

- 698 Painting
- 770 Photography
- 920 Biography (B for lives of individuals)
- 925.4 Biographies of chemists (several together)

Any of the above may have the form divisions, or designations, thus: 03, dictionaries; 05, serials; 06, society publications; 09, history.

Call number consists of class number, as 546
 author mark, as M72 t3Ef; *M72, Molinari*
 t, indicates first word of title, 3 the third edition, E a translation into English, f the initial of translator's name.

LECTURE VII.

ORGANIC CHEMISTRY: BOOKS AND SERIALS

I. Books

- A. General; 1. Comprehensive. 2. Briefer. 3. Laboratory texts
- B. Special, 1. Methods. 2. Preparations. 3. Analysis
- C. Reference, 1. Cyclopedias. 2. Dictionary. 3. Tables of data
- II. A. Serials containing original papers chiefly.
- B. Serials containing abstracts principally.

I, A, 1. The texts in English, now (1919) do not cover the ground very well. The best is Cohen's Organic chemistry, Ed. 2, in three volumes; this is rather a discussion of selected topics than a comprehensive treatise. The organic part of Roscoe and Schorlemmer, has not been revised for thirty years. The English version of the eleventh edition of Richter's *Chemie der kohlenstoffverbindungen* is the best of the kind.

In German, the best is Meyer and Jacobson, Ed. 2 in course of publication; Kekulé and Kolbe are similar works of nearly or quite fifty years ago. The Richter, Ed. 11, 1909-1913, 2 volumes, can be had in English too; it is less elaborate than Meyer and Jacobson.

A,2. Here in English, there are a number of books about equal in size, and of about the same time; Cohen, Theoretical, has very small type, resembling in this Perkin and Kipping, which has more laboratory material. Clarke, Introduction, ~~has been out of print for a year; it~~ is less than Cohen, larger than Noyes', and easy to read. Hilditch, Third year course, takes up certain classes of compounds. Norris is about the size of Holleman, Ed. 4, but the latter gives laboratory directions. Price and Twiss, resembles Holleman, Moore is frankly elementary, and Haskins, Ed. 2, is for medical students who want a minimum; Chamberlain's Organic agricultural chemistry is for students of a special phase.

A,3. Some of the newer ones are the latest revision of Gattermann, Cohen's Laboratory manual, Jones, Sudborough and James with photographs of apparatus used, the revised Bernthsen.

B.1. Methods

There is no general work in English here comparable to Weyl, in 3 volumes (this can be had in French too); Lassar-Cohen in 2 (general and special, but only the special one here, in a recent edition) while Hans Meyer, *Analyse*, gives many general methods.

B.2. Preparations

Newest and largest is Vanino, 1914, taking the place held by Bender and Erdmann, 1893; Posner on synthesis, is next in size; smaller German books are Henle, Ullmann, Levy, Fischer; the last can be had in English, too. Barnett has been the only work in English; the *Bulletin of the University of Illinois*, 1919, in press, to be in four parts, gives a number of special preparations tested in actual practice.

B.3. Analysis : (a) general comprehensive, (b) brief; (c) industrial

(a) Most elaborate is Mulliken, now in three volumes, and a fourth in preparation. Sherman, *Organic analysis*, Ed. 2, is enough for most purposes, with Clarke's *Handbook*; Kingscott and Knight, for quantitative. Smaller works are those by Neave, Weston, Rakshit, Noyes and Mulliken.

In German, Rosenthaler, published as vol. 21 of Margosches, *Die chemische analyse*, is the largest here; H. Meyer, *Die Analyse*, is a trifle less, and can be had in English too. G. Cohn has two huge volumes, in which organic compounds are grouped by odor and taste.

(c) Allen's *Commercial organic analysis*, Ed. 4, in 9 volumes, is the most useful in English; Lunge, *Technical analysis*, makes six large volumes in the English version. Leach, Ed. 4, is invaluable for food chemists. The industrial organic chemistries of Martin, 1914, Molinari, 1908, Sadtler, Ed. 4, and Herzog (in German) 1908, all include analysis as well as methods of manufacture. The ninth volume of Allen is notable because it has a collective index to the whole set.

C. Reference works

1. Cyclopedias; here at present the only one is Beilstein, and of this Ed. 4 has one volume ready. A substitute in English is being planned. Friedrich Konrad Beilstein, 1839-1906, Russian by birth, began while a student under Wöhler at Göttingen, to keep a systematic record of all literature upon organic substances. The first edition from these notes appeared in 1881; the third edition with 4 volumes, 4 supplementary volumes, and a collective index, makes available in one place all organic literature through July, 1903.

For each substance there is given, name, formula, brief history, occurrence, preparation, characteristics, compounds and derivatives, with references to the original papers. Reference is made in the collective index thus: II, 1457 (743), that is, original vol. II, p. 1457 is supplemented by later material in supp. vol. II, p. 743.

2. Dictionary

Here again we have one book, and that in German, for which an English substitute has been suggested. Max Moritz Richter (*not* Victor of the organic textbook) published in 1884, a small volume to serve as a formula index for Beilstein's *Handbuch*; the 16,000 compounds of this edition seem few compared

to 250,000 in the third edition, which includes literature through November, 1909. The supplement, planned to appear at two-year intervals, has been published for Dec., 1909-Dec., 1911, inclusive, one volume.

The preface to Richter, in English, French, German, Italian explains the method of arrangement clearly; substances are entered under formula, arranged first by number of carbon atoms, then by number of other elements after C, using here H, O, N, Cl, Br, J, (I), F, S, P, (sometimes called the "chemical alphabet), then the other elements alphabetically.

Note that at the top of each page the number of carbon atoms, and the number of *other* elements is given, 5 IV, 7, III, the figure is the number of carbon atoms, the Roman numeral the number of other elements besides carbon in compounds on that page. Data are brief, boiling or melting point, one or two references, and—if the substance is in Beilstein, the reference to that. The Beilstein reference is a heavy dash, followed by volume and page, and a starred volume and page for the supplement to Ed. 3 of Beilstein:)—II, 429; * II, 157. A. is Annalen, B. is Berichte, C. is Chem. Zentr. Knowing the name, use Beilstein first; having only the formula, consult Richter, there finding the reference to Beilstein.

C, 3. Tables of data, constants, etc.

For information not found in Beilstein or Richter Landolt-Börnstein, Ed. 4 of 1913, or the more recent tables from the French Société de physique; work done in 1910, 1911, 1912, is in the Tables annuelles for those years, an international publication, which has not appeared for later years. Castell-Evans has briefer tables in English, and Seidell is useful for solubilities, and Scudder for ionization constants. Van Nostrand's Annual, 1918, Chemists' Yearbook (English), Chemical handbook (less than Van Nostrand), and Chemiker Kalender, give the ordinary compounds with constants.

II. Serials

A. Containing chiefly original papers; this includes practically all serials on general chemistry or special phases, except metallurgy. The principal ones are the Journals of the American and English chemical societies; Annalen, Berichte, Monatshefte, Journal für praktische, chemie, in German; Annales, Bulletin de la société chimique de France, that of the Belgian society, Recueil (from Leyden), in French; the Gazzetta chimica italiana, Helvetica chimica acta (new, partly in French, partly in German), and the two Swedish Journals, Arkiv, and Svensk Kemisk Tidskrift. Of these, only the English society's Journal and the French society's Bulletin have any abstracts now. The American chemical journal was largely organic, but was merged in the Journal of the American chemical society in January, 1914. Practically all of these review new books.

B. Abstract and review serials.

Here, use all those listed for general chemistry, with those for special phases, for example, if the topic is nearly biochemical, use the biochemical ones. Through December, 1911, Richter and Beilstein cover the field fairly.

Note that, for original papers in those serials only, each of the following has an annual formula index to be used for years after Richter: Annalen, Berichte,

Journal of the Chemical society, Monatshefte and Recueil. Jahresbericht (Liebig and Kopp) has formula indexes, but the volumes here are no more recent than the Richter supplement.

Patents, 1877-1914, of organic substances connected with the dye industry are best given in Friedländer, Fortschritte der teerfarbenfabrikation.

LECTURE VIII.

APPLIED (INDUSTRIAL) CHEMISTRY: SERIALS

A. General: 1. Original material. 2. Index, abstract, and review.

B. Special: These for special fields or industries usually have both original papers and some abstracts.

A, 1. Before 1877, this literature was in the general serials; in that year the *Chemiker-zeitung* was started, to pay particular attention to industrial chemistry. It has always had abstracts, and these have formed so large a volume, annually the *Repertorium*, that it has been bound separately. Published three times a week, the *Chemiker-zeitung* has been the nearest approach to a chemical daily paper. It has no collective index, but annual ones.

Die chemische industrie, founded 1878, "to further the interests of the German chemical industries", has paid more attention to manufacturing processes and patents, the few abstracts have been chiefly on these. Beginning with January, 1919, there has accompanied the numbers, a set of patent reports, printed only on one side, apparently to be cut up and filed. Annual indexes are presented but no collective one.

The serial now called *Zeitschrift für angewandte chemie*, began in 1878, as the *Correspondenzblatt des Vereins analytischer chemiker*, being half abstracts and half original papers. In 1882 the name was changed to *Repertorium der analytischen chemie* and in 1887 to the present one. Most of the time it has appeared twice a month, but in 1914, it began to appear several times a week; the originally planned "three times", was changed by the war.

There is a collective index for 1887-1907 inclusive, as well as annual ones. The abstracts have been very complete, but, beginning January, 1919, they form now the technological section of the *Chemisches Zentralblatt*.

The oldest serial on chemical industries in English is the *Journal of the Society of chemical industry*, 1882-, with excellent abstracts, and original papers, annual indexes, and two collective ones covering the period through 1905. It is published twice a month, and the abstracts are grouped in 25 classes, approximately the same as in the *Zeitschrift für angewandte chemie*.

Five much younger serials are these: *Revue générale de chimie pure et appliquée*, began in 1899; it appears twice a month, has good original papers, annual indexes, and a small number of very brief abstracts, bound since 1901 as a separate serial, *Repertoire*, and shelved with the abstract serials.

Journal of industrial and engineering chemistry, started in 1909, by the American chemical society, monthly, with annual index. This had no abstracts till

1914, when a section was put in, giving abstracts of U. S. and State publications primarily. It has a section listing new publications, books and articles in serials, that seem of value for industrial chemists.

The Journal of chemical technology, begun in 1912, died or is in a state of suspended animation at present; it was to further chemical interests in Great Britain and her dependencies; it had a few selected abstracts.

There are two French journals, rather new; *L'industrie chimique*, revue universelle . . . begun in 1914 before the war, has original papers, trade news, and lists of patents, book reviews, and annual indexes. *Chimie et industrie*, founded in June, 1918, as a monthly organ of the Société de chimie industrielle, promises to be very important; each number so far has had a number of excellent original papers, and at times as many as fifty pages of good signed abstracts (with the Decimal classification number added); it is on good paper, well illustrated. The cover bears the note "Recognized as of public benefit by decree of 23 June, 1918". (*Reconnue d'utilité publique par decret du 23 Juin 1918*).

Two that have yet to prove their value are the English and American Chemical Age (entirely separate serials). Both started in July, 1919, the English "devoted to industrial and engineering chemistry", the American "for the business man in the chemical industry".

Trade papers, are the Chemical trade journal and chemical engineer, English, now in its 65th volume, and its nearest American relatives, Oil, paint and drug reporter, and Drug and chemical markets. All three appear weekly. Chemical engineering particularly has *The chemical engineer*, American, 1904 to date, but majoring on dye stuffs now; it gives some abstracts, and even reprints whole articles that appear in publications not usually read by chemists, when the papers seem of value. A similar English serial is the *Chemical engineer and works chemist*, now in its ninth volume. *The Chemical World* (English) 1912-14, seem to have died after vol. 3. The Canadian chemical journal, v. 2 now, closely resembles the Journal of industrial and engineering chemistry.

The annual volumes of the Transactions of the American Institute of chemical engineers, consist of papers by men who are recognized authorities in their field.

A, 2. Abstract, index, and review serials.

For this, the complete literature must be searched for in the general serials as well as the special ones. Before 1855, use the general serials; in that year, Wagner's *Jahresbericht über die leistungen der chemischen technologie* was commenced; it has had one and later two volumes a year, with several collective indexes; the most recent one only extends through 1894.

Biedermann edited, 1880-1905, the *Technisch-chemisches Jahrbuch*, abstracts really, with annual indexes, including however only what he considered the most valuable articles. It then ceased publication.

The best supplements for Wagner are the abstract sections of *Zeitschrift für angewandte chemie*, and *Journal of the Society of Chemical industry*, using collective and annual indexes.

The Society of chemical industry began in 1916 to publish an annual review volume, *Report of progress in applied chemistry*; this is small, semi-critical, and

not inclusive apparently of all articles; in the first volume Explosives are omitted on purpose, while it is stated that the subjects of Food, Agricultural chemistry, and Analysis, are satisfactorily dealt with in the Chemical society's similar Annual report.

For very recent work, any and all of the other industrial serials having abstracts should be consulted, to make sure that nothing is omitted; it will generally result in being a mere check on the two principal serials noted; since January, 1919, the *Chemisches Zentralblatt* publishes the abstract section of the *Zeitschrift für angewandte chemie*.

B. Special serials

These are very numerous, and only a few of the more pretentious, typical ones can be mentioned. The chemist working in any industry has to learn the serials of most value for his own field.

Agricultural chemistry

The Experiment station record, 1889 to date from the office of experiment stations of U. S. Department of agriculture, has annual and two collective indexes.

In 1916, the Agricultural index was begun, giving reference only, not abstracts.

In German there are two old and important ones, Hoffman's *Jahresbericht*, 1858-, and Biedermann's *Centralblatt für agrikulturchemie*, 1872-date. Both have some collective indexes. They are in the Agricultural library.

Dyestuffs, etc.

Newest in English is the American color trade journal, now in its fifth volume, with original papers and some abstracts. There are a number of English serials, as the *Journal of the Society of dyers and colourists*, of which v. 25 is 1909, but these are not here.

The French, *Revue générale des matières colorantes*, with its three supplementary serials on manufacturing processes is good, chiefly original papers, and it formerly had many samples inserted, showing dyes on actual fabrics.

For abstracts here, the best at present is the *Fortschritte der teerfarbenfabrikation*, Friedländer, 1877 to 1914, giving German and other patents in considerable detail, with some references to other papers. There are subject indexes in each volume, and several collective indexes by patent number. Patents are indexed by number also in the *Journal of the Society of chemical industry* and the *Zeitschrift für angewandte chemie*.

Electrochemistry

The Faraday Society (English) publishes *Transactions* (formerly *Proceedings*); similar material is in the *Proceedings of the American electrochemical society*, and shorter papers in the *Chemical and metallurgical engineer*. In German, the *Elektrochemische Zeitschrift* is less elaborate in scope than the *Zeitschrift*; the latter has a collective index for vol. 1-10. The *Jahrbuch der elektrochemie* has not been kept up to date.

Food

The leading serial has been the *Zeitschrift untersuchung der für nahrung³³ und für electrochemie*.

genussmittel, original papers and abstracts; Zeitschrift für fleisch und milchhygiene specializes more closely. The Analyst deals chiefly with problems of adulteration for food, Pure Food has been the brewers' journal largely, while both the American and English food journals are popular rather than scientific, with great emphasis in the English one on prosecution for adulteration. The French Annales des falsifications et des fraudes has some abstracts.

Gas

The (English) Gas World is paralleled by American gas engineering. In English, water supply problems are included by Gas Journal (formerly Journal of gas lighting and water supply) while the Journal für gasbeleuchtung und wasser-versorgung has similar material; this last has occasional abstracts. The Gas world has a special section once a month on coking problems.

The Proceedings of the American gas institute furnish papers by authorities, while the Gas chemist's summary (English), is an annual report of progress.

Hygiene

American journal of public health has no abstracts, nor does the English, Journal of hygiene, which is more truly medical with special supplements on the plague in India. Journal of infectious diseases specializes on water-borne forms. Hygienische rundschau has both original papers and many abstracts.

Leather

The German Collegium has been the most important; an English serial of the same name and field was begun in 1915. Neither is here; we have Journal of the American leather chemists association, with original papers and a few abstracts.

Pharmacology & Pharmacy.

Here there are two distinct types, the serial published as a trade paper for the dealers in drugs at wholesale or retail, and the scientific serials.

For the first, good samples are the Pacific pharmacist, Bulletin of pharmacy, and Drug and chemical markets.

The oldest American one of the second class is the American journal of pharmacy, 1830 to date with annual and several collective indexes. The Proceedings (now Yearbook) of the American pharmaceutical association, for 1851 to date, with a collective index for vol. 1-50, is fair as a collective set of abstracts. The Journal (first called Bulletin) of the Association, has only original papers. The Journal of experimental pharmacology does too, but covers a slightly wider range of topics.

The English Pharmaceutical journal (and transactions) 1841 to date, was formerly in the scientific class, and had many abstracts; in the past decade it has become nearly a trade paper.

The Archiv der pharmacie, and Berichte der deutschen pharmaceutischen gesellschaft, are the leading German ones, with the Archiv für experimentalle pathologie und pharmakologie; this last is at the Agriculture library.

The Journal de pharmacie et de chimie, original papers and abstracts, is here in part.

The general abstract and review serials must be used too. There are ref-

erences also given in the U. S. ~~Pharmacopoeia and the~~ Dispensatory, while the Index Medicus, 1879, gives help on specific substances.

Photochemistry and photography

For the first, the Zeitschrift für wissenschaftliche photochemie und photographie, and for the latter Photominiature for scientific, and Photo-era for popular, are here.

Water supply and sewage treatment

For these we do not have Wasser und abwässer, said to be the best in German. The Journal of infectious diseases, Journal of the American waterworks association, and the abstract section of Hygienische rundschau and Chemical Abstracts will give enough for most purposes.

Some special topics like mining, and mine problems are cared for by the U. S. Bureau of mines Bulletins, Circulars, Technical papers; for others, State of U. S. (or both) Geological survey publications. The U. S. Bureau of Standards does much valuable work, to be most easily sought through the Journal of industrial and engineering chemistry. State and municipal publications on water supply problems are in the Water survey library, with some others in the Municipal reference collection, now in Lincoln Hall.

Topics where emphasis is put on the engineering side should be looked up in the various indexes to that literature, and these are in both the main library and at the Engineering library, where most of the mining literature is to be found.

Every special industry, as ceramics, has its own serials, and papers dealing with the special chemical problems are apt to be published in such serials. In general, the abstract serials include most of these, but reference should be made to the list in the index of Chemical Abstracts, for any year to be certain.

LECTURE IX.

APPLIED (INDUSTRIAL) CHEMISTRY: BOOKS

Books upon this general topic are entered in the catalogue under the subject heading "chemical technology", while special works are given the most specific headings possible.

Progress in this field is so rapid that a book is nearly out of date by the time the final proof is read. Principles remain and general methods based upon them can usually be found at greater length in books. All statements upon such books must be taken as qualified and limited by the specifications, "best at present" or "best at hand" or some similar phrase.

1. Dictionaries and works of reference
2. General descriptive texts
3. General analytical works
4. Books upon special topics or industries or processes.