

ethanol and benzene with dry hydrogen chloride. The hydrochloride was allowed to stand in a desiccator with solid sodium hydroxide until it came to constant weight and was then analyzed.

Anal. Subs., 0.8449: wt. of HCl absorbed, 0.0889. Calcd. for $C_{19}H_{12}O_5 + HCl$: HCl, 11.39. Found: 11.28.

Anal. Subs., 0.2746: AgCl, 0.1094. Calcd. for $C_{19}H_{12}O_5 + HCl$: Cl, 9.94. Found: 9.86.

This hydrochloride is very hygroscopic and did not melt when heated to 300°.

Professor Vieweg of the Department of Geology has kindly furnished the following description of the crystals.

Pyrogallolbenzein from Methanol.—This forms irregularly shaped crystals, somewhat resembling fuchsin in appearance. They show a yellow-green surface color and in smaller fragments transmit a red-orange color.

Pyrogallolbenzein from Alcohol and Benzene.—This material is a crystalline powder very similar to the pyrogallolbenzein from methanol. The surface color is also yellow-green, but the transmission color in thin pieces is a purple-red.

Pyrogallolbenzein Hydrochloride from Methanol.—This substance forms in bladed crystals. They show a steel blue surface color. Most of the crystals are too thick to be translucent, but in thin sections they transmit a red-brown color.

Summary

It has been shown in this paper that the formula, $C_{38}H_{24}O_{11} + 5H_2O$, given to pyrogallolbenzein by Doebner and Förster is not correct. When crystallized from ethyl alcohol and benzene, pyrogallolbenzein has the formula $C_{19}H_{12}O_5$. When crystallized from methyl alcohol, it contains 3 molecules of water of crystallization and has the formula $C_{19}H_{12}O_5 + 3H_2O$. A well-crystallized hydrochloride having the formula $C_{19}H_{12}O_5 + HCl + 3H_2O$ has been obtained. It has also been shown that pyrogallolbenzein combines with dry hydrogen chloride to form a hydrochloride having the formula, $C_{19}H_{12}O_5 + HCl$. The structure of pyrogallolbenzein is similar to that of resorcinolbenzein and of gallein.

ITHACA, NEW YORK

NEW BOOKS

Chemistry in the Twentieth Century. An Account of the Achievements and the Present State of Knowledge in Chemical Science. Prepared under the Guidance of a Committee Representing the Scientific Societies with Dr. E. F. ARMSTRONG, F.R.S., as Chairman and Editor. The Macmillan Company, New York, 1924. viii + 281 pp. 62 figs. 19 × 25.5 cm. Price \$5.25.

The preface says "The aim of this volume is to present to the reader, by means of a series of monographs, a statement of the present position of Chemical Science in Great Britain, as illustrated by the exhibits in the Chemical Hall at the British Empire Exhibition (1924). . . .

"The story told in these pages is a record of achievement which in friendly rivalry challenges comparison with similar work done in other parts of

the world, and in Great Britain in decades gone by. It is offered as a contribution made by British men of science to the work of building up the Empire, which is commemorated more fully in the whole Exhibition itself."

Here is a collection of monographs, for the most part comprehensible to the ordinarily intelligent reader, which is not written down to his supposed inferior level, nor "relieved" by exaggeration and newspaper jargon. Some of them are introductory and will not present any difficulties. They are followed by more specialized monographs which carry the reader by easy stages to the very outskirts of their fields and to the very latest discoveries.

The monographs cover a great variety of subjects: The Structure of the Atom, by Edward Neville da Costa Andrade, Crystallography, by Sir Henry Alexander Miers and Thomas Vipond Barker; X-Ray Analysis of Crystals, by Sir William Henry Bragg; The Rare Gases of the Atmosphere, by Morris William Travers; The Chemistry of Carbon Compounds, by Jocelyn Field Thorpe; The Sugars and Carbohydrates, by James Colquhoun Irvine; The Alkaloids, by Frank Lee Pyman and Thomas Anderson Henry; Biochemistry and Fermentation, by Arthur Harden; The Chemistry of Photography, by Sir William Jackson Pope and Walter Clark—to mention only about a third of the titles. These monographs will be read with pleasure by every chemist. This will be particularly the case with those which deal with subjects in which he himself has not specialized, for it will put him in touch with current research in those subjects with gratifying ease.

Of course, in describing primarily British achievements in chemistry much non-British work had to be slighted or omitted, but a spirit of moderation and fairness runs through all the articles. Besides, the record is such an honorable one that exaggeration is unnecessary.

Every British chemist must be proud of this volume, but the innumerable advances which it records, all along the frontiers of our science, must thrill every chemist and impress him with the vigor and the fertility of the human mind.

Dr. Armstrong is surely to be congratulated on the success of his and the Committee's efforts.

ARTHUR B. LAMB

Trattato di Chimica Generale ed Applicata all' Industria. Vol. I. Chimica Inorganica. (Treatise on General Chemistry with Industrial Applications. Vol. I. Inorganic Chemistry.) Part I. By DR. ETTORE MOLINARI. Fifth edition, revised and enlarged. Ulrico Hoepli, Milan, 1924. xv + 680 pp. 299 figs. 24 × 16.5 cm. Price Lire 40.

The extent to which this work is appreciated is in a measure shown by the fact that in less than 20 years there have appeared four editions of it

in Italian, two in English, two in Spanish and one in French. The character of the book in the arrangement of its topics and methods of treatment has been preserved throughout in each edition. The changes have consisted in a revision of the data, correction of errors, and addition of new matter through which to record the material progress in the field the author seeks to cover. The latter has led to a considerable amplification in size notwithstanding the fact that the treatment is concise and the statements are condensed. To meet this growth "Inorganic Chemistry," formerly presented in a single volume, is in the fifth edition divided into two parts. Part I embraces General Chemistry, which has grown from 125 to 238 pages, and the Descriptive Chemistry of the non-metallic elements from hydrogen to antimony which previously covered 195 pages now requires 442 pages, although at least one-fourth of this matter is set in 8-point type, or smaller. The elementary exposition of general principles has been revised by Vittorio Molinari, son of the senior author. The make-up of the book is most attractive; it is clearly impressed upon glazed paper which is well adapted for displaying the numerous cuts and photographic reproductions with which the book is profusely illustrated.

The second instalment on inorganic chemistry is to be issued during the present year and it is to be followed shortly by the new edition of the organic chemistry.

CHARLES E. MUNROE

Chemische Konstitution und Pharmakologische Wirkung: Ihre Beziehungen zu einander bei den Kohlenstoffverbindungen. Eine Pharmakologie der Kohlenstoffverbindungen bekannter Konstitution. (Chemical Constitution and Physiological Action: Their Relations in the Carbon Compounds. A Pharmacology of Carbon Compounds of Known Constitution.) By Professor Dr. med. et phil. ADOLF OSWALD, Zürich. Gebrüder Borntraeger, W 35 Schöneberger Ufer 12a, Berlin, 1924. x + 892 pp. 27 × 18 cm. Price \$8.70.

This work is largely a rearrangement of material already at hand, but from a somewhat different and broader view point. The author recognizes three main types of pharmacological action: the methane, the benzene and the ammonia types. The methane type of action consists essentially in a depressant action upon protoplasm and especially upon that of the nervous system; in this group are included the sedatives, narcotics and general anesthetics which are derived from the aliphatic series. The benzene type is stated to include aromatic compounds which act upon the motor functions of the central nervous system, the heat regulating centers, to have antineuralgic effects, etc.; as a matter of fact some of these compounds are considered in this chapter but most of them are discussed under the third great subdivision which includes the compounds with an "ammonia" type of action.

Six hundred and sixty-seven pages are devoted to compounds supposed

to have these three types of action; then follow 75 pages in which are discussed compounds (of phosphorus, arsenic, antimony, selenium and tellurium and some halogen and sulfur compounds) which cannot be brought into harmony with the author's main scheme and this is followed by a very useful chapter on the changes undergone by carbon compounds in the organism. The latter subject, that is, the chemical changes which compounds undergo in the body, receives consideration throughout the book and is one of its most valuable features. On the other hand, there is much in the discussion of the physiological action of the compounds which is rather unsatisfactory. It is not based in many cases upon recent advances and conceptions of physiology and anatomy. Such statements, for example, as that a given compound causes a rise of blood pressure conveys little useful information, for this effect can result from an action upon any one of a number of distinct anatomical structures; the pharmacologist wishes to know whether a "depression of the spinal cord" is due to an action upon nerve cells or to an interruption of nerve impulses at a synapse; physiologists no longer speak of "excitor-motor ganglia of the heart," etc. In other words, this, as is usually the case in works written from the standpoint of the chemist, neglects the animal organism and the latter is, after all, an important factor in pharmacological action; without accurate physiological data, speculations as to the role of different groups in chemical compounds are of little value.

A comparison of this work with Heffter's "Handbuch der Experimentellen Pharmakologie" (now in process of publication) shows how much more definite are the results when the subject is approached from the physiological standpoint. It is interesting to recall in this connection the words of one who made unusually important contributions to the subject of the relation of physiological action and chemical constitution and whose work is so frequently quoted by Oswald: Ehrlich in 1898 reproached his (that is, the medical) profession with having abandoned to the chemists a field which was most decidedly and peculiarly its own and predicted that progress would come only when "purely biological viewpoints" replaced chemical viewpoints. Of course the difficulty is that pharmacology has, as Cushny once remarked, shared the fate of the bat of the fable: it has been considered by the universities to belong to the medical faculty and has never had the close coöperation of chemists and biologists, and it has been considered by the medical faculties as something rather apart from their main activities and has received scant support from them. It is this position of pharmacology in the educational world which makes such books as the present one possible—a work for which both chemists and pharmacologists will be grateful, although it falls short of covering the subject in a satisfactory manner.

Die Fermente und ihre Wirkungen. (*The Ferments and their Actions.*) By Professor CARL OPPENHEIMER, Dr. phil. et med., Berlin, with a chapter by Dr. RICHARD KUHN, Munich. Parts I, II and III. Fifth, completely revised edition. Georg Thieme, Leipzig, Germany, 1924. vii + 480 pp. Illustrated. 26.5 × 19.5 cm. Price \$1.90 for each of the three parts, unbound.

The fourth edition of this comprehensive work has been out of print for a number of years. Moreover, in the ten-year interval which has elapsed since its publication, there have been not only a vast accumulation of new facts, but also a far-reaching and fundamental revision of the existing subject matter, thanks in large part to the efforts of Willstätter, Euler, Harden, Neuberg and their pupils. The appearance of this new edition is, therefore, to be warmly welcomed.

The author assures us that he has made the treatment as complete as is humanly possible, although regretting that in much of the recent foreign literature he has been obliged to depend largely on the abstracts rather than on the original articles. It has been necessary to rewrite substantially the whole book. Earlier and now largely obsolete work has not, however, been suppressed but at least references to it have been retained. In addition, a new chapter has been introduced on the physical chemistry and kinetics of the ferments, by Dr. Richard Kuhn.

The new edition is to appear in two volumes, and will occupy about 2000 pages. It will be issued in some ten to twelve instalments, but purchase of one instalment commits one to the whole series. The author promises to complete the two volumes in about a year.

The first three instalments have now appeared, and maintain the high standard of the earlier editions. They cover the general chemistry of the ferments: first, their classification; second, the descriptive chemistry of the ferments; third, the effect of external factors upon the ferments; fourth, the physical chemistry and kinetics of the ferments; and fifth, the biology of the ferments. The fourth section is particularly timely and valuable. It occupies over 300 pages and contains a wealth of material. While the treatment is clear and illuminating, it aims at completeness of presentation rather than a critical discussion. It will be not only of special value to the fermentologist, but also of much interest to physical chemists in general.

ARTHUR B. LAMB