

experiments only geronic acid semicarbazone could be isolated.⁵ It is unlikely that this acid is formed from rearrangement of the α -form during ozonization since α -ionone, α -ionylideneacetone, and the ethyl ionylideneacetate from α -ionone all give only isogeronic acid. In view of the fact that the β ester in question gives only geronic acid and the α ester gives only isogeronic acid while an equimolar mixture of these two esters gives a mixture of geronic and isogeronic acids, it is difficult for us to assign the same (α) structure to both esters. Although the yields of isogeronic and geronic acids obtained from the esters in this preliminary study were only 13–19%, they were consistent with those we obtained on the α - and β -ionones of known structure.

Further work on ozonization and polarographic studies of the ethyl α - and β -ionylideneacetates is in progress in order to establish unequivocally the structure of these substances.

Correction: In our previous publication, *THIS JOURNAL*, 66, 521 (1944), the data for the solid and liquid forms of β -ionylideneacetic acid are reversed in Table I. These items should read:

	λ max. m μ	ϵ max. ^b
β -ionylideneacetic acid (solid) ^a	294, 260	13700, 12900
(liquid)	283	17700

(^a) Karrer, Morf and Walker, *Helv. Chim. Acta*, 16, 975 (1933).

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF CALIFORNIA AT SEYMOUR L. LINDENBAUM
LOS ANGELES LAWRENCE J. ANDREWS
LOS ANGELES 24, CALIFORNIA W. G. YOUNG

RECEIVED SEPTEMBER 6, 1944

THE REACTION OF BUTENYLMAGNESIUM BROMIDE WITH ACETOMESITYLENE

Sir:

In a study of the nature of the butenyl Grignard reagent it appeared that valuable information might be obtained from the composition of the butenes resulting from the enolization of ke-

tones by butenylmagnesium bromide. Acetomesitylene was chosen for this experiment as several investigators^{1a,b,c} have shown that organometallic compounds such as ethylmagnesium bromide, *n*-butyllithium and phenylsodium do not add to the carbonyl group of this compound but give enolization products exclusively.

Contrary to expectation, the reaction of butenylmagnesium bromide with acetomesitylene gave virtually no enolization products. Less than 3% of the calculated amount of butene was detected. From the reaction mixture was recovered less than 12% of the original ketone and the principal product was a compound which we believe to be *s*-butenylmesitylmethylcarbinol (I); b. p. 119–123° (2 mm.), n_D^{20} 1.5330; mol. wt. by hydrogenation, 214 (calcd. for C₁₅H₂₂O, 218); yield, 83%.

Anal. Calcd. for C₁₅H₂₂O: C, 82.54; H, 10.16. Found: C, 82.36; H, 10.23.

On distillation at atmospheric pressure, I cleaved smoothly to give butene and acetomesitylene. The latter compound was characterized by two derivatives. Ozonization of I gave formaldehyde, propionaldehyde and, apparently, acetomesitylene.

Benzylmagnesium chloride reacts with acetomesitylene to give benzylmesitylmethylcarbinol (II) in 52% yield. Enolization products amounted to 38%. The structure of II was established by oxidative degradation which gave benzoic acid. On strong heating, II did not cleave, but appeared to dehydrate.

Further studies of the addition of β , γ -unsaturated Grignard reagents and other organometallic compounds are in progress.

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF CALIFORNIA WILLIAM G. YOUNG
LOS ANGELES 24, CALIFORNIA JOHN D. ROBERTS
RECEIVED NOVEMBER 20, 1944

(1) (a) Kohler and Baltzly, *THIS JOURNAL*, 54, 4015 (1932); (b) Kohler, Jacobs and Sonnichsen, *ibid.*, 62, 785 (1940); (c) Gilman and Jones, *ibid.*, 63, 1162 (1941).

NEW BOOKS

Fundamentals of Chemistry and Applications. By CHARLOTTE A. FRANCIS, A.M., Formerly Instructor in Chemistry, Teachers College, Columbia University, and EDNA C. MORSE, R.N., A.M., Instructor in Chemistry, Teachers College, Columbia University. Second edition. The Macmillan Company, 60 Fifth Avenue, New York, N. Y., 1943. xi + 537 pp. 98 figs. 15 × 22 cm. Price, \$3.50.

Relatively few college teachers of elementary chemistry realize how the "other half lives," and learns, until they have read carefully a text such as this, planned and written for students in nursing and similar schools. The time allotted to a student nurse's course is short, for study, class and laboratory, and she is expected to understand and retain a considerable amount of descriptive general, inorganic and organic chemistry, much of it of course by brute force

memory. The field covered is limited by time and rather closely prescribed by hospital practice and the "Curriculum Guide for Schools of Nursing"; the instruction usually is by members of the hospital staff, often trained previously in the same school.

This book comprises thirty-one chapters, the first nineteen (280 pages) dealing with: Substances, Mixtures, Physical and Chemical Change, Compounds, Elements, Oxygen, Catalytic Agents, Combustion, Energy Transformations, Chemical Measurements, Chemical Shorthand, Bases-Acids-Salts-Radicals, Valence, Within the Atoms, Water, Reactions of Acids, Bases and Salts, Solutions-Colloids-Emulsions, Electrolytes and Ionization, Weak Electrolytes-Equilibrium-Water, Oxidation-Reduction. The remainder takes up **Organic Chemistry**, twelve chapters (235 pages) on: Introduction, Hydrocarbons and

Halogen Derivatives, Alcohols, Aldehydes and Ketones, Organic Acids-Salts-Esters, Carbohydrates, Fats, Cyclic Compounds, Proteins, Chemistry of Digestion, Function and Fate of Glucose, Fats, Proteins, Salts and Ions.

The college instructor will view this list with varied emotions: no descriptive chapters on non-metals other than oxygen, nor on any of the metals, no gas laws, no metallurgy, a smattering only of ionization theory and atomic structure, and an overpowering dose of briefly touched-on organic chemistry, including much not even taken up in a regular advanced organic course. A little reflection on the needs of the student and graduate nurse, however, largely reconciles the contents and the users' requirement of a back-ground of general descriptive chemistry with emphasis on compounds, their classification and properties, and then a survey of organic chemistry for a listening, correlating and care-taking knowledge of medicinals, foods, human workings, and their inter-relationships. The authors have tried to prepare a textbook to meet these needs, with considerable success.

A careful reading of the volume leads to comment, favorable and critical, on major and minor points, both factual and pedagogical. The authors write and present their topics in an easy and conversational but old-fashioned style, with occasional lapses into very involved passages and over-use of certain stilted phrases. They have made frequent and effective use of fine-type explanatory material including many amply-described word equations (of which some teachers will not approve), and many good illustrative facts (as well as a few absurdly wrong ones, such as that nearly all the earth's oxygen is in the air (forgetting the ocean water and the silicates and carbonates in the crust), and that nitroglycerine is used in making guncotton, collodion, pyroxylin enamels and lacquers). They endeavor to maintain a healthy student discrimination between theory and fact but their emphasis on assumptions, and reluctance to make definite statements, succeeds only in leaving a really vague feeling of uncertainty as to the truth on many topics. They fail to do a good piece of work in their brief presentation of atomic structure and modern ionization theory, leaving an unfortunate compromise between the factually well-supported modern theories and the old-fashioned attitude of "this is too advanced stuff for these students," as witness their allegiance to the whole of Arrhenius' theory, leading to repeated use of hydrolysis to produce a strong base *in the presence of* a strong acid, and mention of "molecules" of strong electrolytes. Their survey of organic chemistry is fairly well done, especially the chapters on digestion (which every student of chemistry could profit by reading), but the reviewer questions the usefulness of filling page after page with structural formulas of isomeric sugars, sterols, heterocyclic compounds, vitamins, and protein substances; he doubts that the authors themselves can write many of them correctly from memory, few if any professional organic chemists can, and their effect on the average time-harried nursing school student can be left to vivid pedagogic imagination.

ALLEN D. BLISS

Valency, Classical and Modern. By W. G. PALMER, Sc.D., D.Sc., Fellow of St. John's College, Cambridge, University Lecturer in Chemistry. The Macmillan Company, 60 Fifth Avenue, New York, N. Y., 1944. ix + 242 pp. Illustrated. 14 × 22.5 cm. Price, \$2.50.

"The first four chapters present a compact elementary account of classical and modern conceptions of valency suitable for the more general reader and for students preparing for university examinations. The concluding chapters are more advanced: chapter five shows how the electronic theory is applied to the heavier elements and their principal compounds; and the last chapter is devoted to current developments and theories in their early stages."

The classical theories are first developed historically and then applied to a limited number of compounds, astutely selected. The objections and problems raised by modern

physical and physico-chemical methods of investigation are next presented with the help of diagrams and tables. The corresponding solutions are postponed until after a discussion of electronic theory, in which wave functions are sparingly employed.

If the students above mentioned were to follow the proposed program too literally, they would enter the examination room guiltless of ideas regarding such topics as hydrogen bonds, complex compounds and electronegativity. The early chapters, however, are so well designed to arouse curiosity that few will want to lay down the book unfinished, or to refrain from the study of periodical literature. The final arguments are at once clear, scholarly and open-minded. The style is elegant, and the author adheres to correct terminology in such words as tervalent, quinquevalent, septivalent. Beginners and advanced chemists alike can use this book with profit, and what is more, with enjoyment.

GEORGE S. FORBES

Cellulose Chemistry. By EMIL HEUSER. The Institute of Paper Chemistry, Appleton, Wisconsin. John Wiley & Sons, Inc., 440 Fourth Ave., New York, N. Y., 1944. v + 660 pp. Illustrated. 15 × 21.8 cm. Price, \$7.50.

Heuser's new book is a welcome addition to the libraries of students, research workers, and technologists whose problems are related to the chemistry of cellulose and its derivatives. Presented largely from a chemical point of view it will serve equally well as a textbook for advanced students and research workers or as a reference book for many technologists. It covers the recent literature well and, in addition, information may be readily located through excellent subject and author indices.

The book consists of fifteen chapters, the bulk of which are devoted to the reactions and degradation of cellulose. Chapter I briefly introduces the subject and discusses the occurrence and nature of cellulose. Chapter II presents an excellent discussion of the microscopic and submicroscopic structure of cellulose fibers, as well as the formation of cellulose in plants. With this sequence it might have been advisable to present Chapter XIV on "The chain structure of cellulose" as Chapter III, although the author's reason for presenting it later is recognized. Chapters III, IV, V, and VI, cover in detail the reactions of cellulose with water, and inorganic and organic bases; these reactions are of extreme importance in the manufacture of rayons, transparent films, finishes, cellulose derivatives, etc. Chapters VII, VIII, and IX are comprehensive discussions of cellulose esters, xanthates, and ethers. Chapter X, on the oxidation of cellulose, includes discussions of the types of reactive groups formed during oxidation and methods for estimating them, the aging of alkali cellulose, the nature of the reactions of cellulose with various oxidizing agents, and the effect of the ultraviolet light. Chapters XI, XII, and XIII deal with the decomposition of cellulose by acids, heat and bacteria. Although Chapter XIII is brief, it is extremely welcome in view of the importance to our war effort of the problem of deterioration of cellulose by biological processes. Chapter XV, dealing with the molecular weight of cellulose and the methods for determining it, might well have been discussed earlier along with the chapter on chain structure.

Any criticisms must be considered to be of a minor nature. For example, on page 444 is a section dealing with fractionation of oxycelluloses with alkali. Most oxycelluloses are to a greater or less degree decomposed by alkali and therefore a true fractionation is not obtained.

The author has not only reported the point of view of the literature covered but also has not hesitated to offer hypotheses or conclusions based on his own wide experience in the field. Thus on page 477, a hypothetical mechanism to explain the aging of alkali cellulose is put forth. The author clearly points out, however, that it remains to be seen whether this hypothesis can be supported by further experimental evidence. In this way many of the unsolved

problems of cellulose chemistry have been emphasized, a feature of the book which will appeal to research workers.

Consideration of the widespread interest in cellulose chemistry, as well as the great amount of published work in this field, emphasizes the herculean task assumed by a single author in the preparation of such a book. Nevertheless, it represents a job well done.

MILTON HARRIS

Vegetable Fats and Oils. Their Chemistry, Production, and Utilization for Edible, Medicinal and Technical Purposes. By GEORGE S. JAMBESON, Ph.D., United States Department of Agriculture. Second edition. American Chemical Society Monograph Series. Reinhold Publishing Corporation, 330 West Forty-Second St., New York, N. Y., 1943. 508 pp. 2 figs. 16 X 23.5 cm. Price, \$6.75.

A word-wide shortage of fats and oils, accompanied by rapid technological progress in modifying and adapting them to new uses, makes the appearance of a new edition of this valuable and widely used reference especially timely.

As in the earlier edition, the author has emphasized (a) composition data, (b) references in the literature, and (c) well standardized methods of laboratory testing. Relatively little attention has been given to recent technological developments or to some of the very important advances in methods of analysis. One might expect to find, for instance, (a) an outline and a critical discussion of methods of analysis based upon distillation *in vacuo*, (b) a discussion of relationships between structure or composition and physico-chemical properties, and (c) an outline of changes that result from refining, variations in origin and production, polymerization, and oxidation.

Following a brief introductory chapter on the general composition of fats and oils (17 pp.), the author devotes one chapter each to the non-drying oils (141 pp.), semi-drying oils (82 pp.), drying oils (83 pp.), fatty acids (35 pp.), and methods (98 pp.). The material in Appendix I, on "various other seed oils" (2 pp.) possibly could have been included in the other sections to better advantage. The tables of data given in Appendix II are surprisingly heterogeneous, but the summaries of approximate "constants" and botanical nomenclature, of which most chemists are relatively ignorant, will be especially useful.

New material has been added concerning methods of determining and interpreting diene and thiocyanogen numbers.

The careful workmanship of the author in handling references and technical data, and the quality of the publisher's work, especially under present circumstances, merit special commendation.

C. G. KING

Colloid Chemistry, Theoretical and Applied. By Selected International Contributors. Collected and Edited by JEROME ALEXANDER. Volume V. Theory and Methods. Biology and Medicine. Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y., 1944. vi + 1256 pp. Illustrated. 16 X 24 cm. Price, \$20.00.

This present volume is the fifth in this widely and favorably known series. The Editor, because of war-time conditions, was not able to secure as world-wide a representation of authors as in the previous volumes, but he has nevertheless assembled contributions from a distinguished group of chemists, physicists, biologists and physicians in this country.

The sixty essays in this book, varying in length from five to ninety pages, cover a vast field of the natural sciences. They are arranged in two nearly equal sections, the first dealing with the theory and methods of colloid chemistry, the second with its applications to biology and medicine. Each essay recounts the present status of, and the latest developments in, its special field, presenting the subject matter particularly from the point of view of the author's own researches.

It would be difficult and indeed invidious to select any one or more of these essays for special mention, particularly since a different selection certainly would be made by every reader. I am therefore reproducing herewith the Table of Contents.

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Personally, I find this a striking list with scarcely a title that does not interest me. To be sure, the classification of some of them under colloid chemistry may be far-fetched, but one is glad that they have been included. The great variety and excellence of the essays is a tribute to the versatility of the Editor, to his enthusiastic interest in the fundamental phenomena of chemistry and biology and to his evangelistic devotion to colloid chemistry.

I have but one regret to register. It is too bad to publish or rather to embalm these excellent and stimulating essays in such an awkward, bulky and expensive tome. They should have been issued in several instalments, separately purchaseable and of a size that could be conveniently transported, held and read by an ordinarily robust human being.

ARTHUR B. LAMB

Advances in Enzymology. Edited by F. F. NORD, Fordham University, New York, N. Y., and C. H. WERKMAN, Iowa State College, Ames, Iowa. Volume IV. Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y., 1944. viii + 332 pp. Illustrated. 15.5 × 23.5 cm. Price, \$5.50.

The volume of scientific literature that is being published today is so great that few students or investigators can

hope to acquire more than a bowing acquaintance with most of it. One can follow a specific topic in which he is interested with a moderate degree of assurance that he has not missed anything of vital importance, but it frequently happens that progress in some more distant, or even in a cognate field takes a sudden turn and in a distressingly short time one finds himself out of touch with the newer developments. The publication of comprehensive review articles in journal or in monograph form is one of the most useful ways to minimize this unpleasant result and accordingly the continuation of the present series of collections of reviews of enzymology into a fourth volume is most welcome.

The fourth volume contains eight reviews: The Chemical Formulation of Gene Structure and Gene Action by Addison Gulick; Specificity, Classification, and Mechanism of Action of the Glycosidases by William Ward Pigman; The Transamination Reaction by Robert M. Herbst; Tyrosinase by J. M. Nelson and C. R. Dawson; Gramicidin, Tyrocidine, and Tyrothricin by Rollin D. Hotchkiss; Biological Energy Transformations and the Cancer Problem by V. R. Potter; The Influence of Hormones on Enzymatic Reactions by H. Jensen and Leon E. Tenenbaum; and The Absorption Spectra of Vitamins, Hormones, and Enzymes by Wallace R. Brode.

The discussions maintain the high standard of excellence of those previously published in this series. They are factual and critical as well as authoritative and serve excellently to familiarize the reader with the present situation in each of the several fields of investigation. Comprehensive bibliographies are provided.

H. B. VICKERY

BOOKS RECEIVED

October 10–November 10, 1944

H. BREDERECK and R. MITTAG. "Ergebnisse der Vitamin- und Hormonforschung." Volume 1. "Vitamine und Hormone und ihre technische Darstellung." 1938. Republished May, 1944. Advance Scientific Publishers, Inc., 64 Fulton Street, New York 7, N. Y. 138 pp. \$4.00.

CHARLES A. BROWNE. "Thomas Jefferson and the Scientific Trends of his Time." Waltham, Mass., the Chronica Botanica Co.; New York City, G. E. Stechert and Co. No. 3 of Volume 8 of Chronica Botanica, edited by Dr. Frans Verdoorn. 64 pp. \$1.25.

JAMES MURRAY LUCK, EDITOR. "Annual Review of Biochemistry." Volume XIII. Annual Reviews, Inc., Stanford University P. O., California. 795 pp. \$5.00.

W. G. PALMER. "Valency, Classical and Modern." The Macmillan Company, 60 Fifth Avenue, New York, N. Y. 242 pp. \$2.50.

FRANK SEITZ. "Darstellung von Vitaminpräparaten." Volume 2. "Vitamine und Hormone und ihre technische Darstellung." 1939. Republished, May, 1944. Advance Scientific Publishers, Inc., 64 Fulton Street, New York 7, N. Y. 205 pp. \$4.00.

ERICK VINKE. "Darstellung von Hormonpräparaten." Volume 3. "Vitamine und Hormone und ihre technische Darstellung." 1938. Republished, May, 1944. Advance Scientific Publishers, Inc., 64 Fulton Street, New York 7, N. Y. 162 pp. \$4.00.