

Although one of the oxidation products probably was acetic acid, it is obvious that it could not be detected, since the oxidation was carried out in an acetic acid solution. It is nevertheless evident that the hydrocarbon obtained by polymerization and simultaneous reduction of isoprene is a mixture of 2,6-, 2,7- and 3,6-dimethyl-2,6-octadienes.

Summary

The dimer of isoprene formed under conditions which normally produce "sodium rubber" has been stabilized by the addition of hydrogen. This partially hydrogenated dimer is a mixture of three isomeric dimethyloctadienes; its formation indicates that the mechanism of the polymerization of isoprene to synthetic rubber is the joining of many isoprene molecules by linkage of the 1,1-, the 1,4- or the 4,4-carbon atoms to produce a long-chain molecule.

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NEW BOOKS

Annual Survey of American Chemistry. Vol. III, July 1, 1927, to July 1, 1928. Edited by CLARENCE J. WEST. Prepared under the auspices of the Division of Chemistry and Chemical Technology, National Research Council. The Chemical Catalog Company, Inc., 419 Fourth Avenue, New York, 1928. 395 pp. 13.5 × 21.5 cm. Price \$3.00.

This volume of the Survey contains forty-six chapters which deal with the more actively studied fields in chemistry. A change in policy by the editorial board is announced in the foreword. This consists in "varying the subjects treated from year to year, which will mean that certain less active fields will be covered only every second or third year. Different authors also will be asked to write the reviews, thus distributing the effort of preparing the chapters among the authorities in the fields involved, and giving the readers more than one man's point of view on a particular subject."

The last volume of the Survey is well up to the standard of the former ones. The book is invaluable to one who wishes to keep in touch with the remarkable advance in research in chemistry in this country.

JAMES F. NORRIS

Gmelins Handbuch der anorganischen Chemie. (Gmelin's Handbook of Inorganic Chemistry.) Edited by R. J. MEYER. Eighth edition, completely rewritten. Sodium. System No. 21. Issued by the Deutsche Chemische Gesellschaft. Verlag Chemie, G. m. b. H., Corneliusstrasse 3, Berlin, W 10, Germany; 1928. 18 + 33 + 992 pp. 75 figs. 17 × 25 cm. Price, to subscribers, M. 118; singly, M. 150 (postage included).

This is the largest volume so far published in this encyclopedia of inorganic chemistry. It contains almost a thousand pages, exclusive

of the extensive table of contents. In accordance with the scheme of treatment followed throughout the encyclopedia, it first discusses sodium itself and then all of the compounds of sodium with elements bearing a lower number in the arbitrary numerical series that has been adopted.

The text is replete with many hundreds of tables of numerical data and with many skilfully executed diagrams. One cannot but be impressed first with the tremendous amount of human effort that has been devoted to the investigation of even this limited corner of the universe, and second with the industry, patience and understanding which the succinct recapitulation of all this information has required.

Particular features are the forty page account of the occurrence of sodium compounds; the eighty-five page account of the physico-chemical properties of the element and the sixty page account of sodium chloride. The literature has been covered up to January 1, 1928.

We cannot but be grateful to the editor and to the numerous staff of collaborators who have been responsible for this excellent and valuable volume.

ARTHUR B. LAMB

Gmelin's Handbuch der anorganischen Chemie. (Gmelin's **Handbook of Inorganic Chemistry.**) Edited by R. J. MEYER. Eighth edition, revised. **Radium and its Isotopes.** System No. 31. By OTTO ERBACHER. Issued by the Deutsche Chemische Gesellschaft. Verlag Chemie, G. m. b. H., Corneliusstrasse 3, Berlin W 10, Germany; 1928. xxii + 80 pp. 4 figs. 17 × 25 cm. Price, to subscribers, M. 12; singly, M. 15.

This volume is the smallest of the series so far. At first blush this small size appears surprising when one recalls the immense amount of study which has been devoted to radium. On further thought, one realizes that partly because of the short time that has elapsed since its discovery and more because of its great rarity, little actual study of the chemical behavior of radium or of the properties of its compounds has been made. Moreover, its radioactive properties are of such transcendently greater interest that the investigation of the ordinary chemistry of radium has doubtless seemed hardly worth while. Indeed, an inspection of this book shows that only about a score of radium compounds have so far been made.

The literature has been covered up to January 1, 1928.

ARTHUR B. LAMB

Symbols and Formulae in Chemistry. By R. M. CAVEN, D.Sc., F.I.C., Professor of Inorganic Chemistry in the Royal Technical College, Glasgow, and J. A. CRANSTON, D.Sc., A.I.C., Lecturer in Physical Chemistry in the Royal Technical College, Glasgow. Blackie and Son, Ltd., London and Glasgow, England, 1928. ix + 220 pp. 15 × 22.5 cm. Price, 15s., net.

According to the title page this book is an historical study of symbols and formulas in chemistry. In reality the growth of the ideas represented

by the symbols and formulas is illuminatingly traced; this is, of course, as it should be, and the book is really a history of the growth of chemical ideas.

For example, the rise and fall of the dualistic theory of Berzelius is sympathetically and fully discussed, even though there were but few symbols specifically applied to this theory. The tenacious adherence of Berzelius to what he was convinced was the truth, and what really embodied the truth in a vague sort of way, is vividly set forth; also his inability to support his theory against the unitary view of Dumas just because he could not grasp a clear conception of a relation between matter and electricity. It needed but the recognition of the adding or subtracting of discrete charges of electricity later to bring the dualistic theory into its own again; in fact, the modern study of the electron in chemistry is but the culmination of Berzelius' ideas of dualism.

The various modern ideas concerning the function of the electron in chemical structure and valence are briefly but adequately and impartially presented and the great confusion arising from the contradictory meanings with which modern theorists use old symbols in fashioning their formulas is noted. The idea suggests itself to the reader that perhaps the modern theories are suffering, just as did Berzelius' theory, from a failure to grasp some elusive but probably very simple and clarifying conception.

ARTHUR A. BLANCHARD

Problèmes et calculs de chimie générale, recueil destiné aux élèves des grandes écoles et aux étudiants en chimie. (Problems and Calculations of General Chemistry, a Compilation for Students in Advanced Schools and Students of Chemistry.) By R. HOCART, Licencié in the Physical Sciences. Preface by H. Copaux. Gauthier-Villars et Cie., 55 Quai des Grands-Augustins, Paris, France, 1928. x + 181 pp. 14 figs. 14 × 22.5 cm. Price, 30 fr.

The problems here set forth were first presented in a series of lectures by M. Hocart. Each chapter begins with a brief presentation of the fundamental principles and follows with a large number of carefully selected problems. As a collection of problems the volume is unique in that a complete solution is given for every problem presented, together with a reference to the literature in many cases. The large variety in the subject matter of the problems makes the volume not only informative and valuable in the understanding of the fundamental principles but also useful in the solution of industrial problems. Nearly a hundred problems are presented in the following chapters: (1) Thermo-chemistry; (2) Dissociation of Gases, Law of Mass Action, Equilibrium and Temperature, Free Energy; (3) Electrolytic Dissociation, Solubility Product, Distribution Coefficient, Hydrolysis; (4) Reversible Cells, Gibbs-Helmholtz Equation, Free Energy and Temperature; (5) Speed of Reactions.

H. E. BENT