



This corresponds to the conversion of II, by loss of water, into IV (colorless rods from water, m. p. 298°, blackening. *Anal.* Calcd. for $C_{12}H_{11}ON$: C, 77.88; H, 5.96; N, 7.56. Found: C, 77.73; H, 6.17; N, 7.57 (burned with copper oxide)). IV, by analogy, would be expected to have the structure of 4-keto-2,3,4,5-tetrahydro- α -quinindene,^{11,12} rather than the alternative linear formu-

(11) Cf. The Ring Index, New York, 1940, Structure No. 1764.

(12) The melting point of IV is 42° higher than is reported for 4-keto-2,3,4,5-tetrahydro- α -quinindene (256°) [Blount, Perkin and Plant, *J. Chem. Soc.*, 1975 (1929)]. The isomeric 9-keto-2,3,4,9-tet-

here will be demonstrated shortly.

rahydro- β -quinidene is reported to melt at 327°. The synthesis of these compounds for comparison with (IV) is in progress.

(13) Cf. Camps, *Ber.*, **32**, 3228 (1899); *Arch. d. Pharm.*, **237**, 659 (1899).

(14) Cf. Huisgen, *Ann.*, **559**, 101 (1947).

(15) Perkin and Plant, *J. Chem. Soc.*, **123**, 676 (1923).

(16) Keneford and Simpson, *ibid.*, 2318 (1948).

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NEW BOOKS

Electronic Interpretations of Organic Chemistry. By A. EDWARD REMICK, Ph.D., Associate Professor of Chemistry, Wayne University, Detroit. Second Edition. Chapman and Hall, Limited, London. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1949. vii + 600 pp. Illustrated. 15.5 × 23.5. Price, \$6.00.

A book describing modern organic chemical theory is dated in a very short time. It is therefore gratifying that this book which first appeared in 1943 has been extensively revised and brought up to date. In the process of revision the book has been expanded by over a hundred pages in spite of the fact that the appendices on physico-chemical background material were left out and the historical introduction was abridged. The chapter on chemical physics has been almost completely rewritten, and while the applications of the older (pre-1935) electronic theories have been cut down, most of the topics appear in later sections as applications of present theoretical concepts. Many new studies in reaction mechanisms are included. An excellent chapter on contributions from the field of stereochemistry appears for the first time.

The author usually treats the "English" theories and "American" quantum mechanical and resonance concepts separately, a stratagem which may be necessary because the two schools use different though parallel terminology. The reviewer feels, however, that much more correlation between the two approaches could have been accomplished to make clear their essential similarity.

The main criticism must be levelled at the discussion of resonance. Firstly, no matter how much explanation is given, to say that the molecule *resonates*, leaves an im-

pression in the reader's mind that the molecule *does* something, that there are electronic movements between extreme positions. The pendulum analogy is unfortunate, since the two pendulums exist even when uncoupled, while the contributing resonance structures have only imaginary existence (pp. 110-111). The discussion of the actual nature of a molecule exhibiting resonance is confused (p. 109). According to Bridgman's operational approach (also implied in Wheland's views), it is meaningless to discuss whether the electrons oscillate, are stationary, or are "smeared out," when no conceivable physical measurement can distinguish between the alternatives. The inductive and mesomeric "electron displacements" are also imaginary movements of electrons since the initial configurations (the normal valence bond structures) do not occur in nature. Only the inductomeric and electromeric displacements are postulated as actual electronic movements. In this connection it is misleading to use the expression "Moment of reaction" (p. 54).

The postulates collected at the end of the book are useful for reference purposes but require much interpretation before being of use in predicting reactions. For instance, it is difficult to understand postulate (P) 7: "The electromeric effect, except when unusually weak, is much more powerful than any of the other electron displacements." In postulates 16-20 it is not always clear what "Other things being equal" means. Thus two contributing resonance structures with differing numbers of covalent bonds (P 16) also have differing charge distributions or a different number of unshared electrons.

A few errors and omissions were noted. The Berliners in their work on hyperconjugation (p. 134), far from dis-

counting carbon-carbon hyperconjugation, have given definite evidence for it in the case of *t*-butylbenzene (Feb. 1948). The studies on the effects of substituents in the 3', 4' and 5'-positions of sterically hindered biphenyls (p. 296) were not all carried out in the same solvent. In the discussions of alkyl halide substitution no mention is made of Swain's mechanistic studies which may throw open to question many of the statements made. On pages 392 and 425 non-linear transition state configurations are represented.

The book is written fluently in excellent style and achieves one of the most readable accounts of the English electronic theories. It will serve as an excellent introduction for the student of modern organic theory.

O. THEODOR BENFEY

Bibliography of Animal Venoms. By R. W. HARMON and C. B. POLLARD, Department of Chemistry, University of Florida. University of Florida Press, Gainesville, Florida 1948. xxviii + 340 pp. 16.5 × 23 cm. Price \$8.00.

The bibliography comprises 4157 articles, listed alphabetically by authors for each year starting in 1875 and ending with a few papers which appeared in 1946. The final 31 pages are devoted to an alphabetic Index of Authors.

Each item consists of name (or names) of author(s), title of article, original reference, and reference to abstracting journals. Papers dealing with all types of animal venoms are included.

The authors state in a short preface that the bibliography was compiled primarily for their own research projects. They might have rendered the handsomely printed book very much more useful for others if they had included a Subject Index.

While the completeness of such a bibliography is difficult to assess this reviewer noted the omission of reference to the paper by N. Gralèn and The Svedberg entitled, "The Molecular Weight of Crotoxin," *Biochem. J.* **32**, 1375 (1938), an important link in the physicochemical characterization of the only snake venom protein of established purity. Notwithstanding these deficiencies the book will certainly prove a useful source-work for many purposes.

HEINZ L. FRAENKEL-CONRAT

Cation Exchange in Soils. By WALTER P. KELLEY, Ph.D., Professor Emeritus, Soil Chemistry, University of California, Berkeley. Reinhold Publishing Corporation, 330 W. 42nd Street, New York, N. Y. 1948. 144 pp. + xiii. Illustrated. 16 × 23.5 cm. Price, \$4.50.

The careful perusal of Dr. Kelley's monograph by this reviewer has invoked mingled feelings of admiration and exasperation. It is a fine thing that the author, with his vast experience of the subject of cation exchange in soils, should finally attempt a critical summary for the benefit of the younger generation of soil scientists. If, however, one measures the actual content of this volume against the purpose and scope of A. C. S. monographs as stated in the final paragraph of the general introduction, then some serious omissions become apparent.

The first arises through the lack of correspondence between title and content. The volume deals primarily with cation exchange upon the mineral constituents of soils. This, however, is not apparent from the title nor is it explained in the preface. The reader only learns of the existence of this limitation in Chapter 2 entitled "The Cation Exchange Material," in which the soil organic matter is summarily dismissed in a couple of pages. Even so,

it should have been possible to indicate to the reader the most important contributions dealing with the chemical nature and the exchange reactions of soil humic matter. That the classical work of Sven Odén should receive absolutely no mention, is inexcusable.

Next, it is pertinent to inquire whether, within the limitations adopted, a well balanced treatment and a reliable guide to the literature have been achieved. Some inexplicable omissions are apparent to this reviewer. The development of the complementary ion principle in exchange involving several cations (Jenny and Ayers) is nowhere mentioned, nor, in a discussion of the exchange of aluminum, is there indication that Dr. Kelley has considered the work of Paver and Marshall. Only one (early) paper by Bradfield is quoted; surely, Bradfield and Allison's work on the carbonate-bicarbonate-soil system should have been discussed.

Yet there are many praiseworthy features of Dr. Kelley's book which should be mentioned. His discussions of exchange cations in various soil types (Chapter 5) and of the determination of exchangeable cations (Chapter 6) contain much of the cautious wisdom with which his years of experience have imbued him. Every young research worker in soils should read them. His precise evaluation of the earlier literature as exemplified both in Chapter 1 (Historical) and Chapter 6 (Methods) is of great service.

The work is concluded by a chapter on the identification and estimation of the clay minerals, which is, of course, extraneous to the title, but, nevertheless, of considerable value.

C. E. MARSHALL

BOOKS RECEIVED

January 10, 1950-February 10, 1950

M. L. ANSON, JOHN T. EDSALL AND KENNETH BAILEY (edited by). "Advances in Protein Chemistry." Volume V. Academic Press, Inc., 125 East 23rd Street, New York, N. Y. 1949. 481 pp. \$7.50.

R. E. BURK AND OLIVER GRUMMITT (edited by). "Frontiers in Colloid Chemistry." Frontiers in Chemistry, Volume 8. Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y. 1950. 157 pp. \$4.00.

PAUL L. KIRK. "Quantitative Ultramicroanalysis." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1950. 310 pp. \$5.00.

HUMBOLDT W. LEVERENZ. "An Introduction to Luminescence of Solids." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1950. 569 pp. \$12.00.

R. H. F. MANSKE AND H. L. HOLMES (edited by). "The Alkaloids. Chemistry and Physiology." Volume I. Academic Press, Inc., 125 East 23rd Street, New York, N. Y. 1950. 525 pp. \$10.00.

F. RADT (edited by). "Elsevier's Encyclopaedia of Organic Chemistry. Volume 12 B part II: Naphthalene, Nitrogen Compounds. In Series III: Carboisocyclic Condensed Compounds." "Elsevier Publishing Company, Inc., 215 Fourth Avenue, New York 3, N. Y. 1949. Pages (345-1052). Single volume, \$64.00; for subscribers to Series III, \$56.00; for subscribers to the complete work, \$48.00.

MARKUS REINER. "Deformation and Flow. An Elementary Introduction to Theoretical Rheology." Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y. 1949. 346 pp. \$6.50.