

dimensions and both waters thus practically crystallize as a single body. This circumstance had formerly been pointed out by myself, but the absolute impossibility of a stepwise fractionation could not be postulated *a priori*.

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G. BRUNI

RECEIVED AUGUST 23, 1934

OXYGEN A FACTOR IN THE BROMINATION OF CINNAMIC ACID

Sir:

We have found that bromine and cinnamic acid combine rapidly in the dark at room temperature when dissolved oxygen has been removed from the solution. When the oxygen has not been removed, the reaction is very slow in the dark, but it proceeds rapidly in the light. Apparently the many previous investigators of the photobromination of cinnamic acid, including ourselves [Bauer and Daniels, *THIS JOURNAL*, **56**, 378 (1934)] have been dealing with an oxygen-inhibited reaction.

The experimental apparatus and materials were as described before, except that a side arm containing a magnetic hammer and a sealed-off bulblet of bromine was fused to the quartz reaction cell. The cell was filled with a solution of cinnamic acid in carbon tetrachloride and boiled under reduced pressure at room temperature. The cell was then chilled and sealed off. When the cell had reached 20°, the bromine cell was broken in the dark. In every case the bromine reacted and the solution became colorless so rapidly that the rate of reaction could not be measured conveniently.

Under the same conditions, when a bulblet of

oxygen was broken before the bromine bulb was broken, the solution retained its reddish color until exposed to bright light, behaving qualitatively as observed in the earlier investigation when air had not been removed.

Similar results were obtained using simpler apparatus and unpurified materials. An inverted U-tube of Pyrex was provided with a stopcock and tilted in such a way that one leg was partially filled with a carbon tetrachloride solution of cinnamic acid and the other with a carbon tetrachloride solution of bromine, care being taken to prevent bromine from getting into the cinnamic acid solution. Evacuation was continued until the solutions had boiled away to about half of their volumes. The stopcock was closed and on mixing the two solutions the bromine faded out within a few minutes. Admission of air practically stopped the reaction.

These results are in agreement with the findings of Kharasch [Kharasch and Mayo, *THIS JOURNAL*, **55**, 2468 (1933)] that peroxides affect the addition of hydrobromic acid to the double bond, with those of Schultze [*ibid.*, **56**, 1552, (1934)] that the rate of bromination of cyclopentadiene is affected by oxygen, and with those of Dickinson and Leermakers [*ibid.*, **54**, 3852 (1932)] that oxygen inhibits the photochlorination of tetrachloroethylene.

Experiments in this Laboratory indicate that the influence of oxygen on reactions of this type may be quite general.

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WALTER H. BAUER
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RECEIVED AUGUST 24, 1934

NEW BOOKS

A Comprehensive Treatise on Inorganic and Theoretical Chemistry. By J. W. MELLOR, D.Sc., F.R.S. Vol. XIII. **Iron.** Longmans, Green and Co., 55 Fifth Ave., New York, 1934. ix + 948 pp. 559 figs. 15.5 × 25 cm. Price, \$20.00.

This volume continues the discussion of iron and its compounds. Specifically it covers the physical and chemical properties of the free element and the occurrence, preparation and properties of its oxides.

There are many special chapters of great interest and merit; for instance (18) The Mechanical—(19) The

Thermal—(20) The Optical—(21) The Electrical—and (22) The Magnetic Properties of Iron and Iron Carbon Alloys; (24) The Corrosion of Iron and Steel; (26) The Passivity of Iron; (31) and (32) Hydrated Ferric Oxide-Hydrosol and-Hydrogel.

An extraordinary amount of information has been assembled in this volume in compact and accessible form, and as tested in a few restricted fields familiar to the reviewer, this information appears to be surprisingly complete. There is certainly no other treatise on this subject in our language which can compare with it in these respects.

It should be of great value to chemists and to others concerned with this important element.

ARTHUR B. LAMB

Quantitative Chemical Analysis for Beginning Students, with Explanatory Notes, Questions and Analytical Problems. By GEORGE MCPHAIL SMITH, Professor of Chemistry in the University of Washington. Third edition, revised and enlarged. The Macmillan Company, 60 Fifth Avenue, New York, 1933. xii + 199 pp. Illustrated. 14.5 × 22.5 cm. Price, \$2.25.

Analyse Chimique Quantitative a l'Aide de Liqueurs Titrées. (Volumetric Analysis.) By H. CARON and D. RAQUET, University of Lille. Libraire Vuibert, 63 Boulevard Saint-Germain, Paris V^e, France, 1934. iv + 304 pp. 16.5 × 25 cm. Price, 40 fr.

This new edition of the well-known textbook by Professor Smith is substantially the same as the previous one. The only noteworthy additions are the inclusion of a discussion (16 pages) of P_H measurements and their significance and the introduction of an experiment (2 pages) on the "Colorimetric Determination of the P_H of a Solution." Concerning the minor changes in the notes and directions, it may be observed that most of the changes in the latter occur in the procedures for volumetric determinations and make possible the use of the conventional 50-ml. burets instead of 30-ml. burets.

As in previous editions the carefully written procedures are followed by explanatory notes and are further supplemented by a series of instructive questions. These features make the book especially suited for use in large classes. In the opinion of the reviewer, however, the usefulness of the book would have been increased by a more thorough consideration of the usual rules for the manipulation of both burets and pipets. One typographical error was noted by the reviewer. On page 78 the directions call for a 5.0-g. sample of limestone instead of, probably, one-tenth as much.

The second of the volumes listed above is best described as a compendium of procedures for the quantitative determination of both inorganic and organic constituents by volumetric methods. The major divisions of the subject matter are: (I) (9 pages) a brief statement of the general principles of volumetric analysis; (II) (86 pages) acidimetry and alkalimetry, with a discussion of P_H determinations; (III) (126 pages) analyses involving oxidation, reduction or substitution; (IV) (57 pages) determinations in which precipitates are formed; (V) (10 pages) a short description of water analysis.

The book contains working directions for the analysis of an extraordinary number of substances, many of which would not be classified as common. For instance, the second section comprises at least one hundred different procedures. Although the directions are practically abstracts, they are supplemented by brief statements of the underlying principles and also by rather detailed information regarding the calculations. It is unfortunate that the authors have restricted themselves to the use of the older volumetric reagents, the value of which was already established fifteen years ago, and have ignored the application of the newer reagents. Another weakness of the text is the total absence of references to original papers.

Were it not for these shortcomings the book could be recommended as a serviceable reference book for the analytical laboratory.

ARTHUR F. SCOTT

The Sub-Atoms. An Interpretation of Spectra in Conformity with the Principles of Mechanics. By WILLIAM MAYO VENABLE. The Williams and Wilkins Company, Baltimore, Md. 148 pp.

The author discards practically all current ideas relating to nuclear and atomic structure and the origin of spectra. He prefers to substitute atoms consisting of relatively large positive ions with small negative electrons bouncing up and down like "a rubber ball bouncing on a hard pavement."

"The atoms are revealed not as bodies with great positive charges concentrated in one nuclear structure, with swarms of electrons circulating thereabout, as assumed in theories now most popular, which originated with the speculations of Bohr, but as composite bodies made up of aggregations of ions, each with a positive charge +1, accompanied by an electron with its negative charge -1. These smaller ions, each with its electron, I have designated sub-atoms. The chemical atoms, when subjected to suitable excitation, lose some of their sub-atoms by subdivision, successive losses of sub-atoms, not merely electrons, being characteristic of various stages hitherto ascribed exclusively to ionization."

The author postulates further that ordinary atomic spectra are produced by recombination of the groups of sub-atoms. The atomic mass is assumed to consist of the sum of the masses of the constituent sub-atoms.

The author's very limited explanations of experimental facts in terms of his theory are unconvincing to the reviewer.

W. F. GIAUQUE

Handbuch der Chemotherapie. Erster Teil. Metallfreie organische Verbindungen. Zweiter Teil. Metallderivate. (Handbook of Chemotherapy. Part I. Metal-Free Organic Compounds. Part II. Metallic Derivatives.) By Dr. VIKTOR FISCHL, Berlin, and Prof. Dr. HANS SCHLOSSBERGER, Berlin-Dahlem. Fischers Medizinische Buchhandlung, Antonstrasse 15/19, Leipzig C 1, Germany, 1932, 1934. viii + 898 pp. 17 × 25 cm. Price, M. 89; bound, M. 92.

The term "chemotherapy" was introduced by Ehrlich (the discoverer of arsphenamine) to emphasize the difference between drugs which are used to give relief from pain, insomnia, etc., and those which remove the cause of disease; the use of quinine in malaria is a classical example of chemotherapy.

The authors of this work, Fischl, a chemist, and Schlossberger, a member of the German Imperial Health Office, begin at once the technical discussion of chemotherapeutic agents. The first compound considered is chloroform. No reference is made to the anesthetic properties of chloroform; it is discussed only from the chemotherapeutic standpoint, that is, its use in the removal of intestinal worms.

The chemotherapeutic agents are considered in chemical groups: the first group includes other chlorine compounds of the methane series. The next group considered is that

of the unsaturated fatty acids, of which cod-liver oil is the most important; this is followed by a discussion of the fatty acids used in the treatment of leprosy. The various derivatives of benzene (salicylic acid, etc.) are next discussed; the discussion of quinine and its many derivatives occupies 83 pages. The acridine derivative and various dyes are also considered. This, the first part of the work, covers 357 pages.

The second part deals with the derivatives of arsenic (the inorganic compounds but more especially with the organic compounds: atoxyl, salvarsan, etc.) and the compounds of antimony, bismuth, iodine, copper, silver, gold, mercury and the rarer metals.

The references to the original literature are very complete; those referring to the arsenic compounds for example cover 34 pages.

This work will be of great value to all interested in the field of chemotherapy.

REID HUNT

Introduction to Physiological Chemistry. By MEYER BODANSKY, Ph.D., Professor of Pathological Chemistry, University of Texas. Third Edition, Rewritten and Reset. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, 1934. xi + 662 pp. 15.5 × 24 cm. Price, \$4.00.

This textbook remains a very satisfactory introduction to a rapidly growing subject. It has been largely rewritten and sometimes condensed in order to include the material that has accumulated since the appearance of the second edition in 1930 without unduly increasing the length of the volume. Even so there are now 610 pages of text instead of 497. The text is for the most part contemporaneous, including, for example, Hirst's formula for ascorbic acid.

A reviewer can, of course, find defects. For example, Bergmann's syntheses of polypeptides are not mentioned. And while the Zwitterion hypothesis is mentioned, its implications are not discussed. To this reviewer the filtration-reabsorption hypothesis concerning the formation of urine has been overemphasized, without considering the possibility of tubular secretion. Nor is the discussion of the pituitary gland quite up to date.

None the less the general excellence of the book outweighs such deficiencies. The very numerous references to original literature, generally brought down to 1934, and to contemporaneous reviews are outstanding. It is an excellent introduction to a very large subject.

RONALD M. FERRY

Précis de Toxicologie. (Outlines of Toxicology.) By E. KOHN-ABREST, D. es-sci. phys. Gaston Doin et Cie., Éditeurs, 8 Place de l'Odéon, Paris VI^e, France, 1934. xii + 388 pp. 54 figs. Price, 50 fr.

This is a very practical book written by an experienced toxicologist and medico-legal expert.

After a few pages on post-mortem examinations, and the collection of samples, the author discusses the various groups of poisons, beginning with poisonous gases. The first poison considered is carbon monoxide; the symptoms of poisoning, the action upon the blood, methods of detecting, etc., are briefly but clearly discussed. A discussion of other poisonous gases (hydrogen sulfide, hydrocyanic acid, volatile arsenic compounds, etc.) follows.

Arsenic, antimony, mercury, lead, the mineral and organic acids, the alkaloids, glucosides, barbiturates, ergot, etc., are then discussed. The toxicology of ethyl alcohol is considered but no reference is made to methyl alcohol (which has been described as "The American Poison").

A number of physiological tests are introduced in connection with digitalis, strophanthin, cantharides, atropine, cannabis, etc.

There is an excellent index of 27 pages.

REID HUNT

BOOKS RECEIVED

July 15, 1934–August 15, 1934

KONRAD BERNHAUER. "Einführung in die organisch-chemische Laboratoriumstechnik." Verlag von Julius Springer, Linkstrasse 23–24, Berlin W 9, Germany. 129 pp. RM. 4.80.

JOHN B. EKELEY. "A Laboratory Manual of Inorganic Chemistry with an Introduction to Qualitative Analysis." Fourth edition. John Wiley and Sons, Inc., 440 Fourth Ave., New York. 293 pp. \$2.00.

W. FINKELNBURG, R. MECKE, O. REINKOFER AND E. TELLER, Editors. "Molekul- und Kristallgitterspektren." Band 9, Abschnitt II, Eucken-Wolf Handund Jahrbuch der chemischen Physik. Akademische Verlagsgesellschaft m. b. H., Markgrafenstrasse 6, Leipzig C 1, Germany. 408 pp. RM. 34; bound, RM. 36.

LOUIS GERSCHENFELD. "The Jew in Science." The Jewish Publication Society of America, Broad and Spring Garden Sts., Philadelphia, Pa. 224 pp. \$2.75.

THOMAS MARTIN. "Faraday." Great Lives Series. Gerald Duckworth & Co., Ltd., 3 Henrietta St., Covent Garden, London W. C. 2, England. 144 pp. 2s./- net.

M. NIERENSTEIN. "The Natural Organic Tannins: History, Chemistry, Distribution." J. & A. Churchill, Ltd., 40 Gloucester Place, Portman Square, London, England. 319 pp. 21s.

VICTOR VON RICHTER. "Organic Chemistry or Chemistry of the Carbon Compounds." Edited by Prof. Richard Anschütz and Dr. Fritz Reindel. Vol. I. Chemistry of the Aliphatic Series. Translated and Revised from the 12th German Edition by Eric Newmarch Allott. P. Blakiston's Son and Co., 1012 Walnut St., Philadelphia, Pa. 790 pp. \$10.00.

ROBERT B. SOSMAN AND OLAF ANDERSON. "Large-Scale Phase Equilibria Diagrams." Research Laboratory, United States Steel Corporation, Kearny, N. J. 4 diagrams. \$2.00.

H. P. STARCK. "Volumetric Analysis." William Wood and Company, Mt. Royal and Guilford Aves., Baltimore, Md. 228 + 31 pp. \$3.00.

L. ZECHMEISTER. "Carotinoide. Ein biochemischer Bericht über pflanzliche und tierische Polyfarbenstoffe." Verlag von Julius Springer, Linkstrasse 23–24, Berlin W 9, Germany. 338 pp. RM. 28; bound, RM. 29.40.