubrication. Queen's U., Kingston, Ont 1926? 166 p. $5.

22D ASPHALT

****Abraham, H.** Asphalt and allied substances. Lockwood. 1920. ed. 2. 635 p. 42s.

***Richardson, C.** The modern asphalt pavements. Wiley. 1908. ed. 2. 629 p. $4.

Spielmann, P. E. Bituminous substances. Benn. 1925. 221 p. 15s. Emphasizes analysis.

22E WOOD PRODUCTS

†Bugge, G. Die Holzverkohlung und ihre Erzeugnisse. Gruyter. 1925. 140 p. M1.25. A readable booklet.

***Bunbury, H. M.** Destructive distillation of wood. Benn. 1923. 320 p. 35s. Theory and practice.

Dumesny, P., and Noyer, J. (trans.). Wood products, distillates and extracts. Scott. 1921. ed 2. 2 parts. 368 p. 21s Part 1 treats of distillation products, part 2 of dyeing and tanning extracts

†Dumesny, P., and Noyer, J. L'industrie chimique des bois. Leurs dérivés et extraits industriels. Gauthier. 1926. ed. 2. 432 p. 50 fr.

****Hawley, L. F.** Wood distillation. Chem. Cat. 1923. 141 p. $4. (A. C. S. monograph.) Two sections, on hardwood and resinous wood, respectively.

Hawley, L. F., and Wise, L. E. See 23A.

***Klar, M.** (trans.) Technology of wood distillation. Van Nost. 1925. From German ed. 2. 511 p. $6.50. Essentially the 1910 ed with a chapter on recent progress added

22F ANALYSIS

†Dean, E. W., and others. The analytical distillation of petroleum and its products. U. S. Bur. of Mines. 1922. *Bull.* 207. 82 p. 15¢.

Gill, A. H. Short handbook of oil analysis Lipp. 1922. ed. 10. 223 p. $2.50. A concise manual.

***Hamor, W. A., and Padgett, F. W.** The technical examination of crude petroleum, petroleum products and natural gas. McGraw. 1920. 591 p. $6.

Holde, D. (trans). Examination of hydrocarbon oils and of the saponifiable fats and waxes. Wiley. 1922. ed. 2, from German ed. 5. 572 p. $6.—German ed 6 ("Untersuchung der Kohlenwasserstofföle und Fette," etc.), Springer. 1924. 856 p. M45.

Institution of Petroleum Technologists. Standard methods for testing petroleum and its products. The Institution, London. 1924. 100 p. 6s. Very favorably reviewed.

23 CELLULOSE AND PAPER

23A CELLULOSE

Plastics. See 18F. (See also 25D2 (*Silk and rayon*).)

***Cross, C. F., and Dorée, C.** Researches on cellulose. Longm. 1901–22. 4 v. covering the period 1895–1921. A noncritical digest, forming a supplement to Cross and Bevan's book "Cellulose" (1895).

Fuchs, W. See 11D.

***Hall, A. J.** Cotton cellulose: its chemistry and technology. Benn. 1924. 228 p. 30s. A summary of the state of knowledge.

†Hawley, L. F., and Wise, L. E. The chemistry of wood. Chem. Cat. 1926. 334 p. $6. (A. C. S. monograph.)

****Heuser, E.** (trans.). Textbook of cellulose chemistry. McGraw. 1924. From Ger-

man ed. 2. 212 p. $2.50. "Essentially theoretical."

†**Schorger, A. W.** Chemistry of cellulose and wood. McGraw. 1926. 596 p. $6.

Schubert, M. Die Cellulosefabrikation Krayn. 1925? ed. 4. 279 p.

†**Schwalbe, C. G.** Die Chemie der Cellulose. Borntraeger. 1911. 665 p. Comprehensive review to 1910.

†**Sindall, R. W., and Bacon, W.** Wood and cellulose. Van Nost. 1926.

Worden, E. C. Technology of cellulose esters. Van Nost. 1916–. To be 10 v., of which v. 8 appeared in 1916 (611 p., $5) and v. 1 in 1921 (5 parts, 4182 p., $40). Comprehensive but noncritical. Will include about 335,000 references

23B PAPER AND PULP

†**Beadle, C.** Chapters on paper-making Lockwood. 1901–08 5 v. (v. 3, 4, 5 *o p.*).

†**Beveridge, J.** The papermakers' pocketbook. Van Nost. 1925. ed. 3. 412 p. $8.

†**Blasweiler, T. E.** The use of sodium silicate for the sizing of paper. Constable. 1926. 133 p. 10s.6d.

****Committee of the Pulp and Paper Industry** (ed.). The manufacture of pulp and paper McGraw. 1921–25. 5 v. averaging 540 p. $5 each. By J. J. Clark and others. A series of textbooks on modern practice. (1) Calculations, etc., (2) the elements of physical science, (3) wood pulp, (4) papermaking, (5) machines, special papers, sizing, etc. New ed of v. 3 in 1927, 670 p., $5.

****Cross, C. F., and Bevan, E. J.** A textbook of paper-making. Spon. 1920. ed. 5. 540 p. 30s.

***Cross, C. F.**, and others. Wood pulp and its uses. Constable. 1918. ed. 2. 275 p. 8s.6d.

†**Hägglund, E.** Technik und Praxis der Papierfabrikation. O. Elsner, Berlin. v. 2, part 2 (Natronzellstoff, 360 p. M30) in 1926.

†**Herzberg, W.** Papierprufung. Springer. 1921. ed. 5

†**Hess, W.** Die Kartonnagen-Fabrikation. Krayn. 1926. ed. 2. 475 p. M22.

†**Hofmann, C.** (ed. J. Teicher). Praktisches Handbuch der Papierfabrikation C. Hofmann, Berlin. 1926. ed. 3. Part 2. 122 p. M15.

†**Hoyer, F.** Die Pappenfabrikation. Krayn. 1925. 316 p. M20.

†**Hoyer, F.** Die Strohzellstoffabrikation und die Herstellung von Zellstoffen aus grasartigen Pflanzen sowie die Herstellung der Strohpappen und Strohpapiere. Krayn. 1926. 353 p. M20.

†**Lassberg, J. F.** Die Warmewirtschaft in der Zellstoff- und Papierindustrie. Berlin. 1926. ed. 2. 288 p. M24.

†**Müller, F.** Die Papierfabrikation und deren Maschinen. Güntter-Staib, Biberach-Riss (Wurtt). 1926. v. 1. 452 p. M30.

†**Reimann, R.** Papier-Prüfungen. Leipzig 1926. 368 p. M15. A practical handbook.

Schubert, M. Die Praxis der Papierfabrikation. Krayn. 1922. ed. 3. "No textbook of papermaking in English quite comparable."

****Schwalbe, C. G., and Sieber, R.** Die chemische Betriebskontrolle in der Zellstoff- und Papier-Industrie Springer 1922. ed. 2. 374 p. English trans. in prepn. ("Chemical control in the pulp and paper industry," Wiley). A standard working manual.

***Smith, S.** (trans.). The action of the beater. Papermakers' Assocn., London. 1923. 212 p. 15s.

Stevens, H. P. The paper mill chemist Scott. 1919. ed. 2. 325 p. 10s.6d.

Strachan, J. Recovery and re-manufacture of waste paper. Aberdeen, Scotland. 1918. 167 p. 12s.6d.

***Sutermeister, E.** Chemistry of pulp and paper making. Wiley. 1920. 479 p. $6. Chiefly American practice.

Technical Association of the Pulp and Paper Industry. Paper testing methods. The Assocn., New York. 1922. ed. 3.

***Witham, G. S., Sr.** Modern pulp and paper making. Chem. Cat. 1920. 600 p. $7.50.

24 EXPLOSIVES AND EXPLOSIONS

(Mention should be made under this heading of U. S. Government publications, especially bulletins and technical papers of the Bureau of Mines, on explosives and explosions.)

24A EXPLOSIVES

Berthelot, M. P. E. (trans.). Explosives and their power. Murray. 1892. 563 p. 28s.

****Brunswig, H.** (trans.). Explosives.

Wiley. 1912. 350 p. $3.50.—German ed. 2 in 1923 (Explosivstoffe, Leipzig. 271 p. M9.60). "Of especial value on the theory and properties of explosives."

†**Brunswig, H.** Das rauchlose Pulver. Berlin. 1926. 499 p. M24.

***Colver, E. de W. S.** High explosives. Lockwood. 1918. 830 p. 63s. "Probably the best up-to-date general work on high explosives."

***Escales, R.** Die Explosivstoffe. Leipzig. 1905–17. 7 v. An excellent treatise with full references to technical and patent literature.

Gody, L. Traité theorique et pratique des matières explosives. 1907. ed. 3. 897 p. "A valuable general treatise."

Kast, H. Spreng- und Zundstoffe. Vieweg. 1921. 548 p. M23.

****Marshall, A.** Explosives, their properties, tests, manufacture, history and industrial applications. Blak. 1917. 2d. 2. 2 v. 795 p. $22. "An excellent general treatise."

Marshall, A. A dictionary of explosives. Churchill. 1920. 160 p. 15s.

***Naoum, P.** Nitroglycerin und Nitroglycerinsprengstoffe (Dynamite). Springer. 1924. 416 p. $4.30.

Stettbacher, A. Die Schiess- und Sprengstoffe. 1919. 326 p. M16.

***Technical Records** of Explosives Supply. H. M. S. Office. 1920–22. 9 numbers. 3s 6d. to 25s. each. Data on the design and operation of British war plants, with many drawings.

Worden, E. C. See 23A.

24B EXPLOSIONS

Beyersdorfer, P. Staub-Explosionen. Steinkopff. 1925. 125 p. M7.

Gibbs, W. E. See 13G.

Price, D. J., and others. Dust explosions. National Fire Protection Assocn., Boston. 1922. 246 p. $3. "The most elaborate study of the subject ever made."

25 DYES AND TEXTILE CHEMISTRY

25A GENERAL

†**Hall, A. J.** Textile bleaching, dyeing, printing and finishing machinery. Benn 1926. 320 p. 50s.

Heermann, P. Farberei- und textilchemische Untersuchungen. Springer. 1923. 370 p. $2.50. "Very thorough."

Matthews, J. M. Laboratory manual of dyeing and textile chemistry. Wiley. 1909. 363 p. $3.50. *o.p.* "Rather old but possibly one of the latest lab. manuals on this subject."

Olney, L. A. Textile chemistry and dyeing. Am. Technical Society, Chicago 1914. 343 p. *o.p.* "Very similar to Matthews but later."

25B DYES

***Bucherer, H. T.** Lehrbuch der Farbenchemie. Leipzig. 1921. ed. 2. $3. "Unsurpassed for a general and full discussion."

Cain, J. C. The manufacture of dyes. Macmil. 1922 274 p. 12s.6d. A compilation of published methods, chiefly from patents. Not a laboratory book.

Cain, J. C. The manufacture of intermediate products for dyes. Macmil. 1919. ed. 2. 273 p. 10s. "A valuable lesser work."

***Cain, J. C., and Thorpe, J. F.** The synthetic dyestuffs; and the intermediate products from which they are derived. Griffin. 1923. ed. 6. 440 p. 21s. "Still one of the best for the elementary treatment of a very complicated subject."

†**Castan, P.** La chimie des matières colorantes organiques Doin. 1926. 540 p. 30 fr. "Manufacturing processes are not described."

Davidson, A. Intermediates for dyestuffs. Benn 1926. 269 p 42s.

Doyle, A. M. Digest of patents relating to coal-tar dyes and allied compounds. Chem. Pub. 1926. 585 p. $20. Covers all patents issued up to 1924 on dyes and intermediates, classified under 24 groups, with useful indexes.

Dumesny, P., and Noyer, J. See 22E.

†**Fierz-David, H. E.** Kunstliche organische Farbstoffe. 1926. 735 p. M63.

***Friedländer, P.** Fortschritte der Teerfarbenfabrikation und verwandter Industriezweige. Springer. 1888–1926. 14 quarto vols., covering the German and some other patent literature for the period 1877–1925 (v. 14, covering 1921–25. 1580 p M196). "Absolutely indispensable for research." See p. 119.

Georgievics, G. von, and Grandmougin, E. (trans.). A textbook of dye chemistry. Scott. 1920. From German ed. 4. 560 p. 30s.—German ed. 5, 1922 (Deuticke, Leipzig. 504 p.).

***Heumann, K.** Die Anilinfarben und ihre Fabrikation. Braunschweig. 1888–1906.

4 v. in 7. A patent digest which, though partly duplicating Friedlander, contains much other material.

*Lange, O. Zwischenprodukte der Teerfarbenfabrikation. Leipzig. 1920. "Indispensable for research work." See p 120.

*Lange, O. Die Schwefelfarbstoffe: ihre Herstellung und Verwendung. Spamer. 1925. ed 2 371 p. M28. "Very important in the sulfur-dye group."

†Martinet, J. Matières colorantes. Indigo et ses dérivées. Baillière, Paris. 1926. 700 p 90 fr. Thioindigos not included Primarily chemical.

†Schultz, G. Die Chemie des Steinkohlenteers mit besonderer Berucksichtigung der kunstlichen organischen Farbstoffe. 1926. ed. 4. v. 1. 576 p. M42.50.

Truttwin, H. Enzyklopadie der Kupenfarbstoffe Berlin. 1920.

†Winther, A. Zusammenstellung der Patente auf dem Gebiete der organischen Chemie 1908–10. 3v., about 4000 p See p 119.

25B1 DYE TABLES

**Rowe, F. M. (ed.). Colour index. Society of Dyers and Colourists, Bradford, England. 1924. 371 double pages Cloth. 115s. Detailed information in tabular form about 1316 dyes and pigments and about intermediates, with full indexes. The corresponding Schultz numbers are given. "Replacing Schultz and far ahead of it."

Schultz, G. Farbstoff-Tabellen. Berlin. 1923 ed. 6 2 v 677 p. $6 each. Was the standard dye index before the appearance of the "Colour Index." Ed 6 is little changed from the ed of 1914. There was an English trans. of a still earlier ed. (Macmil., 1904) The "Schultz numbers" are still frequently referred to.

Shreve, R. N., and others. Dyes classified by intermediates. Chem. Cat. 1922. 631 p. $12 50. "Largely superseded by the Colour index."

25B2 DYE ANALYSIS

*Green, A. G. The analysis of dyestuffs and their identification in dyed and coloured materials, lake-pigments, foodstuffs, etc. Griffin. 1920. ed. 3. 150 p. 10s.6d. Received a higher rating than Whittaker.

Mulliken, S. P. See 10H.

*Whittaker, C. M. Testing of dyestuffs in the laboratory. A. Heywood and Son, Manchester. 1921. 100 p. 12s.6d.

25C DYEING

Austin, W. E. Principles and practice of fur dressing and fur dyeing. Van Nost. 1922. 184 p. $4. "About the only one on the subject.".

†Haerry, J. H. Modern dyeing appliances. Textile Colorist, New York. Vols. 6 and 7 in 1926. 401 p. $6.25.

†Hall, A. J. Textile bleaching, dyeing, printing and finishing machinery. Benn. 1926. 320 p. 50s.

Heermann, P. (trans.). Dyers' materials. Scott. 1919. ed. 2. 159 p. 7s 6d.

*Knecht, E., and others. A manual of dyeing. Griffin. 1922. ed. 7. 2 v. 914 p. 42s. Almost double-starred. "No other to be compared with it. The dyer's Bible."

Knecht, E., and Fothergill, J. B. The principles and practice of textile printing. Griffin. 1924. ed. 2. 631 p. 42s. Chiefly on calico printing. "Most complete and authoritative."

†Lehne, A. Farberei und Zeugdruck. A. Ziemsen, Wittenberg. 1926. 204 p. M15.

*Matthews, J. M. Application of dyestuffs to textiles, paper, leather and other materials. Wiley. 1920. 768 p. $10.

†Möhlau, R., and Bucherer, H. T. Farbenchemisches Praktikum, zugleich Einfuhrung in die Farbenchemie und Farbereitechnik. Gruyter. 1926. ed. 3. 389 p. M22.

Patterson, D. Colour matching on textiles. London. 1901. 140 p. $3 50.

Patterson, D. Textile colour mixing. Scott. 1915. ed. 2. 140 p. 8s.6d

*Whittaker, C. M. Dyeing with coal-tar dyestuffs. Baillière, London. 1926. ed. 2. 256 p. 10s.6d. "General and up-to-date survey." Formerly called "The application of the coal-tar dyestuffs."

†Wood, J. K. The chemistry of dyeing. Gurney. 1926. New ed. 112 p. 3s.6d.

25D TEXTILES

Barker, A. F. Textiles. Constable. 1921. ed. 2. 385 p. 15s. A well-known book covering the whole industry in a broad way.

†Curtis, H. P. Glossary of textile terms. Marsden and Co., London. 1921. 304 p. 7s 6d.

Denny, G. G. Fabrics and how to know them. Lipp. 1922? 141 p. $1.50.

*Georgievics, G. von. The chemical technology of textile fibers. Scott. 1923. English ed. 2. 414 p. 17s.6d.

†**Harmuth, L.** Dictionary of textiles. Fairchild Pub. Co., New York. 1925? ed. 3. 222 p.

****Matthews, J. M.** Textile fibers. Wiley. 1924. ed. 4 1053 p. $10. "The most exhaustive treatment extant."

†**Ristenpart, E.** Chemische Technologie der Gespinstfasern. Krayn. 1926. ed. 3. Part 3. 541 p. M30.

Trotman, S. R., and Trotman, E. R. The bleaching, dyeing and chemical technology of textile fibers. Griffin 1925? 610 p. 30s. Primarily for students but useful as a reference work. "Rather spotty."

†**Woolman, M. S., and McGowan, E. B.** Textiles, a handbook for the student and the consumer. Macmil. 1926. ed. 2. 586 p. $3.

25D1 COTTON

(No books selected)

25D2 SILK AND RAYON

American Silk Journal. A dictionary of silk terms. New York. 1915. 93 p. $1.50.

†**Avram, M. H.** The rayon industry. Van Nost. 1927. 622 p. $10.

†**Chaplet, A.** Les soies artificielles. Gauthier. 1926. ed. 2. 267 p. 40 fr.

Clément and Rivière. See 18F

Foltzer, J. (trans.). Artificial silk and its manufacture. Pitman. 1926. ed. 3. 248 p. 21s.

Haerry, J. H. Artificial silks. Textile Colorist, Inc., New York. 1925? 300 p. $4.25.

†**Hottenroth, V.** Die Kunstseide. Hirzel. 1926. 492 p. M28.

†**Reinthaler, F.** Die Kunstseide und andere seidenglanzende Fasern. Springer. 1926. 165 p. M14.40. Popular.

†**Süvern, K.** Die künstliche Seide, ihre Herstellung und Verwendung. Springer. 1926. ed. 5. 1127 p. M64.50. Includes an abstract of the patent literature down to 1925.

25D3 OTHER SPECIAL TOPICS

(No books selected)

25D4 BLEACHING

†**Liénard-Fiévet.** Manuel de blanchiment-teinture. Baillière, Paris. 1926? 400 p. 18 fr.

***Matthews, J. M.** Bleaching and related processes as applied to textile fabrics and other materials. Chem. Cat. 1921. 676 p. $10.

†**Sykes, A. J.** Concerning the bleaching industry. Falkner. 1926. 120 p.

Trotman, S. R., and Thorp, E. L. Principles of bleaching and finishing of cotton. Griffin. 1925. ed. 3. 610 p. 21s.

25D5 FINISHING

***Bean, P., and McCleary, W.** The chemistry and practice of finishing. Hutton, Hartley & Co., Manchester. 1926. ed. 3. 2 v. 1020 p. 60s. "Best and most complete on the subject."

†**Beaumont, R.** The finishing of textile fabrics. Scott. 1926. ed. 2. 384 p 15s.

Heermann, P. Technologie der Textilveredelung. Springer. 1926. ed. 2. 666 p. M33.

***Hurst, G. H., and Simmons, W. H.** Textile soaps and oils. Van Nost. 1921 ed. 3. 212 p. $4.

Pearson, H. P. Waterproofing textile fabrics. Chem. Cat. 1924. 112 p. $3. Contains formulas of the principal American and some foreign processes

Schofield, J. Wet processes of the wool industries. Netherwood, Huddersfield, England. 1924. 428 p $5. Enlarged from "The practice of scouring and milling."

25D6 LAUNDERING

†**Harvey, A.** Laundry chemistry. Lockwood. 1926. 124 p. 4s. "Extremely elementary." Treats materials rather than methods.

Hubbard, C. C. Instructor in garment cleaning. National Assocn. of Dyers and Cleaners. 1925? 318 p.

***Laundryowners National Association.** Manual of standard practice for the power-laundry washroom The Assocn., La Salle. 1924. ed. 2 187 p. Contains standard formulas for washroom practice.

25D7 ANALYSIS

Barker, A. F., and Midgley, E. Analysis of woven fabrics. Scott. 1922. ed. 2. 340 p. 15s.

Herzfeld, J. (trans.). The technical testing of yarns and textile fabrics. Scott. 1920. ed. 3 217 p. 17s.6d.

26 PAINTS, VARNISHES AND RESINS

26A GENERAL

†**Heaton, N.** Volatile solvents and thinners used in the paint and varnish industries. Van Nost. 1926. 158 p. $4.50.

Painter's Magazine. 1995 paint questions answered. New York. 1919.

****Sabin, A. H.** The industrial and artistic technology of paint and varnish. Wiley 1916. ed. 2. 473 p. $4. New ed in prepn.

†**Stock, E., and Antony, W.** Waren- und Materialienkunde des Lack- und Farbenfaches. 1927. v. 1. 454 p. M16.

26B PAINTS

***Gardner, H. A.** Paint researches and their practical application. Judd and Detweiler, Washington. 1917. 384 p. $6.

†**Jennings, A. S.** Paint and color mixing. Trade Papers Pub. Co., London. 1926. ed. 7. 341 p. 12s.

***Toch, M.** The chemistry and technology of paints. Lockwood 1925. ed. 3. 423 p. 28s. A standard work. This ed. has been criticized as carelessly revised.

****Uebele, C. L.** Paint making and color grinding. Trade Papers Pub. Co., London. 1913. 483 p. $10.

26B1 PIGMENTS

†**Falcon, D. B.** Zinc oxide. History, manufacture and properties as a pigment. London. 1926. 146 p. 12s.

†**Holley, C. D.** Lead and zinc pigments. Wiley. 1909. 340 p $3.

Langton, H. M. Blacks and pitches. Benn. 1925. 179 p. 15s. Of value to users rather than producers. Extremely condensed.

****Zerr, G., and Rübencamp, R** (trans) A treatise on colour manufacture. Griffin. 1908. 605 p. $11.50. New German ed. 1922 (Berlin. 908 p.). New English ed. in prepn.

†**Zimmer, E.** Bleiweiss und andere Bleifarben. Steinkopff. 1926. 126 p. M7.20.

26B2 DRYING OILS

Friend, J. N. The chemistry of linseed oil. Gurney. 1917. 104 p. 2s.6d.

***Morrell, R. S., and Wood, H. R.** The chemistry of drying oils. Benn. 1925. 224 p. 21s. Includes technology

26C VARNISHES

Livache, A. See McIntosh, J. G.

***McIntosh, J. G.** The manufacture of varnishes and kindred industries. Scott. 1908–19.—v. 1. ed. 3. 500 p. 17s.6d. (1919).—v. 2. ed. 2. 220 p. 12s.6d. (1908).—v. 3. ed. 2. 482 p. 14s.6d. (1911). Based on "Drying oils and varnishes" by A. Livache.

****Morrell, R. S.** Varnishes and their components. Frowde. 1923. 373 p. 25s. "A clear and concise summary of all the recent advances."

†**Scheiber, J.** Lacke und ihre Rohstoffe Barth. 1926. 660 p M32.40.

Seeligmann, F., and Zieke, E. Handbuch der Lack- und Firnisindustrie. Berlin. 1923. ed. 3. 827 p This ed. has been criticized as lacking the high character of the earlier ones.

***Sproxton, F.** Cellulose ester varnishes. Benn. 1925. 178 p. 15s. "Eminently practical."

†**Wenzel, F.** Das Lackier-Buch. Justel und Gottel, Leipzig. 1926. 478 p. M11.

***Wilson, S. P.** Pyroxylin enamels and lacquers. Van Nost. 1925. 223 p. $3. "An authentic textbook." "Present-day practice."

26D RESINS

†**Barry, T. H.**, and others. The chemistry of natural and synthetic resins. Benn. 1926. 196 p. 21s. "On the whole is a useful reference and textbook."

Bolton, E. R., and Pelly, R. G. See 27A.

Ellis, C. See 18F.

26E INKS

†**Lehner, S.** Die Tintenfabrikation. Hartleben. 1922. ed. 7. 224 p. "A practical book in a popular style." There is an English trans. of ed. 5 (Ink manufacture. Scott. 1914. 180 p. 6s.).

***Mitchell, C. A., and Hepworth, T. C.** Inks: their composition and manufacture. Griffin. 1924. ed. 3. 366 p. 12s.6d. "Thoroughly up to date."

***Underwood, N., and Sullivan, T. V.** Chemistry and technology of printing inks. Van Nost. 1915. 145 p. $4.

†**Wiborg, F. B.** Printing ink. A history with a treatise on modern methods of manufacture and use. Harper. 1926. 319 p. $4. For the printer and general reader.

26F ANALYSIS

†**Fox, J. J., and Bowles, T. H.** The analysis of pigments, paints and varnishes. Benn. 1927. 179 p. $4.50. British practice.

***Gardner, H. A.** Physical and chemical

examination of paints, varnishes and colors. Institute of Paint and Varnish Research, Washington. 1925. ed. 2 375 p. $10. "The last and most authoritative word on the subject."

*Gardner, H. A., and Schaeffer, J. A. The analysis of paints and painting materials. McGraw. 1911. 96 p. $2. Selected American methods.

**Holley, C. D. Analysis of paint and varnish products. Wiley. 1912. 292 p $2.50. *o.p.*

*Holley, C. D. Analysis of paint vehicles, japans and varnishes. Wiley. 1920. 203 p. $2.50. "Singularly useful"

*Zerr, G. (trans.). Tests for coal-tar colors in aniline lakes. Griffin. 1910. 242 p. 12s.6d. Now somewhat out of date.

27 FATS, FATTY OILS, WAXES AND SOAPS

27A FATS, OILS AND WAXES

Edible fats and oils, see also 12E, 12F. (See also 22C (*Lubricants*))

Bolton, E. R., and Pelly, R. G. Oils, fats, waxes and resins. Benn. 1924. 275 p. 21s. (Resources of the Empire series) "Essentially a business man's encyclopedia."

Chalmers, T. W. The production and treatment of vegetable oils. Constable. 1919. ed. 2. 164 p. 21s.

**Ellis, C. Hydrogenation of oils, catalyzers and catalysis and generation of hydrogen and oxygen. Van Nost. 1919. ed. 2. 767 p. $7.50. New ed. in prepn.

**Fryer, P. J., and Weston, F. E. Technical handbook of oils, fats and waxes. Cambridge U. 1918. v. 1. ed. 3 280 p. v. 2. 314 p. 18s each.

Glikin, W. Chemie der Fette, Lipoide und Wachsarten. Borntraeger. 1912–13. 2 v. "Very useful."

Hefter, G. Technologie der Fette und Oele. Springer 1906–10. 3 v. A reprint was issued in 1921. "The best book in German."

Laucks, I. F. Commercial oils, vegetable and animal, with special reference to Oriental oils. Wiley 1919. 138 p. $1.50.

**Lewkowitsch, J. (ed. G. H. Warburton). Chemical technology and analysis of oils, fats and waxes. Macmil. 1921–23. ed. 6. 3 v. 2149 p. 114s ($38). The standard reference book, which originated as a work on analysis only and was later enlarged.

†Löffl, K. Technologie der Fette und Oele. Vieweg. 1926. 517 p. M38.

Myddleton, W. W., and Barry, T. H. Fats: natural and synthetic. Benn. 1924. 182 p. 25s. "Very condensed."

Southcombe, J. E. See 22A.

*Ubbelohde, L., and others Handbuch der Chemie und Technologie der Oele und Fette. Hirzel. 1908–26. 4 v. 3754 p. (v. 4 in 1926. 798 p. M58.)

*Wright, C. R. A., and Mitchell, C. A. Animal and vegetable fixed oils, fats, butters and waxes. Griffin. 1921. ed. 3. 940 p. 56s. "Standard work of reference."

27B SOAPS AND GLYCERIN

**Fischer, M. H., and others. Soaps and proteins. Wiley. 1921. 272 p. $4.

Hurst, G. H. Soaps. Van Nost. 1922. ed 3. 440 p. $7. A practical manual on soapmaking

Hurst, G. H., and Simmons, W. H. See 25D5.

Martin, G. The modern soap and detergent industry. Lockwood. 1924–26 3 v. 1056 p. 36s. each v 1 is on soapmaking, v. 2 on special soaps and detergents, v 3 on glycerol and its substitutes. Moderately favorable reviews.

†Schaal, J. Die moderne Toiletteseifen-Fabrikation. Verlag f chem. Ind, Augsburg. 1926. ed 2. 417 p. M22 50.

†Schrauth, W. Handbuch der Seifenfabrikation. 1927. ed. 6. 780 p. M39

Watt, A. Soap-making. Lockwood 1920 ed. 7. 323 p 9s. A practical handbook. Includes glycerin recovery and candle-making.

27C ANALYSIS

(See also 22F (*Petroleum, etc. analysis*).)

Allen's commercial organic analysis. See 10H.

†Davidsohn, I. Untersuchungsmethoden der Oele, Fette und Seifen sowie Grundriss ihrer Technologie. Borntraeger. 1926. 460 p. M25 80.

Grün, A. Analyse der Fette und Wachse. Springer. 1925. v. 1. 575 p. M36.

Lewkowitsch, J. The laboratory companion to fats and oils industries Macmil. 1901 197 p. 7s.6d. "Still useful."

Lewkowitsch, J. See also 27A

†Marcusson, J. Die Untersuchung der Fette und Oele. Knapp. 1927. ed. 3. 148 p. M8 20.

Pickering, G. F. Aids in the commercial analysis of oils, fats and their manufactured products. Lipp. 1917. 133 p. $3.50.

28 SUGAR, STARCH AND GUMS

28A SUGAR

***Bardorf, C. F., and Ball, J. A. B.** Elements of sugar refining. Chem. Pub. 1925. 240 p. $4. "The only book on the subject in English."

****Claassen, H.** Die Zuckerfabrikation. Schallehn, Magdeburg. 1922? ed. 5.

****Deerr, N.** Cane sugar. Rodger 1921. ed. 2. 650 p. 42s. "An authoritative, complete and up-to-date reference book."

****Geerligs, H. C. P.** Cane sugar and its manufacture. Rodger. 1924. ed 2. 342 p. 20s.

***Geerligs, H. C. P.** The world's cane sugar industry, past and present. Rodger. 1912. 420 p. 12s

Geerligs, H. C. P. Practical white sugar manufacture· direct from the cane. Rodger 1915. 196 p 12s.

Heriot, T. H. P. The manufacture of sugar from the cane and beet. Longm. 1920. 436 p. 24s.

†**Owen, W. L.** Deterioration of raw sugars during storage. "Facts About Sugar" New York. 1926. 50 p $1

†**Preuss, E.** Die Fabrikation des Starkezuckers, des Starkezuckersirups und der Zuckerkulor mit besonderer Berucksichtigung des Betriebes. Janecke, 1925. 319 p. M16.20. "Exceedingly useful."

Spencer, G. L. A handbook for cane-sugar manufacturers and their chemists. Wiley. 1917. ed. 6. 561 p $4

Ware, L. S. Beet-sugar manufacture and refining. Wiley. 1905–07. 2 v. 1190 p. $9. *o.p.* "Somewhat out of date but the most comprehensive work in English on the subject."

†**Wichelhaus, H.** Der Stärkezucker. Akad. Verlags. 1926? 222 p. M11.

***Wohryzek, O.** Chemie der Zuckerindustrie. Berlin. 1914.

28B STARCH

†**Rehwald, F.** (trans.). Starch making and the manufacture of dextrin, starch sugar, syrup and sugar coloring. A handbook for starch, dextrin and starch-sugar manufacturers Scott. 1926? From German ed. 5. 272 p. 12s.6d.

28C GUMS

†**Blunt, H. S.** Gum arabic. Oxford U 1926 10s.

28D ANALYSIS

***Browne, C. A.** Handbook of sugar analysis Wiley 1912 888 p $6.

Geerligs, H. C. P. Methods of chemical control in cane sugar factories. Rodger. 1917 New ed. 152 p. 10s 6d

Methods of chemical control for cane sugar factories (in Hawaii). Assocn. of Hawaiian Sugar Technologists, Honolulu. 1924. $6.

29 LEATHER AND GLUE

29A LEATHER

†**Arnold, J. R.** Hides and skins A. W Shaw Co., Chicago. 1925. 630 p $6

†**Crockett, H. G.** (ed.). Practical leather manufacture. Leather Trades Pub. Co, London 1922? 428 p 21s.

Dumesny, P., and Noyer, J. See 22E.

***Freudenberg, K.** Die Chemie der naturlichen Gerbstoffe. Springer. 1920.

†**Gnamm, H.** Die Fettstoffe in der Lederindustrie. Wissenschaftliche Verlagsgesellschaft, Stuttgart. 1926. 597 p. M48.

Grasser, G. (trans.). Synthetic tannins: their synthesis, industrial production and application. Lockwood. 1922. 143 p. 12s.

Lamb, M. C. Manufacture of chrome leather. Anglo-American Pub. Co. 1923. 420 p. 26s.

****Procter, H. R.** Leather industries laboratory book of analytical and experimental methods Spon. 1919 ed. 2. 460 p 25s.

****Procter, H. R.** Principles of leather manufacture. Spon. 1922. ed. 2 696 p. 32s. "The standard text in the English language since it appeared in 1903."

†**Steyer, R.** Rezeptbuch der Chromgerbung. Gunther und Sohn, Berlin. 1926. 212 p. M60.

†**Wagner, A.** Gerberei-technisches Taschenbuch. Deutscher Verlag, Leipzig. 1925. 352 p. M20.

Wagner, A., and Paessler, J. Handbuch für die gesamte Gerberei und Lederindustrie. O. Meissner, Hamburg. 1925. 2 v. $22. "A well arranged encyclopædia of tanning and leather."

****Wilson, J. A.** The chemistry of leather manufacture. Chem. Cat. 1923. 343 p. $7. (A. C. S. monograph.)

Wood, J. T. Puering, bating and drenching of skins. Spon. 1912. 315 p. 14s.

29B GLUE

†**Adhesives Research Committee.** Reports. H. M. S. Office. 1st report 1922. 4s—2nd report. 1926. 128 p 3s. Strongly recommended by reviewers.

Alexander, J. Glue and gelatin Chem. Cat. 1923. 236 p $4.50. (A. C. S. monograph) A well recommended compendium.

***Bogue, R. H.** Chemistry and technology of gelatin and glue. McGraw. 1922 644 p. $6. "The best treatise we have on the subject."

†**Cambon, V.** Fabrication des colles et gélatine, traitement industriel des animaux abbatus. Dunod. 1924 268 p.

Kissling, R. Leim und Gelatine. Wissenschaftliche Verlagsgesellschaft, Stuttgart 1923. 214 p "Will appeal chiefly to a different type of reader from those of Bogue and Alexander, but to him it will be more useful."

†**Rideal, S.** Glue and glue testing. Scott 1926. ed 3. 264 p. 12s 6d

Sheppard, S. E., and Mees, C. E. K. See 5.

†**Thiele, L.** Die Fabrikation von Leim und Gelatine. Janecke. 1923. ed. 2. 189 p

30 RUBBER AND ALLIED SUBSTANCES

Bary, P. Le caoutchouc. Dunod 1923 256 p. "A general treatise by an eminent colloid chemist."

****Bedford, C. W., and Winkelmann, H. A.** Systematic survey of rubber chemistry. Chem. Cat. 1923 385 p $8 A bibliography, with full abstracts, of all rubber literature through 1922.

Brown, H. Rubber, its source, cultivation and preparation. Murray 1917. 245 p 6s.

†**Chaplet, A.** Manuel de l'industrie du caoutchouc. Baillière, Paris. 1925. 247 p.

†**DeVisser, W.** (trans.). The calender effect and the shrinking effect of unvulcanized rubber. Lockwood 1926. 152 p. 15s "A milestone on the road of progress."

***De Vries, O.** (trans). Estate rubber, its preparation, properties and testing Ruygrok and Co., Batavia 1920. From the Dutch 637 p. $10. "An admirable treatise by an eminent investigator."

†**Dubosc, A.** Les caoutchoucs factices ou huiles vulcanisées A D. Cillard, Paris. 1926. 212 p 33 fr

Dubosc, A., and Luttringer, A. (trans). Rubber its production, chemistry and synthesis in the light of recent research. Griffin. 1918 383 p. 21s. "A compilation of the chemistry of rubber. It is academic and contains many references."

†**Fonrobert, E.** Kautschuk und Flechtenstoffe. Urban. 1921 438 p (Abt. 1, Teil 10, Heft 1d of Abderhalden's Handbuch der biologischen Arbeitsmethoden)

Geer, W. C. The reign of rubber. Century. 1922. 344 p. $3. An excellent popular book.

***Harries, C. D.** Untersuchungen über die naturlichen und kunstlichen Kautschukarten. Springer. 1920? 258 p "Of historical value, dealing with the well-known investigations of the author"

***Luff, B. D. W.** The chemistry of rubber Benn 1923. 232 p. 25s

Schidrowitz, P. Rubber. Methuen 1920 ed. 3. 319 p. 15s. "A standard book of ten years ago, with a particularly good and detailed description of raw rubber"

†**Schotz, S. P.** Synthetic rubber Benn 1926. 141 p. 21s.

Simmons, H. E. Rubber manufacture: the cultivation, chemistry, testing and manufacture of rubber. Van Nost. 1921 149 p. $4.50. "Particularly valuable for the student or for those not already versed in the subject."

Tuttle, J. B. Analysis of rubber. Chem Cat. 1922. 155 p. $3.50 (A. C. S monograph) "Particularly valuable to the analyst who is not primarily a rubber chemist."

Van Rossen, A. Communications of the Netherland Government Institute for advising the rubber trade and the rubber industry. International Assocn. for Rubber Cultivation in the Netherland Indies, Delft Part. 1 *o.p* Parts 2–7 bound in 1 v.

***Weber, C. O.** The chemistry of India rubber. Griffin. 1919. ed. 5. 324 p. 18s. The original ed. of 1902 was "a classic and the first systematic compilation of the chemistry of rubber."

***Weber, L. E.** The chemistry of rubber manufacture. Griffin 1926. 384 p. 21s "The best and most up-to-date critical textbook of present-day knowledge of the chemistry of rubber." "Based on the 5th ed. of the Chemistry of Ind

Rubber by C. O. Weber, but is essentially a new work covering the advances of the past 20 years."

**Whitby, G. S. Plantation rubber and the testing of rubber. Longm. 1920. 575 p. 28s. "A most valuable treatise by an eminent investigator." Physico-chemical point of view.

AUTHOR INDEX

TO "A SELECT LIST OF CHEMICAL BOOKS"[1]

(References are to sections of the list, not to pages

Abderhalden, E., 11A1, 11A3, 11B.
Abegg, R., 6A.
Abraham, H., 22D
Achard, C., 11E
Adams, R., 10G1
Addicks, L., 9A Cu.
Adkins, H., 10G2
Aitchison, L., 9A2, 9A7, 9A Fe.
Alexander, J., 2D, 29B.
Allbutt, T. C., 2N1.
Allen, A. H., 10H.
Allen, A. W, 9A6.
Allen, H. S., 2C4.
Allen, P. W., 16
Alliott, E. A., 1F5
Allmand, A. J., 4
Altmayer, M., 9A Cu.
American Drug Manufacturers' Association, 17A
American Gas Association, 21D, 21F.
American Institute of Mining and Metallurgical Engineers, 1D, 22B
American Magnesium Corporation, 9A Mg.
American Medical Association, 17A.
American Pharmaceutical Association, 17A.
American Public Health Association, 12F1, 14C, 14D.
American Silk Journal, 25D2.
American Society for Testing Materials, 13C, 20B
American Water Works Association, 14B
Amos, P. A., 12B
Anderson, O. G., 15D.
Anderson, R. J., 9A Al.
André, G., 15A
Anschütz, 10A
Antony, W., 26A
Archbutt, L., 22C.
Archer, R. S., 9B
Arendt, R., 2B6
Arenson, S. B., 2B6
Armsby, H. P., 11E.
Armstrong, E. F., 10F.
Arnall, F., 10E, 10G1
Arndt, K., 2C9.
Arnold, C., 2B1.
Arnold, J. O., 9A7.
Arnold, J. R., 29A.
Arny, H. V., 17A.
Arrhenius, S. A., 2C1, 2C5, 2K.
Aston, F. W., 3
Aston, J. B., 13C
Atack, F. W., 2G
Auerbach, Fr., 6A.
Austin, L. S., 9A
Austin, P. C., 10C.
Austin, W. E., 25C.
Autenrieth, W., 17C
Avram, M. H., 25D2.

Babbitt, H. E., 14C.
Babkin, B. P., 11F.
Bablik, H., 9A3
Backert, A. O., 9A Fe.
Bacon, R. F., 21A, 22B.
Bacon, W., 23A.
Badger, W. L., 1F3
Baker, T. T., 1C
Bailey, C. H., 12B
Bailey, E. H. S., 12A.
Bailey, H. S., 12A.
Baldwin, W. E., 10G2
Ball, J. A. B., 28A.
Baly, E. C. C., 2C6
Bancroft, W. D., 2C2, 2D.
Bandler, S. W., 11F
Barclay, W. R., 9A2.
Barcroft, J., 11F
Bardorf, C. F., 28A
Barker, A. F., 25D, 25D7.
Barker, L. F., 11E
Barker, T. V., 2C3
Barnard, J. E., 5.
Barnett, E. deB., 10G1.
Barrett, W. H., 10C
Barrowcliff, M., 17A
Barry, T. H., 26D, 27A.
Barton, L. J., 4.
Barton, W. H., Jr., 20D.
Bary, P., 30
Baskerville, C., 7B, 14A
Bassett, H., 7C
Bate, S. C., 10F.
Bates, 20.
Battle, J. R., 22B.
Bayliss, W. M., 11A3, 11F.
Beadle, C., 23B.

[1] Subjects (but not titles) are indexed in the general subject index of this book.

Beale, J. F., 14D.
Bean, P., 25D5.
Beaumont, R., 25D5.
Bechhold, H., 2D.
Beck, C., 1C.
Beckurts, H., 7C1.
Bedford, C. W., 30.
Beery, P. G., 2B4.
Behrens, H., 7E.
Beilstein, F., 10A.
Bell, H. S., 22B.
Bender, A., 6D.
Benedicks, C., 9B.
Benedict, F. G., 2L, 11E
Bennett, J. C., 2B3.
Bensley, 2M.
Berge, A., 9A Al.
Bergeim, O., 11B.
Bergey, D. H., 11C.
Bergmann, M., 10F.
Berl, E., 13D.
Bernthsen, A., 10B
Berolzheimer, D. D., 2N4
Berthelot, M. P. E., 2H2, 24A.
Besson, F. S., 20D.
Best, W. N., 21A.
Betts, A. G., 9A Pb
Bevan, E. J., 23A, 23B.
Beveridge, J., 23B
Beyersdorfer, P., 24B.
Beythien, A., 12F.
Biedermann, R., 2G.
Bingham, E. C., 2C8.
Binns, C. F., 19B.
Birtwistle, G., 3.
Bjorling, P. R., 21A.
Black, N. H., 2B3, 2B6.
Blair, A. A., 9A7.
Blake, E. G., 20C.
Blanchard, A. A., 2B3.
Blanchard, A. H., 20D
Blasdale, W. C., 2C5, 7C.
Blasweiler, T. E., 23B
Bleininger, A. V., 20A.
Blount, B., 20A
Bloxam, A. G., 2B1
Bloxam, C. L., 2B1.
Blücher, H., 13A.
Blum, W., 4.
Blunt, H. S., 28C.
Blyth, A. W., 11H2.
Blyth, M. W., 11H2
Bodansky, M., 11A1
Boeke, H. E., 8B
Börnstein, R., 2F.
Böttger, W. C., 7B.
Bogue, R. H., 2D, 29B.
Bohr, N., 3.
Bolas, B. D., 1B.
Bolte, H., 2N2
Bolton, E. R., 12F, 27A.
Bolton, H. C., 2N3.
Bone, W. A., 21B.
Bonikowsky, K., 21B.
Bonney, S. R., 9A3.
Borchardt, K., 21B.
Borchers, W., 9A Al.
Borel, P., 2N3.
Born, M., 2C3, 3.
Bornemann, G., 6D.
Bose, J. C., 2C4.
Boullanger, E., 16.
Bourcart, E., 15D.
Bourion, F., 2C7.
Bouron, H., 21A.
Bourry, E., 19B.
Boutaric, A., 2C7.
Bowles, T. H., 26F.
Boyle, R., 2H4.
Bradbury, R. H., 2B3, 2B6.
Bräuer, A., 13M.
Bragg, W. H., 2C3, 2K
Bragg, W. L., 2C3
Brannt, W. T., 9A3, 16, 18G
Braun, J. von, 10B.
Bray, W. C., 2B2
Brearley, A. W., 9A.
Brearley, H., 9A.
Bredig, G., 2C1.
Bridgeman, P. W., 2C7.
Briggs, D. B., 1B.
Brinkley, S. R., 2B2, 2B6
British Assocn. for Adv. of Science, 2D.
British Science Guild, 2N3
Brockman, C. J., 10F.
Brooks, B. T., 10F.
Brown, H., 30.
Brown, J. C., 2H1.
Browne, C. A., 15A, 28D.
Browning, P. E., 6C.
Brownlee, R. B., 2B3.
Brownlie, D., 21A.
Brunswig, H., 24A.
Brush, G. J., 8A.
Bruttini, A., 13E.
Bryden, C. L., 1F4.
Bucherer, H. T., 25B, 25C.
Buchka, K. H. von, 12A
Buchner, G., 9A3.
Buckley, J. P., 17A
Buckman, H. O., 15B
Budgen, N. F., 9A3, 9A Cd.
Bugge, G., 22E
Bullens, D. K., 9A Fe.
Bunburry, H. M., 13M, 22E
Bureau of Vocational Information, 2Q.
Burgess, G. K., 1D.
Burrell, G. A., 22B2.
Burton, E. F., 2D.
Butler, E., 22B5.

Butts, A., 9A.
Byrom, T. H., 21C.

Cady, H. P., 2B2.
Cain, J. C., 10F, 25B.
Calbeck, J. H., 9A7.
Calcott, W. S., 9A5.
Calish, 2M.
Cambon, V., 29B.
Camp, J. M., 9A7, 9A Fe
Campbell, A., 22B
Campbell, W. R., 11G1
Candiani, A., 13G
Capes, W. P., 14A.
Carpenter, J. D., 14A
Carpenter, W. W., 2L.
Carr, F. H., 17A.
Carr, R. H., 15E.
Carter, H. S., 11E.
Castan, P., 25B.
Cathcart, E. P., 11E
Chalmers, T. W., 27A
Chamberlain, J. S., 15A.
Chamot, E. M., 7F.
Chapin, W. H., 2B2, 2B6
Chaplet, A., 25D2, 30
"**Chemical Age**," 2A
Cheney, R. H., 12E
Chittenden, R. H., 11E
Christie, A. W., 12F
Christopher, J. E., 21C.
Church, M. B., 16.
Claassen, H., 28A
Clark, C. H., 1C
Clark, C. H. D., 3.
Clark, G. L., 3.
Clark, J. J., 23B.
Clark, W. H., 2B2.
Clark, W. M., 7F.
Clarke, A., 12E.
Clarke, F. W., 8A
Clarke, H. T., 10H
Classen, A., 7A, 7C, 7C1, 7C2.
Claude, G., 6C, 18D
Clayton, W., 2D, 12E.
Clément, 18F.
Clennell, J. E., 9A6.
Clifton, E. C., 2M.
Cloeren, H., 7C, 7C2.
Cobb, R., 2N4
Coca, A. F., 11G2
Cohen, E., 2C8, 2H3
Cohen, J. B., 10E, 10G2
Cohn, A. I., 7E.
Cohn, G., 17B.
Cole, S. W., 11B.
Coleman, J. B., 10G1.
Collins, H. F., 9A Pb.
Collins, S. H., 15A.
Colver, E. de W. S., 24A.
Colwell, H. A., 3.
Comey, A. M., 2F.
Committee of the Pulp and Paper Industry, 23B.
Compton, A. H., 3.
Compton, K. T., 3.
Conant, J. B., 2B3.
Conn, H. J., 11B.
Conrady, A. E., 5.
Conseil de Chimie, 2C8.
Cook, E. F., 17A
Cooper, W. R., 21B
Cornubert, R., 2M.
Corson, M. G., 9A Al.
Cottrell, A., 18.
Courtney, W. P., 2N4.
Cousen, A., 19A.
Coutagne, A., 9A Fe.
Cox, H. E., 12F.
Cramer, M., 10F.
Cramer, W., 11B.
Crehore, A. C., 3.
Creighton, H. J., 4
Crockett, H. G., 29A.
Crook, T., 8E
Cross, C. F., 23A, 23B.
Cross, R., 22A.
Crowther, J. A., 3.
Cruess, W. V., 12C, 12F.
Cumming, A. C., 18
Cumming, W. M., 10G2.
Curie, M., 3.
Curtis, H. P., 25D.
Curtman, L. J., 7B.
Cushman, A. S., 9A5
Cushny, A. R., 11F, 11H1.
Czapek, F., 11D.

Dakin, H. D., 11F.
Dale, H. H., 11A2.
Dammer, B., 8E.
Dammer, O., 6A, 13A.
Dana, E. S., 8A.
Dana, J. C., 13K.
Dana, J. D., 8A.
Danielson, R. R., 19C.
D'Ans, J., 13M.
Darrow, K. K., 2N4, 3.
Davidsohn, I., 27C
Davidson, A., 13M, 25B.
Davies, J. H., 9A4.
Davison, H. F., 2L.
Davison, W. C., 11A3.
Davy, W. M., 8D.
Day, A. L., 20.
Day, D. T., 22B.
Dean, E. W., 22F.
Dean, R. S., 9A.
DeBar, R., 9A Al.
Deely, R. M., 22C.

Deerr, N., 28A.
Delany, C. H., 22B5
Deming, H. G., 2B2, 2B6.
Demorest, D. J., 9A7.
Dennis, L. M., 7F.
Denny, G. G., 25D.
Desch, C. H., 9A2, 9B, 20A.
Deters, H., 11A1.
DeVisser, W., 30.
De Vries, O., 30
Dichmann, K., 9A Fe.
Dickey, G. D., 1F4
Dieterich, E., 17A.
Dinsmore, E. L., 2B3.
Dixon, W. E., 11H1.
Doane, L. H., 20D.
Doelter, C., 8A
Doerell, E. G., 15B.
Dolt, M. L., 2M.
Doolittle, R. E., 15E
Dorée, C., 23A
Downs, C. R., 13G
Doyle, A. M., 25B.
Dralle, R., 19A
Drucker, C., 2B1, 2C7.
Drysdale, C. V., 1F2.
DuBois, E. F., 11E.
Dubosc, A., 30
Dümmler, K., 19B.
Duhem, P., 2C7.
Dull, C. E., 2B3
Dumesny, P., 22E.
Duncan, R. K., 2K.
Dunn, J. T., 21A.
Dunoyer, L., 1F10.
Dushman, S., 1E.

Eason, A. B., 2N2.
Ebert, H., 1B.
Eckel, E. C., 20.
Ecker, E. E., 11G2.
Eddy, H. P., 14C.
Eder, J. M., 5.
Edgren, H., 2M.
Eggert, J., 2C1
Ehrenberg, P., 15B.
Ehrlich, P., 7F.
Eisenlohr, F., 1C.
Eissler, M., 9A Ag.
Eitel, W., 8B.
Ellingham, H. J. T., 4.
Ellis, C., 2C4, 18F, 22B2, 27A.
Ellms, J. W., 14B.
Elsdon, G. D., 12E.
Elsner, F., 13D.
Emerson, P., 15B
Emerson, W. R. P., 11E.
Emery, F. B., 2B3.
Emich, F., 7F.
Engler, C., 22B.

Ephraim, F., 6B.
Erdmann-König, 13C.
Escales, R., 24A.
Escard, J., 4
Ettele, C., 22C.
Eucken, A., 2C1, 2C7.
Euler, H., 11A3
Evans, U. R., 6A, 9A5
Ewald, P. P., 2C3.

Faber, H. B., 13L
Falcon, D. B., 26B1.
Fales, H. A., 7C.
Fales, H. L., 11E.
Falk, I. S., 11B.
Falk, K. G., 2C2, 11A3.
Faraday, M., 2K.
Faraday Society, 2C2, 2C4, 4, 5
Farnham, C. M., 8D
Farnham, D. T., 2K
Farrell, H., 2K.
Farrington, E. H., 12F1
Federation of British Industries, 13C
Fehling, H. von, 2A
Ferguson, J., 2N3
Field, S., 9A3.
Fierz-David, H. E., 25B
Findlay, A., 2C8 2C9
Fink, C. G., 4.
Finnemore, H., 17B
Fischer, A., 7C2.
Fischer, E., 2H3, 10F, 10G1.
Fischer, F., 21B
Fischer, M. H., 27B.
Fisher, H. L., 10G2.
Flinn, A. D., 2K, 14B.
Flood, G. M., 14C.
Flügel, F., 2M.
Foerster, F., 2C5.
Fogg, D. E., 18A.
Folin, O., 11B
Foltzer, J., 25D2.
Fonrobert, E., 30.
Foote, P. D., 3
Ford, W. E., 8A
Forsythe, R., 9A Fe
Foster, R. B., 13F
Foster, W. 2B2, 2B3, 2K.
Fothergill, J. B., 25C
Foulk, C. W., 14B
Fowle, F. E., 2F.
Fowler, A., 2C6
Fowler, G. J., 11C.
Fox, J. J., 26F.
Fränkel, S., 11B, 17A.
Francis, C. B., 9A Fe
Frank, J. O., 2L.
Fraps, G. S., 15A.
Frary, F. C., 1B.
Fresenius, C. R., 7B, 7C.

Fresenius, T. W., 7B.
Freudenberg, K., 29A.
Freundlich, E., 2C7.
Freundlich, H., 2D.
Frey, E. von, 2A
Friedländer, P., 25B.
Friend, J. N., 6A, 9A5, 26B2.
Fries, A. A., 13L.
Fritsch, J., 15C, 16.
Fritz, F., 18F.
Fry, H. S., 2C8
Fryer, P. J., 27A
Fuchs, G. F. C., 2N3.
Fuchs, W., 11D
Fürth, A., 21B
Fürth, O., 11G1.
Fueter, R., 2E.
Fuhrmann, F., 12A, 16.
Fuller, G. W., 14C
Fuller, H. C., 17A, 17C.
Fulton, C. H., 9A7
Funk, C., 11E
Furman, N. H., 7C2, 7E

Gadamer, J., 11H2.
Gaehtgens, W., 12F
Gardner, H. A., 9A5, 26B, 26F.
Gardner, W., 2A.
Gatenby, J. B., 11B.
Gattermann, L., 10G1
Gay, L., 2E
Gaye, J., 20B.
Gedroiz, K. K., 15E.
Geer, W. C., 30.
Geerligs, H. C. P., 28A, 28D.
Geiger, C., 9A Fe
Geiger, C. von, 9A3
Geiger, H., 3
Georgievics, G. von, 25B, 25D.
Gérard, J., 13A.
Gerlach, W., 3.
Getman, F. H., 2C1
Gibbs, W. E., 13G, 13M.
Gibson, C. S., 18F.
Gildemeister, E., 17B.
Gill, A. H., 22F.
Gillett, H. W., 9A Fe.
Giolitti, F., 9A Fe.
Gissing, F. T., 21A
Giua, M., 9A2
Giua-Lollini, C., 9A2.
Glikin, W., 27A
Gmelin, 6A.
Gnamm, H., 29A.
Gody, L., 24A.
Goerens, P., 9B.
Götze, R., 2C6.
Goldschmidt, K., 9A Al.
Gooch, F. A., 7C.
Goodenough, G. A., 2C7.
Goodrich, W. F., 14A
Goodwin, H., 1F11.
Gordon, A., 2M.
Gordon, N. E., 2B2.
Gotschlich, E., 14D.
Gottlieb, R., 11H1.
Gould, G. B., 21F.
Gowland, W., 9A.
Graebe, C., 2H2
Gramont, A. de, 2C6
Grandmougin, E., 25B.
Grant, J., 12B, 12E
Grasser, G., 29A
Gray, C. W., 2B3, 2B6.
Grebel, A., 21A
Greeley, S. A., 14A.
Green, A. G., 25B2.
Greenfield, E. V., 2M.
Greenish, H. G., 12F.
Greenwood, H. C., 18D.
Greer, C. C., 2B3
Gregory, R., 2K, 2N3.
Griffin, R. C., 13D.
Griffiths, E., 1D.
Griffiths, J., 21F.
Grimaux, A., 2M.
Grimaux, E., 2H3.
Grimmer, W., 11F.
Grohmann, A., 12A.
Grossfeld, J., 12F.
Groth, P. H. von, 2C3.
Grün, A., 27C.
Grün, R., 20B.
Gruenberg, B. C., 14A.
Gruenwald, J., 19C
Guillet, L., 9A Cu, 9B.
Guilliermond, A., 11D.
Gulliver, G. H., 9B
Gurwitsch, L., 22B.
Gutbier, A., 7B.
Guye, C. E., 2C8.
Gwosdz, J., 21A.

Haanel, B. F., 21A.
Haas, P., 11D
Hackspill, L., 18F.
Hadfield, R. A., 9A, 9A Fe.
Hägglund, E., 23B.
Haerry, J. H., 25C, 25D2.
Hager, H., 17A.
Hahn, D. A., 2F, 10E.
Haldane, J. B. S., 13L.
Haldane, J. S., 11F
Hall, A. D., 15B.
Hall, A. J., 23A, 25A, 25C.
Hall, E. H., 2L.
Hall, J. H., 9A Fe.
Hall, J. W., 9A Fe.
Hall, W. T., 7A, 9A7.
Halliburton, W. D., 11A1.

Halligan, J. E., 15B.
Hamilton, A., 11H2
Hamilton, E. M., 9A6
Hamilton, L. F., 2E.
Hamlin, M. L., 13C
Hammarsten, O., 11A1.
Hamor, W. A., 21A, 22B, 22F.
Hampton, F. A., 17B.
Hanausek, T. F., 7F.
Hanna, H. J., 2B3.
Hanson, 9A Al
Harbord, F. W., 9A Pb.
Harden, A., 16
Harmuth, L., 25D.
Harn, O. C., 9A Pb.
Harries, C. D., 30.
Harris, F. S., 15B.
Harris, W. R., 20B.
Harrow, B., 2H3, 3.
Hartmann, K., 1F1.
Harvey, A., 25D6
Harvey, L. C., 21A.
Haslam, R. T., 21A.
Hasterlik, A., 12B.
Hatschek, E., 2C8, 2D.
Hausbrand, E., 1F1, 1F3, 1F6, 1F7
Hauser, F., 1B
Havard, F. T., 19D.
Havard, V., 14A
Hawk, P. B., 11B
Hawks, E. B., 2N4
Hawley, L. F., 22E, 23A.
Hayduck, F., 16
Hayhurst, E. R., 14A.
Hayward, H. W., 13C.
Heath, H. W., 2B6
Heaton, N., 26A
Hedges, E. S., 2C8.
Hedin, S. G., 11A1
Heermann, P., 25A, 25C, 25D5
Heffter, A., 11H1
Hefter, G., 27A
Hellbusch, E., 2M
Henderson, W. E., 2B2, 2B3, 2B6.
Hendrick, E., 2K
Hendricks, 13K
Henley, 18G
Henrich, F., 10E
Henry, W. A., 12E
Hepworth, T. C., 26E.
Herelle, F. d', 11G2.
Hering, R., 14A.
Heriot, T. H. P., 28A.
Hermanns, H., 21A.
Herzberg, W., 23B.
Herzfeld, J., 25D7.
Herzog, R. O., 13A.
Hess, W., 23B
Hetzel, F. V., 1F8.
Heumann, K., 25B.
Heuser, E., 23A.
Hevesy, G. von, 3, 6C.
Hewitt, F. W., 11H1.
Hibbert, E., 7C1.
Hicks, W. M., 2C6.
Hildebrand, J. H., 2C5.
Hill, J., 2N1
Hill, T. G., 11D
Hillebrand, W. F., 8D.
Hinshelwood, C. N., 2C8.
Hintze, C., 8A
Hiscox, G. D., 18G
Hiss, P. H., Jr., 11C.
Hitchcock, F. L., 2E.
Hoar, R. S., 13F
Hodges, F. W., 10E.
Hodgman, C. D., 2G.
Hodkin, F. W., 19A.
Höber, R., 11A2
Höfer, H. von, 22B
Hoff, J. H. van't, 2C1.
Hoffman, F., 17B.
Hoffmann, M. K., 6A
Hofman, H. O., 9A, 9A Cu, 9A Pb, 9A Zn
Hofmann, A. W., 2H3.
Hofmann, C., 23B
Hofmann, K. A., 6B.
Hogaboom, G. B., 4.
Holde, D., 22F
Holden, E. F., 8E
Holleman, A. F., 6B, 10B
Holley, C. D., 26B1, 26F
Holmes, A., 8B
Holmes, E. M., 17A
Holmes, H. N., 2B2, 2B6, 2D.
Holmyard, E. J., 2H2.
Holst, H., 3
Hooker, A. H., 14A
Hool, G. A., 20B
Hopkins, A. A., 18G
Hopkins, B. S., 6C
Hopkins, C. G., 15B.
Hoppe-Seyler, F., 11B
Hottenroth, V., 25D2
Houben, J., 10G1, 17A
Hovestadt, H., 19A
Howe, H. E., 2K
Howe, H. M., 9A2, 9B.
Hoyer, F., 23B
Hoyt, S. L., 9B
Hubbard, C. C., 25D6
Hubbard, P., 20D
"Hütte," 9A
Hughes, W. E., 4
Hugounenq, L., 11A1.
Hull, C., 2N4
Hund, F., 2C6, 3.
Hunter, A. C., 12A.
Hunziger, O. F., 12D.

Hurst, G. H., 22C, 25D5, 27B.
Hurst, J. E., 9A Fe.

Ibbotson, F., 9A7
Illingworth, S. R., 21F.
Ineson, W. I., 21D.
Institute of American Meat Packers, 12E
Institution of Petroleum Technologists, 22F.

Jackson, D. E., 11H1.
Jacobsen, E., 16
Jacobson, C. A., 2L.
Jacobson, P., 10A
Jacoutot, A., 12E.
Jaffe, B., 2E
Jago, W., 12B.
Jago, W. C., 12B
Jamieson, G. S., 7C1.
Jansky, C. M., 4.
Jaques, A. F., 2B6.
Jeans, J. H., 2C8, 3.
Jeffries, Z., 9B
Jellinek, K., 2C1.
Jennings, A. S., 26B
Jenny, H., 15E.
Job, P., 2C8
Jobling, E., 2C2
Jörgensen, A., 11C
Johannsen, A., 8B
Johnson, A. E., 7C1.
Johnson, C. M., 9A7.
Johnson, J. B., 13C
Johnson, J. E., Jr., 9A Fe.
Johnson, N. C., 20B
Johnson, O. C., 7B
Johnson, T. B., 10E.
Jolles, A., 12A.
Jones, B. E., 5.
Jones, W., 11A2.
Jordan, E. O., 11C.
Jorissen, W. P., 2N3.
Josephson, A. G. S., 2N4.
Julian, H. F., 9A6.

Karsner, H. T., 11G2.
Kast, H., 24A.
Kaye, G. W. C., 1E, 2F, 3.
Kayser, H., 2C6.
Keane, C. A., 13D.
Kearton, W. J., 1F11
Keegan, L. M., 11E.
Kelsey, E. B., 2B6.
Kempf, 2N2.
Kendall, J., 2B2, 2B3, 6B.
Kent, R. T., 13M.
Kent, W., 13M.
Kent-Jones, D. W., 12B.
Keppele, G., 19A.
Kerkhof, W., 17A.
Kershaw, G. B., 14C.
Kershaw, J. B. C., 21A.
Kettridge, J. O., 2M.
King, F. H., 15B.
Kingzett, C. T., 2A.
Kinnicutt, L. P., 14C
Kipping, F. S., 6B, 10B.
Kirsch, G., 3
Kissling, R., 22A, 29B.
Klar, M., 22E.
Klein, 20.
Kleinlogel, A., 20B.
Kley, P. D. C., 7F.
Kloes, J. A. van der, 13C.
Klooster, H. S. van, 2L.
Knecht, E., 7C1, 25C.
Knibbs, N. V. S., 18B.
Knoch, C., 12D.
Knox, C., 12C
Knox, J., 2E, 18E
Kober, G. M., 14A.
Kobert, 11H2
König, J., 12A, 15E.
Koerner, J., 19.
Kolmer, J. A., 11G2
Kolthoff, I. M., 7C1, 7C2, 7E.
Konen, H., 2C6
Kopaczewski, W., 11H1.
Kopp, H. F. M., 2H1.
Kostir, M., 2L
Kraemer, H., 17C.
Kramers, H. A., 3.
Krauch, C., 7E
Kraus, C. A., 2C5, 6C.
Kraus, E. H., 8E
Krause, H., 1F1, 9A Al.
Krauskopf, F. C., 2B6.
Krayer, P. J., 1E
Kremann, R., 13M.
Krogh, A., 11F.
Krüger, K., 21D.
Kruyt, H. R., 2D.
Kuester, F. W., 2E.
Kuhn, R., 11A3.

Laar, J. J. van, 4.
Laby, T. H., 2F.
Lacroix, A., 2E.
Ladoo, R. B., 8E.
Lafar, F., 16.
Lamb, M. C., 29A.
Lander, C. H., 21B.
Landolt, H., 2F.
Landrum, R. D., 19C.
Lane-Claypon, J. E., 12D.
Lang, 2M.
Langbein, G., 4.
Lange, N. A., 2G.
Lange, O., 13A, 13M, 25B.

Langton, H. M., 26B1.
Lant, R., 21B.
Larousse, 2M.
Larsen, C., 12D.
Lassar-Cohn, 10G1.
Lassberg, J. F., 23B.
Latimer, W. M., 2B2.
Laucks, I. F., 27A.
Laundryowners' National Association, 25D6.
Leach, A. E., 12F.
Leathes, J. B., 11A2.
Lebeau, P., 4.
LeBlanc, M., 4.
LeChatelier, H., 1D, 20A.
Lecomte du Noüy, P., 2D.
Lecoq de Boisbaudran, F., 2C6
Ledebur, A., 9A Fe.
Lee, A. B., 11B.
Lefebure, V., 13L.
Leffmann, H., 14D.
Legendre, R., 2C5.
Lehne, A., 25C.
Lehner, S., 26E.
Leighou, R. B., 13C
Leitmeier, H., 8A.
Leon, N. P. de, 2M.
Lepeschkin, W., 11A2.
Lesley, R. W., 20A.
Leslie, E. H., 21A.
Levene, P. A., 10F.
Levine, M., 14D.
Levy, L. A., 21D.
Levy, S. I., 6C, 13A.
Lewes, V. B., 21A.
Lewis, G. N., 2C7, 3.
Lewis, G. S., 22C.
Lewis, J. V., 8A.
Lewis, S. J., 2B1.
Lewis, W. C. M., 2C1.
Lewis, W. K., 13M.
Lewkowitsch, J., 27A, 27C.
Liddell, D. M., 2G, 9A, 13A.
Liénard-Fiévet, 25D4.
Liesegang, R. E., 2D
Lifschitz, I., 2C6
Lilley, E. R., 22B.
Lind, S. C., 3.
Lindgren, W., 8E.
Linger, F., 19B.
Link, A. D., 2B6.
Lippmann, E. O. von, 2H2.
Livache, A., 26C
Lloyd, D. J., 10F.
Lloyd, J. U., 17A.
Lockhart, L. B., 22C.
Lodge, O., 4.
Loeb, J., 2D, 11A2, 11F.
Loeb, L. B., 2C8.
Löffl, K., 27A
Loeser, K., 19B.
Lopes, 2M.
Lord, N. W., 9A7.
Louis, H., 9A Sn.
Lovejoy, E., 19B.
Low, A. H., 9A7.
Lowry, T. M., 2H1, 6B, 10C.
Lowy, A., 10G2.
Lucas, A., 2H2, 2P.
Lucas, E. W., 18G.
Lucke, C. E., 2C7.
Luckiesh, M., 2C4.
Lueger, 2A.
Lüppo-Cramer, H., 5.
Luff, B. D. W., 30.
Lunge, G., 13D, 18, 21E.
Lusk, G., 11E.
Luther, R. T. D., 2C9.
Luttringer, A., 30.
Lyman, T., 2C6.
Lyon, T. L., 15B.

McClintock, J. R., 14C.
McCleary, W., 25D5
McCollum, E. V., 11E.
McCoy, H. N., 2B2.
McCulloch, A., 21B.
McDonald, P. B., 2N1.
MacDougall, F. H., 2C7.
McElvain, S. M., 10G2.
McGee, J. M., 11D.
McGowan, E. B., 25D.
M'Intosh, J. G., 16, 26C.
Mack, E. L., 9A Fe.
McKay, G. L., 12D.
McKay, R. F., 21B.
McKee, R. H., 22B3.
Maclean, H., 11A2.
MacLean, I., 11A2.
McLean, S., 11E.
Macleod, J. J. R., 11E, 11F, 11G1.
McPherson, W., 2B2, 2B3. 2B6.
MacRae, 13K.
Mahin, E. G., 7C, 15E
Makower, W., 3.
Mannheim, E., 11H2.
Manufacturing Chemists' Association of the United States, 1E.
Marcusson, J., 27C.
Margosches, B. M., 7A.
Marie, C., 2F.
Mariller, C., 1F7.
Mark, H., 3.
Marks, L. S., 13M.
Marriott, J. W., 2N1.
Mars, G., 9A Fe.
Marshall, A., 24A.
Marshall, C. E., 11C.
Martens, A., 9A2.
Martin, G., 2K, 13A, 27B.

Martindale, W. H., 17A
Martinet, J., 25B.
Marx, E., 3.
Mason, F. A., 2N2.
Mason, W. P., 14B, 14D.
Masson, I., 2H1.
Masters, H., 2B4.
Mathews, A P., 11A1.
Mathews, E. B., 2N4
Matos, L. J., 13A
Matthews, J. M., 25A, 25C, 25D, 25D4.
Maurizio, A., 12B
Maxwell, I., 11A2.
May, P., 17A.
Mayrhofer, E., 11E.
Meade, A., 21D
Meade, R. K., 9A7, 20A.
Mees, C. E. K., 5, 13G.
Mees, H. R., 2B6.
Megraw, H. A., 9A1
Meigs, J. V., 22B2
Meissner, C. A., 9A Fe.
Mellor, J. W., 2B2, 2C1, 2E, 6A, 6B, 7C.
Melzi, 2M.
Memmler, K., 13C.
Mendel, L. B., 11E.
Mendeléeff, D., 2B1.
Metcalf, L., 14C.
Metge, G., 15E
Meyer, E. von, 2H1.
Meyer, H., 10H, 11H1
Meyer, J., 13L.
Meyer, S., 3
Meyer, V., 10A.
Meyerhof, O., 11A2.
Meyers, M. K., 2M.
Michaelis, L., 2D, 7F.
Michel, H., 18F.
Midgley, E., 25D7.
Miles, F. D., 18
Millard, E. B., 2C1
Millenet, L., 19C.
Miller, E. H., 2E
Millikan, R. A., 3.
Mills, A. P., 13C
Mills, J., 3
Mitchell, C. A., 2P, 12E, 16, 26E, 27A.
Möhlau, R., 25C
Mohler, F. L., 3
Mohr, J. A., 9A Fe.
Moissan, H., 4, 6A.
Mojonnier, T., 12F1.
Moldenhauer, W., 13A.
Moldenke, R., 9A Fe.
Molinari, E., 6A, 10A.
Molisch, H., 11D.
Monier-Williams, G. W., 16.
Monkhouse, A., 4.
Monypenny, J. H. G., 9A Fe
Moore, E. S., 21B.
Moore, F. J., 2H1, 10G2.
Moore, H., 21A.
Moore, R. B., 8D.
Morgan, G. T., 10F.
Morgan, J. J., 21D.
Morley, H. F., 2A.
Morrell, R. S., 26B2, 26C.
Morrison, F. B., 12E.
Morse, W., 11A1.
Mortimer, F. J., 5.
Mossner, C. von, 15C.
Mossner, J., 15C.
Mott, O. E., 10B.
Moulton, C. R., 11E.
Moureu, C., 10B, 13L.
Müller, E., 4, 7C2.
Müller, F., 23B.
Mündler, K., 16
Muir, M. M. P., 2A, 2H1.
Mulliken, S. P., 10H.
Munby, A. E., 1A
Mundey, A. H., 9A Sn.
Muret-Sanders, 2M.
Murray, J. A., 15B.
Muspratt, J. S., 2A.
Myddleton, W. W., 27A.
Myers, J. E., 2C8
Myers, V. C., 11B.

Naoum, P., 24A.
Naske, C., 1F9.
Neblette, C. B., 5.
Nernst, W., 2C1, 2C7, 2E.
Neumann, B. von, 13A.
Neumann, M. P., 12B.
Newell, L. C., 2B2, 2B3, 2B6.
Newitt, D. M., 13K.
Newman, F. H., 1F10.
Newth, G. S., 2L.
Niggli, P., 8A.
Norrenberg, H., 13G.
Norris, J. F., 10B, 10G2.
Norton, J. F., 11B.
Noyer, J., 22E.
Noyes, A. A., 2C1, 7B.
Noyes, W. A., 2B2, 7B, 10B, 10G2.

Ogden, E. L., 2N4.
Olney, L. A., 25A.
Olsen, J. C., 2G, 7C.
Onslow, M. W., 11D.
Oppenheimer, C., 11A1, 11A3.
Orla-Jensen, 11C.
Orton, E., Jr., 19B.
Osborne, T. B., 11D.
Ost, H., 13A.
Osterhout, W. J. V., 11G1.
Ostwald, A., 11H1.
Ostwald, Wi., 2B1, 2B3, 2C1, 2C8, 2C9, 2H4, 2N2, 6B, 7A.

Ostwald, Wo., 2D.
Otto, P., 2N3.
Owen, J. S., 21A.
Owen, W. L., 28A.
Owens, J. W., 9A4.

Padgett, F. W., 22F
Paessler, J., 29A.
Palladin, V. I., 11D.
Palmer, L. S., 11A2, 12D.
Paneth, F., 3.
Park, C. W., 2N1.
Park, W. H., 11C.
Parker, L. H., 18E.
Parkes, J. W., 18.
Parr, S. W., 21F.
Parrish, P., 18B.
Parry, E. J., 17B.
Parsons, T. R., 11A1.
Partington, J. R., 2C7, 2E, 6B, 18B, 18E.
Paschen, F., 2C6.
Patterson, A. M., 2M.
Patterson, D., 25C.
Paul, J. H., 14B.
Pauli, W., 2D.
Pearson, H. P., 25D5.
Pelly, R. G., 27A
Penfield, S. L., 8A
Perkin, W. H., 6B, 10B.
Perrin, J., 3.
Peters, E. D., 9A Cu.
Peters, F., 13A.
Petit, P., 16.
Pettersson, H., 3.
Pharmaceutical Society of Great Britain, 17A
Phelps, E. B., 14A.
Phillips, C. L., 12B.
Phillips, F. C., 2M, 9A7.
Phisalix, M., 11H2
Pickering, G. F., 27C.
Pilcher, R. B., 2Q.
Pirquet, C., 11E.
Planck, M., 2C7.
Plattner, K. F., 7D.
Plimmer, R. H. A., 11A1, 12A.
Plotnikov, J., 2C4.
Poggendorff, J. C., 2N3.
Porter, C. W., 10B.
Porter, H. C., 21B.
Porter, J. E., 14C.
Portevin, A., 9B.
Poschardt, G. R., 21D.
Potonié, R., 21B.
Pott, E., 12E.
Potter, 17A.
Poucher, W. A., 17B.
Poulsson, E., 11H1.
Powell, A. R., 8D.
Powell, O., 12C.

Pregl, F., 10H.
Prescott, A. B., 7B.
Prescott, S. C., 14D.
Preuss, E., 28A.
Price, D. J., 24B.
Price, W. B., 9A7.
Prideaux, E. B. R., 2C8, 7E.
Pring, J. N., 4
Pringsheim, P., 2C4.
Probst, E., 20
Procter, H. R., 29A.
Prost, E., 9A.
Pryde, J., 11A2.

Race, J., 14B.
Radasch, A. H., 13M.
Ragor, C. L., 2E.
Ralston, O. C., 9A Zn.
Rambush, N. E., 21D.
Ramsay, W., 2H3, 6C.
Randall, M., 2C7.
Rankin, 20.
Raper, H. S., 11A2.
Rastall, R. H., 8C.
Rauls, F., 19B.
Read, J., 10B.
Read, W. T., 14B.
Rechenberg, C. von, 1F7.
Rector, T. M., 12C.
Redgrave, G. R., 20A.
Redgrove, H. S., 2H2.
Redington, G., 15A.
Redwood, B., 22B.
Reedy, J. H., 7B.
Regelsberger, F., 9A2.
Rehwald, F., 28B.
Reid, E. E., 2C2, 10E.
Reilly, J., 2C8.
Reimann, R., 23B.
Reinglass, P., 9A2
Reinthaler, F., 25D2.
Remenovsky, E., 21F.
Remington, J. P., 17A.
Remsen, I., 2B3.
Rémy-Genneté, P., 18F.
Rennenosky, E., 13C.
Reuss, I. D., 2N3.
Revis, C., 12F.
Richards, E. H., 14A.
Richards, J. W., 9A.
Richards, R. H., 9A1.
Richardson, C., 22D.
Richardson, O. W., 3.
Richet, 11F.
Richmond, H. D., 12D, 12F1.
Richter, F., 6D, 17B.
Richter, M. M., 10A.
Richter, V. von, 10A.
Rickard, T. A., 2N1, 9A1.
Rideal, E. K., 2C2, 2C8, 14A.

Rideal, S., 14A, 29B.
Ries, H., 8C.
Rievel, H., 12D.
Rinne, F., 2C3.
Ristenpart, E., 25D.
Rivière, 18F.
Robb, J. F., 13F.
Roberts-Austen, W. C., 9A.
Robertson, T. B., 11A1, 11A2, 11F.
Robinson, C. S., 1F3, 1F7, 2E.
Rockwell (W. S.) Co., 1F3.
Rodenhauser, W., 9A Fe.
Röttger, H., 12A.
Rogers, A., 13A.
Rolants, E., 13E.
Rolfe, G. W., 1C.
Rona, P., 11B
Roscoe, H. E., 2H3, 6A.
Rose, M. S., 11E.
Rose, T. K., 9A Au.
Rosenhain, A., 9A Al.
Rosenhain, W., 9B, 19A.
Rosenmund, K. W., 7B.
Rosenthaler, L., 10H.
Ross, D. W., 19D.
Roth, F. C., 15D.
Roth, W., 2G.
Roth, W. A., 1C
Rowe, F. M., 25B1.
Rübencamp, R., 26B1.
Rüdisüle, A., 7A.
Rüst, E., 13C.
Russell, A. S., 3.
Russell, E. J., 15B.
Russell, H. L., 14B.
Russell, R. P., 21A.
Russell, T. H., 1A.
Rutherford, E., 3.
Ryschkewitsch, E., 18F.

Sabatier, P., 2C2.
Sabin, A. H., 26A.
Sackur, O., 2C7.
Sadtler, S. P., 13A.
Sadtler, S. S., 2K, 10H.
Salvetat, H., 20A.
Sandeman, E. A., 19B.
Sandifur, C. W., 2B3, 2B6.
Satterly, J., 2E.
Sauveur, A., 9B.
Savage, W. G., 12C.
Schaaf, W. L., 2N4.
Schaal, J., 27B.
Schade, H., 11G1.
Schaeffer, J. A., 9A7, 26F.
Scheiber, J., 26C.
Scheid, K., 2L.
Scherer, R., 12D.
Schering, H. von, 4.
Schidrowitz, P., 30.
Schleicher, A., 7C2.
Schlesinger, H. I., 2B2, 2B6.
Schlomann, A., 2M.
Schmeideberg, O., 11H1.
Schmidt, E., 17A.
Schmidt, J., 10B, 10F.
Schnabel, C., 9A.
Schneider, A., 17C.
Schoeller, W. R., 8D.
Schoen, M., 11A3.
Schoenawa, J., 9A Fe.
Schoenflies, A., 2C3, 2E.
Schofield, J., 25D5.
Schorger, A. W., 23A.
Schorlemmer, C., 6A.
Schotz, S P., 30
Schrauth, W., 27B.
Schroeter, 10A.
Schubert, M., 23A, 23B.
Schucht, L., 15 C.
Schüssler, 11A1.
Schultz, G., 25B, 25B1.
Schulze, A., 2C8.
Schulze, H., 2D.
Schwalbe, C. G., 23A, 23B.
Schwartz, H. A., 9A Fe.
Schwarz, R., 22B
Schweidler, E. R. von, 3.
Scott, W. W., 7A, 9A7.
Searle, A. B., 19B, 19D.
Seeligmann, F., 26C.
Seger, H. A., 19B.
Segerblom, W., 2F.
Seidell, A., 2F.
Seifert, O., 11H1.
Semmler, F. W., 17B.
Senter, G., 2C1.
Shaw, J. B., 19C.
Shaw, N., 21A.
Shenstone, W. A., 1B.
Shepherd, E. S., 20.
Sheppard, S. E., 2C4, 5.
Sherman, H. C., 10H, 11E, 12A.
Sherrill, M. S., 2C1.
Shollenberger, J. H., 12B.
Shreve, R. N., 25B1.
Sibley, R., 22B5.
Sieber, R., 23B.
Siegbahn, M., 3.
Simmersbach, O., 21C.
Simmonds, C., 16.
Simmonds, N., 11E.
Simmons, H. E., 30.
Simmons, W. H., 25D5.
Simons, T., 9A1.
Simpkin, N., 21B.
Simpson, S. G., 2E.
Sindall, R. W., 23A.
Sisco, F. T., 9A Fe.
Skinner, W. E., 22B.

Slosson, E. E., 2B2, 2K.
Smart, E., 9A6.
Smiles, S., 2C8.
Smith, A., 2B2, 2B3, 2L, 6B.
Smith, E. A., 9A Pt, 9A Zn.
Smith, E. F., 2H2, 2H3, 2N2, 7C2.
Smith, H. R., 2B6.
Smith, S., 23B.
Smith, S. L., 11E.
Smits, A., 2C8.
Smythe, J. A., 9A Pb.
Sneed, M. C., 2B2
Snell, F. D., 7F
Snell, J. F., 2B4
Société française de physique, 2F.
Soddy, F., 3.
Sørensen, S. P. L., 10F.
Sohon, J. A., 2N4.
Sollmann, T. H., 11H1.
Sommerfeld, A., 3.
Sotheran, H. C., 2N3
Southcombe, J. E., 22A.
Spackman, C., 20A.
Spaeth, E., 12A.
Sparks, M. E., 2N2.
Speller, F. N., 9A5.
Spencer, G. L., 28A.
Spencer, J. F., 2C9, 6C.
Spielmann, P. E., 21E, 22D.
Spiers, F. S., 1C.
Spilker, A., 21C.
Spoehr, H. A., 2C4, 11D.
Sproxton, F., 26C.
Stähler, A., 6D.
Staley, H. F., 19C.
Stansfield, A., 4.
Stein, M. F., 14B.
Stelzner, R., 10A
Stettbacher, A., 24A.
Stevens, H. B., 18G.
Stevens, H. P., 23B
Stewart, A. W., 2C8, 10E.
Steyer, R., 29A.
Stieglitz, J., 7B, 11A2.
Stiles, W., 11D.
Stillman, A. L., 1F12.
Stillman, J. M., 2H2
Stitt, E. R., 11C
Stock, E., 26A
Stocking, W. A., Jr., 12D.
Stoek, H. H., 21B.
Stohmann, F., 2A.
Stoklasa, J., 15B.
Stoner, E. C., 3
Stopes, M. C., 21B.
Storer, F. H., 15A.
Stoughton, B., 9A, 9A Fe.
Strachan, J., 23B.
Strache, H., 21A, 21B.
strohecker, R., 12A.
Sucharipa, R., 11D.
Sudborough, J. J., 10B.
Süvern, K., 25D2.
Sullivan, T. J., 18A.
Sullivan, T. V., 26E.
Sumner, J. B., 11A1.
Sutermeister, E., 12D, 23B.
Sutton, F., 7C1.
Sutton, W. L., 7C1.
Svedberg, T., 2D.
Svensen, C. L., 1F2.
Swarts, F., 6B.
Swindin, N., 1F2.
Sykes, A. J., 25D4.

Tague, E. L., 12D.
Talbot, H. P., 7C.
Tammann, G., 2C8, 9B
Tanner, F. W., 12F.
Taylor, F. W., 20B.
Taylor, H. S., 2C1, 2C2, 18D, 21A
Taylor, W., 2C8.
Taylor, W. W., 2D.
Technical Association of the Pulp and Paper Industry, 23B
Teicher, J., 23B
Teichert, K., 12F1.
Terry, E. M., 2B2.
Thiel, A., 2C9
Thiele, L., 29B.
Thierfelder, 11B
Thiessen, R., 21B
Thom, C., 12A, 16.
Thomas, 13K.
Thomas, E., 13F.
Thomas, W., 6C.
Thompson, M. D., 4.
Thoms, H., 17A.
Thomsen, J., 2C7.
Thomsen, T. C., 22C.
Thomson, J. J., 3
Thorne, P. C. L., 13D.
Thorp, E. L., 25D4.
Thorpe, J. F., 10H, 25B.
Thorpe, T. E., 2A, 2H1.
Thresh, J. C., 14D.
Tiede, E., 6D.
Tiemann, H. P., 9A Fe.
Tietze, O., 8E.
Tilden, W. A., 2H2, 2H3.
Tinkler, C. K., 2B4.
Toch, M., 26B.
Trautz, M., 2B1.
Treadwell, F. P., 7A.
Trelease, S. F., 2N1.
Tressler, D. K., 18F.
Trier, G., 11D.
Trinks, W., 1F3.
Trommsdorff, J. B., 2N3.
Trotman, E. R., 25D.

Trotman, S. R., 25D, 25D4.
Troy, H. C., 12F1.
Truscott, S. J., 9A1.
Truttwin, H., 25B.
Tschirch, A., 17C.
Tungay, S. J., 13C.
Tunmann, O., 11D.
Turneaure, F. E., 14B
Turner, F. M., Jr., 2A, 13C.
Turner, T. H., 9A3
Turrentine, J. W., 18C.
Tuttle, J. B., 30.
Tuttle, L., 2E
Tutton, A. E. H., 2C3.
Twenhofel, W. H., 8C.
Twyman, F., 2C6.
Tyler, C., 13G.

Ubbelohde, L., 27A.
Uebele, C. L., 26B.
Ullmann, F., 2A.
Ulmann, H., 21A.
Underhill, F. P., 11F, 11H2
Underwood, H. W., Jr., 10G, 10K2.
Underwood, N., 26E
United States Steel Corporation, 21F.
University of Chicago, 2N1.

Vallery-Radot, R., 2H3.
Van Goor, 2M.
Vanino, L., 6D, 10G1.
Van Patten, N., 22C.
Van Rossen, A., 30
Van Slyke, L. L., 12F1.
Van Vleck, J. H., 3.
Van Wely, F. P. H. P., 2M.
Vedder, E. B., 13L
Venable, F. P., 2H1, 6C
Verein Deutscher Dünger-Fabrikanten, 15C
Vickers, C., 9A2.
Vinal, G. W., 4
Vincent, S., 11F.
Volhard, J., 2H3.
Voorhees, E., 15C.
Vulté, H. T., 2B4.

Wade, F. B., 2B3.
Wade, J., 10B
Waeser, B., 18E
Wagner, A., 16, 18A, 29A.
Wagner, F. H., 21D.
Wahl, W. H., 18G.
Wakeley, C., 3.
Waksman, S. A., 11A3.
Walden, P., 2C5, 10F.
Waldschmidt-Leitz, E., 11A3.
Walker, A. J., 10B.
Walker, J., 2C1.
Walker, J. B., 9A Fe.
Walker, J. E., 13F.
Walker, W. H., 1F1.
Wall, E. J., 5.
Wallis, T. E., 7F, 17C.
Walton, J. H., 2B6.
Wang, C. Y., 9A Sb.
Waran, H. P., 1B.
Warburton, G. H., 27A.
Ware, L. S., 28A.
Warnes, A. R., 20C, 21E.
Washburn, E. W., 2C1, 2F.
Washington, H. S., 8D.
Watson, E. R., 2C8.
Watson-Davis, C. E., 9A Cu.
Watt, A., 4, 27B.
Watt, H. A., 2N1.
Watts, H., 2A.
Watts, O. P., 4.
Webb, H. W., 18A.
Weber, C. O., 30.
Weber, L. E., 30.
Webre, A. L., 1F3.
Wehmer, C., 11D.
Weigert, F., 2C4.
Weimarn, P. P. von, 2D.
Weinland, R., 6C, 7C.
Weiser, H. B., 2D.
Weiss, F. J., 1F3
Weiss, H. F., 20C.
Weiss, J. M., 13G.
Welch, F. V., 5
Wellington, S. N., 21B.
Wells, A. A., 2C4.
Wells, A. E., 18A.
Wells, H. G., 11G1, 11G2.
Wells, H. L., 2E.
Weniger, K. A., 20C.
Wentzel, F., 5.
Wenzel, F., 26C.
West, C. J., 2N4, 13L.
Westcott, H. P., 22B1.
Westcott, W. W., 17A.
Weston, F. E., 27A.
Weyl, T., 10G1.
Weyman, G., 21D.
Wheeler, H. J., 15C.
Wheeler, R. V., 21B.
Whinyates, L., 2G.
Whipple, G. C., 14D.
Whitaker, J. W., 8F.
Whitby, G. S., 30.
White, A. H., 21F.
White, B. S., 9A7.
White, C. H., 9A7.
White, D., 21B.
White, F. B. H., 9A Ni.
Whitehead, S. E., 21E.
Whiteley, M. A., 10H.
Whitmore, F. C., 10F.
Whitney, M., 15B.

Whittaker, C. M., 25B2, 25C.
Whittaker, H. F., 9A5.
Whymper, R., 12E.
Wiborg, F. B., 26E.
Wichelhaus, H., 28A.
Wiederholt, 2N2.
Wiegner, G., 15E.
Wieland, H., 10G1.
Wiessmann, H., 15E.
Wiley, H. W., 12A, 12E, 15E.
Willcox, C. D., 2M.
Williams, A. W., 11C.
Williams, R. S., 9A7.
Willows, R. S., 2C8.
Wills, P. F., 9A4.
Wilson, J. A., 29A.
Wilson, L. B., 9A4.
Wilson, S. P., 26C.
Winkelmann, H. A., 30.
Winslow, C.-E. A., 14D.
Winter, F., 17B.
Winther, A., 25B.
Winton, A. L., 12F.
Wise, L. E., 23A.
Witham, G. S., Sr., 23B.
Withey, M. O., 13C.
Wohryzek, O., 28A.
Woker, G., 2C2.
Woll, F. W., 12F1.
Wood, G. M., 2N1.
Wood, H. C., 17A.
Wood, H. P., 4.
Wood, H. R., 26B2.
Wood, J. K., 25C.
Wood, J. T., 29A.
Woodman, A. G., 12F.
Woodward, W. E., 9B.
Woolman, M. S., 25D.
Worcester, W. G., 19B.
Worden, E. C., 23A.
Worrall, D. E., 10C.
Wren, R. C., 17A.
Wright, A., 1F4.
Wright, C. R. A., 27A.
Wright, F. E., 8B, 19A.
Wright, R. V., 1F8.
Wyckoff, R. W. G., 2C3.
Wyld, W., 18.

Young, S., 1F7, 2C8.
Yule, E. S., 2N1.

Zeitlinger, H., 2N3.
Zerr, G., 26B1, 26F.
Zieke, E., 26C.
Zimmer, E., 26B1.
Zimmer, G. F., 1F8.
Zinsser, H., 11C, 11G2.
Zschimmer, E., 19A.
Zsigmondy, R., 2D.

INDEX

[In this index the only journals and books given individual entries are those discussed in the body of the book. Information about a large number of others will be found in Appendixes 6 and 8.]

Abbreviations, in abstracts, 80.
of journal names, 35, 279.
list of, used in chemical literature, 245.
Abderhalden's handbooks, 19.
Abegg-Auerbach Handbuch, 17.
Abstract journals, book announcements in, 28.
chronological table of, 236.
history of, 78.
the ideal, 78.
from indexing viewpoint, 168.
individual, 81.
production of, 76.
in specific fields, 91.
subject indexes of, as nomenclature guides, 177, 182.
subject indexes of various, 194.
use of, 80.
Abstracts, chronological table of sources of, of general chemical interest, 91.
correct use of, 216.
of Government publications, 130.
ideal, 79.
indexes based on titles of, 167.
from indexing viewpoint, 168.
library abstracting service, 209.
patent, 115.
patent, use of, 123.
published with papers, 36.
quality of, 79.
service, centralization of, 77.
in specific fields, 91.
unorganized state of, 76.
Abstracts of Bacteriology, 95.
Académie des sciences, *Comptes rendus*, 48.
Académie des sciences de l' U. R. S. S., *Bulletin*, 49.
Accademia nazionale dei Lincei, *Atti*, 48.
Accession numbers, 206.
Acids, manufacture of, books on, 395, 396.
Addresses, 137.
Advertisements. See *Trade literature*.
Agricultural chemistry, abstracts on, 97.
books on, 392.
journals on, 67.
Agricultural Index, 198.
"Ahrens' Sammlung," 26.
Akademie der Wissenschaften in Wien, *Sitzungsberichte*, 49.
Alchemy, books on, 363.
Alcohol, books on, 393.
Alkalies, manufacture of, books on, 395, 396.
Alloys, books on, 375–8.
Alphabet, Russian, 156.
Alphabeting, of author names, 157.
of subject index headings, 170.
Alphabetisches Verzeichnis von Trivialnamen, 198.
Aluminum, books on, 376.
American Association of Textile Chemists and Colorists, *Proceedings*, 73.
American Ceramic Society, publications of, 70.
American Chemical Society, *Journal*, 50.
monographs, 22, 26.
news service, 146.
nomenclature rules, 180.
American Chemist, 37.
American Dyestuff Reporter, 73, 99.
American Electrochemical Society, *Transactions*, 56.
American Gas Association, *Bulletin of Abstracts*, 98.
American Institute of Chemical Engineers, *Transactions*, 64.
American Institute of Mining and Metallurgical Engineers, *Transactions*, 59.
American Journal of Pharmacy, 69.
American Journal of Physiology, 61.
American Journal of Science, 46.
American Leather Chemists' Association, *Journal*, 75, 100.

American Medical Association, *Journal,* 61.
American Mineralogist, 58, 94.
American Pharmaceutical Association, *Journal,* 69.
American Society for Testing Materials, *Proceedings,* 64.
American Water Works Association, *Journal,* 67, 97.
Amsterdam Academy, journal of, 49
Analysis, dairy, books on, 388
of dyes, books on, 405.
of fats, oils, soap, etc , books on, 408.
of fertilizers, soils, etc., books on, 393.
food, books on, 388
fuel, books on, 400.
general, books on, 372
industrial, books on, 389.
journals on, 57.
metallurgical, books on, 376.
of minerals and rocks, books on, 374
organic, books on, 381.
of paints, varnishes, etc , books on, 407.
of petroleum, lubricants, etc , books on, 402.
pharmaceutical, books on, 395
sugar, books on, 409.
of textiles, books on, 406
of water, sewage, etc , books on, 392.
Analyst, 57, 94
Analytical chemistry. See *Analysis.*
Annalen der Chemie, 60.
Annalen der Physik, 51.
Annales de chimie, 53.
Annales de chimie analytique, 58.
Annales des falsifications, etc., 62.
Annali di chimica applicata, 66.
Annual reports. See *Yearbooks*
Annual Reports on the Progress of Chemistry, 134.
Annuals. See *Yearbooks.*
Antonyms, in indexes, 173.
Apparatus, books on, 353, 382.
journal on, 56
Archief voor de Suikerindustrie in Nederlandsch-Indië, 75.
Archiv der Pharmazie, 69.
Archives des sciences physiques et naturelles, 48.
Argentina, chemical activity in, 6.
journal published in, 54.
Arkiv för Kemi, Mineralogi och Geologi, 56.
Articles. See *Journals; Papers.*
Asociación química argentina, *Anales,* 54.
Asphalt, abstracts on, 99
books on, 402.
journals on, 72.
Association of Official Agricultural Chemists, *Journal,* 68.
Associations. See *Societies.*
Atack and Whinyates' Year Book, 25.
Atomic structure, abstracts on, 92.
books on, 368
journals on, 49.
Austria, chemical activity in, 6.
journals published in, 49, 54, 70.
Auszüge aus den Patentschriften, 115.
Author indexes. See *Indexes*
Author names, changes in, 160.
company names as, 160.
complex, 158.
errors in, 161
identical, 162
without initials, 162.
Japanese, 155.
Russian, 154
Scandinavian, 158
spelled variously, 161
umlaut in, 157.
Author numbers, in libraries, 206.
Automotive Abstracts, 99.

Bacteriology, books on, 383
Balance, book on, 353
Bases, manufacture of, books on, 395, 396
Beiblätter zu den Annalen der Physik, 92.
Beilstein, Friedrich Konrad, 18.
Beilstein's Handbuch, 18.
Belgium, chemical activity in, 6.
journals published in, 49, 54, 66, 70
"Berichte" (der deutschen chemischen Gesellschaft), 51.
Berichte über die gesamte Physiologie, etc., 95
Berzelius' Jahresberichte, 134.
Berzelius' Lehrbuch, 21.
Bibliographia chimica, 28.
Bibliographia medica, 198.
Bibliographic service. See *Information service*
Bibliographie der deutschen Zeitschriften-Literatur, 198.
Bibliographies, 138.
of articles on chemical literature, 239
of bibliographies, 139, 367.
Bolton's, 29, 133.
index of, of National Research Council, 145.
of lists of periodicals, 267.
preparation of, 220, 223.
use of, in searches, 215, 225.
Bibliotheca Chemica, 29
Bibliotheca Chemico-Mathematica, 29.
Biedermann's Chemiker-Kalender, 24.
Biedermann's Zentralblatt, 97.
Biochemical Journal, 61.
Biochemisches Centralblatt, 95.
Biochemische Zeitschrift, 61.

Biochemistry, abstracts on, 95.
books on, 19, 20, 381.
indexes on, 198, 199.
journals on, 61.
monographs on, 22, 26.
Biographies, bibliographies in, 139.
books, 364.
memorial lectures, etc , 138.
portraits in, 149.
Biological Abstracts, 96.
Biology, abstracts on, 95
index on, 199
journals, chemical interest of, 44.
journals on, 61.
Bleaching, books on, 406.
Blowpipe analysis, books on, 373
Bolton's Bibliography, 29, 133
Book reviews, in journals, 40
Books. (See also *Libraries; Literature*)
catalogs and lists of, 28, 29, 366.
chapter on, 12
choosing and ordering, 30.
of constants, 23.
dealers and publishers, 343.
general, 21.
as guides to original articles, 12.
information sources on, 28
as nomenclature guides, 176, 182.
obtaining, by borrowing, 208.
patent digests, 119.
on patent law and practice, 121
in preliminary work of searches, 213.
publishers' series, 25.
references to, 221.
select list of chemical, 346–411.
sizes of, 30, 207.
uses of chemical, 12.
Borrowing, journals, books, etc., 100, 208.
Botanical Abstracts, 95.
Botany, books on, 383.
Bread, books on, 386.
Bremer Literaturberichte, 28.
Brennstoff-Chemie, 72, 98.
Brewing, abstracts on, 98.
books on, 393.
journals on, 68.
Bricks, books on, 397.
Briquetting, book on, 354.
British Chemical Abstracts, 86.
patent abstracts in, 116.
subject indexes of, 196.
British Empire, chemical activity in, 6.
journals published in, 47, 50, 57–9, 61–4, 67–9, 71–5.
British Government, publications, 132.
British Journal of Photography, 57, 93.
British Patent Office, index of periodicals, 200
Official Journal, 114, 125.
British Science Guild Catalog, 28.
Building materials, books on, 399.
journals on, 71.
Bulletins. (See also *Société chimique de Belgique;* etc.) 128.
filing, 230.
foreign, 132.
miscellaneous, 132.
state and municipal, 131.
United States Government, 128.

Calculations, books on, 362.
Call numbers, in libraries, 206.
Canada, libraries in, 259.
Canadian Chemistry and Metallurgy, 64
Canadian Government, publications of, 132.
Canned foods, books on, 387.
Carbonization of coal, books on, 399, 400
Card catalogs. See *Catalogs.*
Card indexes. See *Indexes.*
Carnegie Institution, publications of, 132
Carnegie Library of Pittsburgh, trade literature collection, 142.
Catalogs, of apparatus, etc , of National Research Council, 145.
of books, 28, 29, 366.
card, of the International Institute of Bibliography, 146.
consolidated, 141.
filing, 230.
of Government publications, 129, 130.
industrial and trade, 140, 390.
International, of Scientific Literature, 200
library (card, dictionary), 29, 194, 203
literature, list of, 366.
of theses, 133.
Catalogue of Scientific Papers, 198.
"Catalogue Studies," 141.
Catalysis, books on, 358.
Cellulose, abstracts on, 99.
books on, 402.
journals on, 72.
Cellulosechemie, 99.
Cement, books on, 398.
journals on, 71.
Centralblatt für Mineralogie, etc., 58.
Centrifuging, books on, 354.
Ceramics, abstracts on, 98
books on, 397.
journals on, 70.
Ceramic Society (British), *Transactions*, 71.
Cereal Chemistry, 62.
Cereals, books on, 386.
Chandler, Charles F., portrait of, facing page 37.
Chemical Abstracts, description of, 86
formula indexes of, 192.
journal lending service, 101.
"List of Periodicals Abstracted by," 101.

In literature searches, 216.
patent abstracts in, 116.
ring formula indexes of, 192.
subject indexes of, 194.
"Chemical Age" Dictionary, 23.
Chemical Age (London), 65.
Chemical Catalog Co., information service of, 145.
Chemical compounds. See *Compounds.*
Chemical engineering, books on, 353, 388.
Chemical literature. See *Literature.*
Chemical, Metallurgical and Mining Society of South Africa, *Journal*, 59, 94.
Chemical & Metallurgical Engineering, 63.
Chemical News, 50.
Chemical nomenclature. See *Nomenclature.*
Chemical Reviews, 49.
Chemicals, books on, as commodities, 389.
books on heavy, 395.
"Chemicals" (the journal), 63.
Chemical Society (London), Annual Reports, 134.
Journal, patent abstracts in, 118.
Journal, subject indexes of, 195.
library of, 210.
nomenclature rules, 180.
publications of, 83.
Chemical Society of Japan, publications of, 55.
Chemical Trade Journal, 65.
Chemie der Zelle und Gewebe, 61.
Chemiker-Kalender, 24.
Chemiker-Zeitung, 90.
patent abstracts in, 118.
Chemische Apparatur, 56.
Chemische Novitäten, 28.
Chemisches Journal, 37.
Chemisches Repertorium, 90, 118.
Chemisches Zentralblatt, description of, 81.
patent abstracts in, 117
"Stelzner" as a formula index to, 190.
subject indexes of, 196.
Chemisch-technische Uebersicht, 90.
patent abstracts in, 118.
Chemisch Weekblad, 66.
Chemistry. (See also *Agricultural chemistry; Biochemistry; Electrochemistry; Industrial chemistry; Inorganic chemistry; Organic chemistry; Physical chemistry;* etc.)
books on general, 13, 14, 15, 21, 355.
indexes on general, 194–206.
journals on general, 49.
reviews (annual) on general, 134, 135.
Chemistry & Industry, 85.
Chemists' Club of New York, Library of (illustration), frontispiece.
Chimie & industrie, description of, 90.
patent abstracts in, 117.
patent application lists in, 116.
subject indexes of, 197.
China, chemical activity in, 6.
Chronological table, of abstracts and reports, 236.
of journals containing abstracts, 91.
Circulars, 128.
Citations. See *References.*
Classics, reprints of, 364.
Classification, of books used in this book, 352.
in indexes, 152.
of journals, 38–45.
library systems, 204.
of patents, 109.
Clay products. See *Ceramics.*
Cleveland Scientific and Technical Institution, *Bulletin*, 95.
Clippings, filing, 230.
Coal, books on, 399, 401.
Coke, abstracts on, 98.
books on, 400.
journals on, 71.
Collegium, 75, 100.
Colloids, abstracts on, 93.
books on, 361.
journals on, 52, 53.
Committee work, 147.
Communication, personal, 8, 144, 148.
Company names, in author indexes, 160.
Compilations, critical *vs* noncritical, 218.
Composition. See *Writing*
"Composition of matter" patents, 105.
Compounds. (See also *Nomenclature*)
complex, especially organic, naming and indexing, 177.
foreign names and English equivalents of, 186.
formula indexes of, 188.
group *vs.* specific names for, in indexes, 184
"index" and parent, 178, 183.
inorganic, indexing, 181.
ring formula indexes, 192.
in subject indexes, 176–88.
trade names of, in indexes, 184.
"trivial" name index, 198.
"Comptes rendus," 48.
Concilium Bibliographicum, 199.
Concrete, books on, 398.
journals on, 71.
Condensation, books on, 354.
Condensed Chemical Dictionary, 23.
Constants, books of, 23, 362, 363.
Conventions. See *Meetings.*
Conversation, as an information source, 8, 148.
Copper, books on, 377.

Correspondence, 8, 144.
Corrosion, books on, 375.
Cosmetics, books on, 395.
Countries, chemical activity in various, 6.
issuing patent publications, 111.
journals classified by, 46–76.
patent-issuing, 106.
printing patent specifications, 108.
Court records, of patent cases, 108.
Crell's Chemische Annalen, 37.
Critical compilations, 218.
Critical Tables, International, 23.
Cross references, in author indexes, 160.
in subject indexes, 171
varieties "see," and "see also," 171.
Crushing, books on, 354.
Crystals, books on, 358.
Cutter expansive system, of classification, 205.
Cutter mark, 206.
Cutter table, 206.
Cyanide process, books on, 376.
Cyclopedias. See *Encyclopedias*.
Czechoslovakia, chemical activity in, 6.
journals published in, 55, 75.

Dairy analysis, books on, 388
Dairy chemistry, books on, 387.
Dammer's Handbuch, 17.
Dealers, in chemical literature, list of, 343.
Decimal system, of classification, 204.
Denmark, chemical activity in, 6.
journals published in, 55, 70.
Deutsche chemische Gesellschaft, library of, 210
publications of, 16, 18, 20, 51, 81.
Dewey system, of classification, 204.
Dictionaries, chemical, 13, 23, 355.
foreign language, 365.
of solubilities, 24, 362, 363
Directories, industrial, 390.
Dissertations, 133.
Distillation, books on, 354, 393.
of coal, books on, 399, 400.
of wood, books on, 402.
Doyle's Digest of Patents, 120.
Drugs, books on, 394.
Drying, books on, 354.
Dyeing, books on, 404, 405.
Dyes, abstracts on, 99.
books on, 404
journals on, 73.
searching experience in field of, 225.

Eastman Kodak Co., *Abstract Bulletin*, 93, monographs, 27.
Education, chemical, books on, 364.
Journal of Chemical, 50.
Electroanalysis, books on, 373.
Electrochemistry, abstracts on, 93.
books on, 369.
journals on, 56.
Enamels, books on, 397.
journals on, 70.
Encyclopedias, 13, 355.
in preliminary work of searches, 213.
Endocrinology (the journal), 95.
Engineering, chemical, books on, 353, 388.
monthly list of articles on, 201.
"Engineering" (the journal), 65.
Engineering Index, 199.
Engineering & Mining Journal, 59.
Engineering News-Record, 67.
Enzymes, books on, 382.
Erlenmyer's Handwörterbuch, 15.
Errors, in indexes, 151, 161, 166.
Esperanto, literature in, 231.
Essential oils, books on, 395.
Evans' "Metals," 17.
Evaporating, books on, 353.
Experiment Station Record, 97.
Explosions, abstracts on, 99.
books on, 404.
journals on, 73
Explosives, abstracts on, 99.
books on, 403.
index on, 199.
journals on, 73.

Faraday Society, *Transactions*, 51.
Farben-Zeitung, 74.
Fats, abstracts on, 99.
books on, 408.
journals on, 74.
Fehling's Handwörterbuch, 14.
Fermentation industries, abstracts on, 98.
books on, 393.
journals on, 68.
Fermentforschung, 62.
Ferments (enzymes), books on, 382.
Fertilizers, abstracts on, 97.
books on, 393.
journals on, 67.
Fibers, textile, abstracts on, 99.
textile, books on, 405.
textile, journals on, 73.
Filing, of information, 230.
Filtration, books on, 354.
Finishing (of textiles), books on, 406.
Flotation, books on, 375.
Flour, books on, 386.
Fluids, transporting, books on, 353.
Foods, abstracts on, 96.
books on, 386.
journals on, 62.
Forensic chemistry, books on, 368.
patents in relation to, 103.
Formula indexes, 188.
ring, 192.

Formula lexicons, 20.
Formulas, books of industrial, 396.
Fortschritte der Chemie, 52.
Fortschritte der Mineralogie, etc., 58.
Founding, books on, 377.
France, chemical activity in, 6.
journals published in, 48, 53, 57–8, 60, 62, 66, 68–9, 71–6.
Franklin Institute, *Journal*, 46.
Frémy's Encyclopédie, 15.
French, chemical, books on, 365.
names of compounds, 186.
reading, 231.
Friedlaender's "Fortschritte," 119.
Friend's Text-book, 17.
Fuel oil, books on, 402.
Fuels, abstracts on, 98.
books on, 399
journals on, 71
Fungicides, abstracts on, 97.
books on, 393.
journals on, 67.
Furnaces, books on, 354.
electric, books on, 369, 370.

Gardner's "Synonyms," 23
Gas analysis, books on, 373, 400
Gases, manufacture of (except fuel gas), books on, 396.
Gas (manufactured), abstracts on, 98.
books on, 400.
journals on, 71.
Gas (natural), books on, 401.
Gasoline, books on, 401.
Gazzetta chimica italiana, 53.
Gelatin, books on, 409
General chemistry. See *Chemistry.*
Geology, abstracts on, 94.
books on, 374.
journals on, 58.
Gerhardt's Précis, 22.
German, chemical, books on, 365.
names of compounds, 186.
reading, 231
German Patent Office, publications of, 115.
Germany, chemical activity in, 6
journals published in, 48, 51, 56–62, 65, 67–9, 71–5.
Giornale di chimica industriale ed applicata, 66.
Glass, abstracts on, 98.
books on, 397.
journals on, 70.
Glass blowing, books on, 353.
Glass Industry, 71.
Glossaries, 23.
Glue, books on, 409.
journals on, 75.
Glycerin, books on, 408.
"Gmelin-Kraut," 16.
Gmelin's Handbuch, 16.
Government. See *British Government; Canadian Government; United States Government.*
Greek letters, meanings of, in chemical literature, 245.
Grinding, books on, 354.
Gums, books on, 409.

Handbooks ("Handbücher") (See also *Pocketbooks.*), 15.
in preliminary work of searches, 213
Handling of materials, books on, 354.
Hart, Edward, portrait of, facing page 37.
Headings. See *Index headings.*
Heating, books on, 353.
Helvetica chimica acta, 54.
Hill system, for formula indexing, 189.
Historic sense, literature as a means to, 3, 33, 34.
History, of abstract journals, 78.
of chemistry, books on, 363.
of journals, 36.
of one's subject, value of, 3, 34, 236.
Hoffmann's Lexikon, 21.
"Hofmannhaus," 210.
Holland. See *Netherlands*
Household chemistry, texts, 357.
"House organs," 143.

Ido, 231.
Illustrated Official Journal, 114, 125
Immunity, books on, 385.
Imperial Institute monographs, 27
Index-Catalogue of the Library of the Surgeon General's Office, 199.
"Index compounds," 178, 183.
Indexes, 366.
author, 154.
errors in, 161.
use in searches, 227.
as bibliographies, 138
of bibliographies of National Research Council, 145.
card, 193.
of foreign words, 232.
of Hill, 191
prepn of, 214
private, 222, 224, 226.
chapter on, 150.
formula, 188,
general characteristics of, 151.
independent, 198.
introductions to, 153.
kinds of, 150.
patent-number, 193.
of patents, 113, 114, 115, 120.
of ring systems, 192.
subject, 162.
of abstract journals as nomenclature guides, 177, 182

subject, accuracy in, 166.
choice of headings to consult, 172
classification in, 152.
compounds in, 176–88.
convenience in use, 170.
cross references in, 171.
in foreign languages, 186.
fullness of, 167, 168, 169.
of individual abstract journals, 194.
limitations of, 163.
nomenclature in relation to use of, 179.
qualifications needed for using, 163.
resourcefulness in using, 174, 176, 185, 222
scattering of entries in, 165.
of titles, 167.
use of words not in text, 165.
subjects (general *vs.* specific) in, 175, 184
use of, in searches, 152, 215.
of words, 164, 165.
Index headings, alphabeting, 170
Indexing, exhaustiveness of, 168.
inorganic compounds, 181.
nomenclature in relation to, 178
nomenclature principles, 183
requirements for satisfactory, 163
Index Medicus, 199.
Index modifications, 169
definition of, 164.
Index of Mining Engineering Literature, 200.
Index to the Literature of Explosives, 199.
Indian Chemical Society, *Journal,* 51.
India Rubber Journal, 75.
India Rubber World, 75, 100.
Indicators, books on, 373.
Industrial and Engineering Chemistry, 63
Industrial Arts Index, 200.
Industrial chemistry, books on general, 388.
encyclopedic works on, 13, 14, 15
indexes on, 196–202.
journals on, 39–43, 63–7.
literature of—see also *Patent literature; Patents.*
monographs on, 26.
reviews (annual) on, 135.
searching experiences in field of, 226
Industrie chimique, patent abstracts in, 118
Information service, 144.
requirements for satisfactory, 4
Inks, books on, 407.
Inorganic chemistry. (See also "general" under *Chemistry.*)
books on, 16–18, 370.
formula lexicon, 21.
journal on, 52, 57.
nomenclature in, 181.
Inorganic compounds. See *Compounds.*
Insecticides, abstracts on, 97.
books on, 393.
journals on, 67.
Institute of Metals, *Journal,* 59, 94.
Institute of Petroleum Technologists, *Journal,* 72, 99
Institut International de Bibliographie. See *International Institute of Bibliography.*
Institution of Mining and Metallurgy, *Bulletin,* 59.
Institution of Rubber Industry, *Transactions,* 75.
Intermediates for dyes, books on, 404.
International Catalogue of Scientific Literature, 200.
International Critical Tables, 23.
International Index to Periodicals, 201.
International Institute of Bibliography, 146.
classification, 205
International Review of the Science and Practice of Agriculture, 98.
International Society of Leather Trades' Chemists, *Journal,* 75, 100.
International Sugar Journal, 74, 100.
Interpretation, of published results, need for, 4
Iron, books on, 377.
Iron Age, 59.
Iron and Steel Institute, *Journal,* 59, 94.
Italy, chemical activity in, 6.
journals published in, 48, 53, 66, 70

Jahresberichte. See *Yearbooks.*
Japan, chemical activity in, 6.
journals published in, 49, 55, 62, 66, 70–1.
Japanese Journal of Botany, 96.
Japanese Journal of Chemistry, 55.
Japanese Journal of Geology and Geography, 94.
Japanese Journal of Medical Sciences, 96.
Japanese Journal of Physics, 93.
Japanese names, 155.
Journal de chimie physique, 54.
Journal de pharmacie de Belgique, 70.
Journal de pharmacie et de chimie, 69
Journal de physique, 53, 92, 93.
Journal für praktische Chemie, 60.
Journal of Agricultural Research, 67.
Journal of Agricultural Science, 68.
Journal of Biochemistry (Japan), 62.
Journal of Biological Chemistry, 61.
Journal of Chemical Education, 50.
Journal of Dairy Science, 62.
Journal of General Physiology, 61.

Journal of Industrial and Engineering Chemistry, 63.
Journal of Industrial Hygiene, 67, 97.
Journal of Physical Chemistry, 50.
Journal of Physiology, 61.
Journals. (See also *Libraries; Literature;* and such headings as *American Chemical Society; Franklin Institute;* etc.)
abstract—see *Abstract journals.*
book reviews in, 40.
bulletins as, 128.
chapter on, 32.
Chemical Abstracts list, 101.
classification of, 38–45.
classified and described, 46–76.
current, in libraries, 206.
with formula indexes, 191.
formula indexes of, 190.
history of, 36.
"house organs," 143.
independent indexes to, 198.
industrial, 39–43, 63–7.
list of, of chemical interest, 279–342.
list of organizations which publish, 273.
lists of, bibliography of, 267.
name abbreviations, 35.
nature and use of, 32.
obtaining, 100, 101, 208.
patent, 111.
patent abstracts in, 115.
on patent law and practice, 122.
patent, use of, 125.
philanthropic *vs.* for profit, 41.
reading, importance of, 33.
references to, 35.
reviews in, 137.
of societies, 38, 41, 43.
specialized, 39.
subject indexes of, 167.
technical, 42.
trade, 41.
union lists of, 101, 267.

Kekulé's Lehrbuch, 22.
Killeffer's Eminent American Chemists, 149.
Kingzett's Encyclopaedia, 15.
Kolloidchemische Beihefte, 52.
Kolloid-Zeitschrift, 52, 93.
Koninklijke Akademie van Wetenschappen te Amsterdam, *Verslag*, 49.
Kunstseide, 73.
Kunststoffe, 65.

Laboratories, books on, 353.
Laboratory manuals, on biochemistry, 382.
on general chemistry, 357.
on inorganic chemistry, 371.
on organic chemistry, 380.
on physical chemistry, 360.
Ladenburg's Handwörterbuch, 15.
Landolt and Börnstein's Tabellen, 23.
Lange's "Zwischenprodukte," 120.
Languages. (See also *Translation.*)
foreign, books on, 365.
indexes in, 186.
knowledge of, 231.
international, 231.
journal classification by, 44.
limitations of, as an obstacle in searches, 5, 6.
Laundering, books on, 406.
Lavoisier's Traité, 21.
Lead, books on, 378.
Leather, abstracts on, 100.
books on, 409.
journals on, 75.
Lecture experiments, books on, 364, 365.
Lectures, 138.
Legal chemistry, books on, 368.
patents in relation to, 103.
Letters, personal, and "to the editor," 8, 144.
Lexicons, formula, 20.
Libraries, catalogs of, 29, 194, 203.
chapter on, 203.
of Chemists' Club (illustration), frontispiece.
classification in, 203.
consulting service, 206.
European, 210.
government depository, 130.
journal files of, key to, 101.
lending service, 208.
list of American, 259.
patent literature in, 109, 111.
special, 210.
special services by, 145, 208.
thesis collections, 133.
trade literature in, 142.
of U. S. Patent Office, 122.
Library Association (London), Subject Index to Periodicals, 202.
Library of Congress, cards, 29.
classification system, 204.
Library searches. See *Literature searches.*
Liebig's Annalen, 60.
Liquors, alcoholic, books on, 393.
"List of Periodicals Abstracted," by *Chemical Abstracts*, 101.
Literature. (See also *Books; Bulletins; Journals; Patent literature; Reports; Reviews;* etc.)
bibliography of articles on, 239.
books on, of chemistry, 366.
from committees, 147.
dealers in, and publishers of chemical, 343.
distribution of, 7.
indexing faults as weakness of, 163.
interpretation needed, 4.

magnitude of, 7, 33.
miscellaneous, 128.
obtaining, 230.
old, 234.
old journal, 32, 34, 36–9.
original, importance of consulting, 216.
popular scientific, 145, 364.
production, distribution and use of, 10.
productivity of the various countries, 6.
reasons for knowing, 2.
sources, kinds of printed, 8.
state of, 4.
symbols and abbreviations used in chemical, 245.
trade, 140.
unpublished, 146.
Literature searches, conversational method, 9.
delegation to others, 153.
experiences of others, 221.
final touches, 217.
how far to go, 32, 217, 229.
importance of, 1.
indexes in, 152.
kinds of, 9.
obstacles to, 4.
patent, 122.
preliminary work, 213.
procedure in, 212.
purpose of, 2.
requirements for satisfactory, 163.
starting points in, books as, 13.
systematic, 214.
Literatur-Register, Stelzner's, 20, 182.
Loans. See *Borrowing*.
Loeb Collection of Chemical Types, 147.
Lubricants, abstracts on, 99.
books on, 402.
journals on, 72.

McClelland, E. H., trade literature discussion by, 140.
Manufacturers, directories of, 390.
Materials, industrial, books on, 389.
Mathematics, chemical, books on, 362.
Mechanical Engineering (the journal), 64.
Medicine, indexes on, 199, 201.
Meetings, scientific, value of attending, 9, 148.
Melliand's Textilberichte, 73.
Mellor's Treatise, 17.
Memorial lectures, 138.
portraits in, 149.
Memory, proper use of, 235.
Metabolism, books on, 384.
Metallography, abstracts on, 94.
books on, 378.
journals on, 59.
Metallurgical & Chemical Engineering, 63.
Metallurgy, abstracts on, 94.
books on, 374.
journals on, 59.
Metals, abstracts on, 94.
books on, 375–8.
journals on, 59.
Metal working, books on, 375.
Meyer's "Moderne Theorien," 22.
Microscope, books on, 353.
Microscopy, books on, 353, 373.
Mikrochemie (the journal), 54.
Milk, books on, 387, 388.
Mineral industry, books on, 374.
"Mineral Industry" (the annual), 135, 136.
Mineralogical Abstracts, 94.
Mineralogical Magazine, 58.
Mineralogy, abstracts on, 94.
books on, 373.
journals on, 58.
Mining, books on, 374.
Mining and Metallurgy, 59.
Mining engineering, index to literature of, 200.
Mining Index, 201.
Mining World Index, 201.
Modifications. See *Index modifications*.
Moissan's Traité, 18.
Monatshefte für Chemie, 54.
Moniteur scientifique, patent abstracts in, 118.
Monographs, 22.
series of, 25.
Municipal chemistry, books on, 391.
Municipal publications, 131.
Museum collections, 147.
Muspratt, 14.

Names. See *Author names; Nomenclature*.
National Academy of Sciences, *Proceedings*, 46.
National Research Council, committee work of, 148.
information service of, 144.
and its publications, 131.
Nations. See *Countries*.
Natural gas, books on, 401.
Nature (the journal), 47.
Naturwissenschaften, Die, 48.
Netherlands, chemical activity in, 6.
journals published in, 49, 55, 66, 68, 70, 75–6.
Neues Jahrbuch für Mineralogie, etc., 58, 94.
News Service, for science, 145, 146.
"New Technical Books," 28.
Nitrogen fixation, books on, 396.
Nobelinstitut, *Meddelanden*, 56.
Nomenclature, biological, etc., in relation to indexes, 186.
in foreign languages, 186.

guides on, 176, 182.
importance of learning, 179.
indexing principles, 183.
in index use, 176.
inorganic, 181.
organic, 182.
rules, 180, 182.
Norway, chemical activity in, 6.
Note taking, 214.
Noyes, W. A., portrait of, facing page 37.
Numerical data. See *Constants.*
Nutrition, books on, 384.

Obituaries, bibliographies n, 139.
memorial lectures, etc , 138.
portraits in, 149.
Official Gazette of the U. S. Patent Office, 113, 125.
Offprints, 143.
Oil and Colour Chemists' Association, *Journal,* 74, 99.
Oil and Fat Industries, 74, 99
Oil, Paint and Drug Reporter, 74.
Oils, drying, abstracts on, 99.
drying, books on, 407.
drying, journals on, 74.
essential, books on, 395.
fatty, abstracts on, 99.
fatty, books on, 408.
fatty, journals on, 74.
mineral, books on, 401, 402,
mineral, journals on, 72.
Oppenheimer's Handbuch, 20.
Optical apparatus, books on, 353
Ordering, books, 30.
journals, 101.
patents, 126.
Ore dressing, books on, 375.
Organic chemistry, books on, 18, 22, 378.
formula lexicons, 20.
journals on, 60.
nomenclature in, 182.
searching experience in field of, 223.
Organic compounds. See *Compounds.*
Organization, industrial, books on, 390.
Organizations. (See also *Societies.*)
list of scientific and technical, 273.
publishing bulletins, 131, 132.

Paints, abstracts on, 99.
books on, 407
journals on, 74.
Pamphlets, filing, 230.
Paper and pulp, abstracts on, 99.
books on, 403.
journals on, 72.
Papers. (See also *Bibliographies; Bulletins; Journals; References.*)
abstracts published with, 36.
books as guides to original, 12.
independent indexes to, 198.
indexes based on titles of, 167.
obtaining, 100.
published in different places, 34.
reprints and preprints of 143.
titles of, 168, 219.
Paper Trade Journal, 72, 99.
Papier-Fabrikant, 99.
Parent compounds, indexing, 178, 183.
Paris, libraries in, 211.
Patent and Trade-Mark Review, 122.
Patent applications, availability of, 108.
lists of, 116.
Patentblatt, 115.
Patent literature, author indexes to, 160.
forms of, 107.
magnitude of, 105.
nature and scope of, 103.
searches, procedure in, 122.
Patent Office. See *British Patent Office; German Patent Office; United States Patent Office.*
Patent Office Society, *Journal,* 122.
Patentregister der Jahresberichte, 120.
Patents, abridgments of British, 114.
abstracts, 115.
abstracts, use of, 123.
books on, 121, 389.
chapter on, 103.
classification systems, 109.
countries issuing, 106.
digests and lists, 119.
disclosures, 104.
files of specifications in libraries, 109
indexes (numerical) of, 193.
indexes of, 113, 114, 115, 120.
information sources for, 107.
interference proceedings, court records, etc., 108.
internationalization of, 107.
journals on patent law and practice, 122.
journals, use of, 125.
obtaining copies of, 126.
official publications, 111.
specifications, 107.
titles, 108.
United States system, 104.
Pathology, books on, 385.
Paving materials, books on, 399.
Perfumery, books on, 395.
Periodicals. See *Journals; Literature.*
Personal contact, 8, 144, 148.
Petroleum, abstracts on, 99.
books on, 401, 402.
journals on, 72.
Petrology, books on, 374.
Pharmaceutical chemistry, abstracts on, 98.
books on, 394.
journals on, 69.

Pharmaceutical Journal, 69.
Pharmaceutical Society of Japan, *Journal*, 70.
Pharmaceutisches Centralblatt, 81.
Pharmaceutisch Weekblad, 70.
Pharmacognosy, books on, 395.
Pharmacology, books on, 385
Pharmacopeias, 394.
Pharmacy, abstracts on, 98.
books on, 394.
journals on, 69.
Philippine Journal of Science, 49.
Philosophical Magazine, 47.
Photochemistry, books on, 358.
Photographic Abstracts, 93.
Photographic Journal, 57
Photographische Industrie, 57.
Photographische Korrespondenz, 57.
Photography, abstracts on, 93
books on, 370.
journals on, 57.
monographs on, 27.
Photoprints, 100, 208.
U. S. Patent Office facilities for, 126, 127.
Physica, 55.
Physical chemistry, abstracts on, 92
books on, 17, 22, 357.
journals on, 49.
monographs on, 26, 27
tables of constants, 23, 24
Physical Review, 50.
Physical Society of London, *Proceedings*, 51.
Physics, journals, chemical interest of, 44.
Physikalisch-chemisches Centralblatt, 93.
Physikalische Berichte, 93.
Physikalische Zeitschrift, 52.
Physiological Abstracts, 95.
Physiological chemistry. See *Biochemistry*.
Physiology, books on, 384.
Pigments, abstracts on, 99.
books on, 407.
journals on, 74.
Plant chemistry, books on, 383.
Plant equipment, books on, 353.
journal on, 56.
Plant processes, books on, 353, 389.
Pocketbooks, 24, 363.
Poisons, agricultural, abstracts on, 97.
agricultural, books on, 393.
agricultural, journals on, 67.
books on, 386.
Poland, chemical activity in, 6.
journals published in, 55.
Polariscope, book on, 353.
Polymers, formula indexing of, 190.
Polytechnische Bibliothek, 28.
Poole's Index, 201.
Popular chemical books, 364.
Popularizing science, information services for, 145, 146.
Portland cement. See *Cement*.
Portraits, 149.
Potentiometry, books on, 373.
Preparations, inorganic, books on, 371.
organic, books on, 380.
Preprints, 143.
Preserved foods, books on, 387.
Pressure, producing, books on, 354.
Procedure. See *Literature searches*.
Proceedings. See *National Academy of Sciences; Royal Society (London)*; etc.
Profession of chemistry, books on, 368.
Protoplasma, 62
Publication, by scientists as a duty, 2, 10, 147.
use of good nomenclature in, 179.
Public Health Engineering Abstracts, 97.
Publishers, of chemical books, etc., list of, 344
Publishers' series, 25.
Pulp and Paper Magazine of Canada, 99
Pyrometers, books on, 353.

Qualitative analysis. See *Analysis*
Quantitative analysis. See *Analysis*.
Quantum theory, books on, 368.
Quarterly Cumulative Index to Current Medical Literature, 201.

Radicals, order of, in organic names, 178, 183.
Radiochemistry, abstracts on, 92.
books on, 368.
journals on, 49.
Radium, Le, 93.
Ramsay series, of monographs, 27.
Rare elements, books on, 371.
Rayon, books on, 406.
Readers' Guide, 201.
Reading, in foreign languages, 232.
general, value of, 218, 222.
of journals, importance of, 33.
Reagents, books on, 373.
Receipt books, 396.
Records, written, of searches, 218, 223, 224, 225, 227.
Recueil des travaux chimiques des Pays-Bas, 55.
References. (See also *Bibliographies*.)
citing, 219.
cross—see *Cross references*.
errors in index, 151.
form of, 34–5, 220.
importance of, in books, etc., 12, 138.
index, 166.
to reprints, 143.
Refractometer, book on, 353

Refractories, books on, 398.
journals on, 70.
Reichspatentamt, publications of, 115.
Remsen, Ira, portrait of, facing page 37.
Repertorium der technischen Journal-literatur, 120, 201.
Reports, annual—see *Yearbooks*.
committee, 147.
published, 128.
written, of searches, 218.
Reports on the Progress of Applied Chemistry, 134.
Reprints, 143.
citing from, 219.
of classics, 364.
filing, 230.
Research. (See also *Literature searches*.)
laboratory *vs*. literature, 2.
unpublished results of, 146.
Research Information Service, of National Research Council, 144.
Resins, abstracts on, 99.
books on, 407.
journals on, 74.
"Resources of the Empire," 25.
Review of American Chemical Research, 86.
Review of Applied Entomology, 98.
Reviews. (See also *Book reviews*.) 134
in periodicals, 137.
in preliminary work of searches, 213.
Revue de géologie et des sciences connexes, 94.
Revue de métallurgie, 60, 94.
Revue des produits chimiques, patent abstracts in, 118.
Revue générale des colloïdes, 53.
Richter's Lexikon, 20, 182.
Richter system, for formula indexing, 189.
Ring indexes, 192.
Röntgen rays, books on, 358, 368.
Rothamsted monographs, 27.
Royal Society (London), catalogs of literature, 198, 200.
publications of, 48.
Royal Society of Edinburgh, publications of, 48.
Rubber, abstracts on, 100.
books on, 410.
journals on, 75.
Rumania, chemical activity in, 6.
journals published in, 55.
Russia, chemical activity in, 6
journals published in, 49, 56, 67
Russian alphabet, 156.
Russian names, in indexes, 154
Russian Physical-Chemical Society, *Journal*, 56.

Safety devices, book on, 353.
Salts, manufacture of, books on, 396.
Sammlung chemisch-technischer Vorträge, 138.
"Sammlungen," 25.
Sanitation, abstracts on, 97.
books on, 391.
journals on, 67.
Scandinavian names, 158.
Science, advancement of, as purpose in literature searching, 3.
indexes on general, 198, 200, 201
journals on general, 46.
popularizing, information services for, 145, 146.
"Science" (the journal), 47.
Science Abstracts, 92
Science Service, 146, 149
Science, technique & industries photographiques, 93.
Scientific attitude, in relation to literature searching, 1, 3
Searches. See *Literature searches*.
Separates, 143.
filing, 231.
Serials. See *Journals*
Series, publishers', 25.
Sewage, abstracts on, 97.
books on, 392
journals on, 67.
Shale oil, books on, 401.
Silk, books on, 406.
Smithsonian Institution, publications of, 131.
Smoke abatement, books on, 399.
Soap, abstracts on, 99
books on, 408
journals on, 74
Sociedad española de física y química, *Anales*, 56
Société chimique de Belgique, *Bulletin*, 54.
Société chimique de France, *Bulletin*, 89.
Bulletin, subject indexes of, 197.
Société de biologie, *Comptes rendus*, 62.
Société de chimie biologique, *Bulletin*, 62.
Société française de photographie, *Bulletin*, 57, 93.
Societies. (See also *Organizations*.)
committee work, 147.
journals published by chemical, 38.
list of scientific and technical, 273
meetings of, value of attending, 9, 148.
scientific, 148
Society of Chemical Industry, annual reports, 135.
Journal, 84.
patent application lists and patent abstracts in, 116.
subject indexes of, 196.

Society of Chemical Industry (Japan), *Journal*, 66
Society of Dyers and Colourists, *Journal*, 73, 99.
Society of Glass Technology, *Journal*, 71.
Soil Science, 68.
Soils, abstracts on, 97.
books on, 393.
journals on, 67.
Solids, conveying, books on, 354
Solubilities, dictionaries of, 24, 362, 363
Solutions, books on, 359.
South African Chemical Institute, publications of, 51.
Spain, chemical activity in, 6
journal published in, 56.
Special Libraries (the journal), 210.
Specifications, for apparatus, 353.
for materials, books on, 389.
patent, 107.
Spectra, books on, 359, 368.
Spectroscope, book on, 353.
Spectroscopy, books on, 359, 368.
Spelling, of author names, 154–62.
Stahl und Eisen, 60.
Starch, book on, 409.
State publications, 131.
Steel, abstracts on, 94.
books on, 377.
journals on, 59.
Stelzner's Literatur-Register, 20, 182
Storage batteries, books on, 370.
Style manuals, 366.
Subatomic phenomena, abstracts on, 92.
books on, 368.
journals on, 49.
Subject indexes. See *Indexes.*
Subject Index to Periodicals, 202.
Subscriptions, to journals, 101.
Sugar, abstracts on, 100.
books on, 409.
journals on, 74.
Sundries, manufacture of, books on, 396.
Superintendent of Documents, 128.
Surgeon General's Office, Index-Catalogue of, 199.
Survey of American Chemistry, 135.
Swanson's Guide, 131.
Sweden, chemical activity in, 6.
journals published in, 56, 70.
Switzerland, chemical activity in, 6.
journals published in, 48, 54, 57, 63, 66, 70.
Symbols, list of, used in chemical literature, 245.
Synonyms, in indexes, 173.

Tables, of constants, 23, 362.
of dyes, 405.
Tables annuelles, 24.
Tanning, abstracts on, 100.
books on, 409.
journals on, 75.
Tar, abstracts on, 98
books on, 400.
journals on, 71.
Teaching of chemistry, books on, 364.
journal on, 50.
Technical Association of the Pulp and Paper Industry, abstracts and bibliographies issued by, 99.
Technical Book Review Index, 28.
Technical journals. See *Journals*
Technique, laboratory, learning of, 234.
Technische Zeitschriftenschau, 202.
Temperature apparatus, books on, 353
Testing materials, books on, 389.
Textbooks, 21, 353–411.
Textile Colorist, 99.
Textile Institute, *Journal*, 73, 99
Textiles, abstracts on, 99.
books on, 405.
journals on, 73.
Theoretical chemistry. See *Physical chemistry.*
Thermochemistry, books on, 359
Thermodynamics, books on, 359.
Theses, 133.
Thorpe's Dictionary, 13
Tiles, books on, 397.
Titles, indexes of, 167.
of papers, 168, 219.
patent, 108.
Toxicology, books on, 386.
Trade journals. See *Journals.*
Trade literature, 140.
advertisements, 40.
catalogs of apparatus, etc., 145
Trade names, in indexes, 184.
Transactions. See *American Electrochemical Society;* etc.
Translation (see also *Languages.*), 233
by libraries, 209.
of names of compounds, 186.
Transliteration, from Japanese, 155.
from Russian, 154.

Ullmann's Enzyklopädie, 14.
Umlaut, in author names, 157.
Union lists, 101, 267.
United States, chemical activity in, 6.
journals published in, 46, 49, 56–9, 61–3, 67, 69–75.
libraries in, 260.
patent system, 104.
United States Government, publications of, 128.
United States Naval Institute, *Proceedings*, 99.

United States Patent Office, classification system of, 109.
examiners' lists, 120.
Hill card index, 191.
library of, 122.
Official Gazette, 113, 125.
ordering from, 126.
photoprint service, 209.
proceedings, 108.
searching facilities of, 109, 111, 123.
Universities, theses, 133.
Unpublished material, 146.
Ure's Dictionary, 15.

Vacuum, books on, 353, 354.
Van Nostrand's Annual, 25.
Varnishes, abstracts on, 99.
books on, 407.
journals on, 74
Verein deutscher Ingenieure, *Zeitschrift*, 65
Verzeichnis erteilten Patente, 115.
Vitamins, books on, 384.
Volumetric analysis. See *Analysis*.

Wagner's Jahresbericht, patent abstracts in, 118.
Warfare, chemical, books on, 391.
Washington Academy of Sciences, publications of, 46.
Wasser und Abwasser, 97.
Wastes. (See also *Sewage.*)
books on, 389.
Water, abstracts on, 97.
books on, 391, 392.
journals on, 67.
Water of hydration, in formula indexing, 190
Watts' Dictionary, 13.
Waxes, abstracts on, 99.
books on, 408.
journals on, 74.
Welding, books on, 375.
Wilson Topical Index, 231.
Winther's "Patente," 119.
Witzemann, E. J., notes by, 234.
Wood, chemistry of, books on, 402.
Wood products, books on, 402
Word indexing, 164.
Writing, of reports, 218.
technical, 219.
technical, books on, 366.
Wurtz's Dictionnaire, 14.

X-rays, books on, 358, 368.

Yearbooks, 134.
list of, 135.
pocketbooks, 24, 25.
use in searches, 227.

Zeitschrift. See *Verein deutscher Ingenieure;* etc.
Zeitschrift für analytische Chemie, 58, 94.
Zeitschrift für angewandte Chemie, 65.
patent abstracts in, 117.
Zeitschrift für anorganische und allgemeine Chemie, 52.
Zeitschrift für das gesamte Schiess- und Sprengstoffwesen, 73.
Zeitschrift für Elektrochemie, 56.
Zeitschrift für Krystallographie, 52.
Zeitschrift für Metallkunde, 60, 95.
Zeitschrift für Physik, 53.
Zeitschrift für physikalische Chemie, 53.
Zeitschrift für physiologische Chemie, 62.
Zeitschrift für Untersuchung der Lebensmittel, 62.
Zentralblatt für Agrikulturchemie, 97.
Zentralblatt für Biochemie und Biophysik, 95.