

**Organic Colloids.** By BRUNO JIRGENSONS, Biochemist, University of Texas M. D. Anderson Hospital and Tumor Institute; Associate Professor, University of Texas Postgraduate School of Medicine and Baylor University School of Medicine, Houston, Texas. D. Van Nostrand Company, Inc., 126 Alexander Street, Princeton, New Jersey. 1958. xiv + 655 pp. 16 × 23.5 cm. Price, \$16.75.

In this book a very general survey of the science of organic colloids is presented, a colloid being defined by the author as "a particle composed of about  $10^3$  to  $10^9$  atoms." Within the scope of this definition two general classes of materials are discussed: true macromolecular substances and large aggregates of low molecular weight materials. The inclusion of such diversified materials in one text seems justified solely by the fact that similar experimental techniques are used in their study. The book is divided into two almost equal parts, the first portion of which consists of a discussion of the methods of preparation and study of organic colloids while the second part is concerned with a description of the properties of the different types of colloids. The style of the book is primarily descriptive with emphasis being placed on experimental results and relationships at the expense of the development of any underlying basic theory.

The wide variety of experimental techniques that have been developed to investigate the properties of these classes of materials are each discussed in a very brief and non-critical manner in the first portion of the book. It is somewhat lamentable that more emphasis was not paid to both the theoretical and practical limitations of the individual methods. Also included in this portion is a very cursory description of polymerization methods.

The deficiencies of the first portion are somewhat compensated by the remainder of the book which contains a vast amount of information on the properties of these substances. Included are discussions of synthetic polymers, polysaccharides, proteins, nucleic acids, emulsions and detergents and the author is to be congratulated on describing so well such a wide variety of substances.

Since the book is well written and the material is presented in a very elementary and concise manner it should be of utility to the beginner in the field. On the other hand, the reviewer would not consider it to be too useful to the advanced student or research worker.

POLYMER STRUCTURE SECTION  
NATIONAL BUREAU OF STANDARDS      LEO MANDELKERN  
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**Nickel and its Alloys.** National Bureau of Standards Circular 592. By J. G. THOMPSON. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 1958. iv + 87 pp. 20 × 26 cm. Price, 60 cents.

The large amount of information available on the subject of nickel and nickel-bearing alloys can be treated only briefly in a compilation 87 pages in length, but within this limitation the new NBS Circular 592, a revision of NBS Circular 485, covers most of the important material well. Over 800 references are included providing interested readers with material with which to peruse specific subjects. The subject matter is not indexed but the clear, detailed table of contents makes this unnecessary in so short a volume.

In the eight years since publication of the earlier circular, interest in new uses for nickel has resulted in the addition of material in Circular 592 on the subjects of nuclear properties, thermionic properties and nickel coating by spraying, vapor plating and electroless deposition. The latter information is of particular interest and is receiving close industrial attention since these methods offer means to achieve relatively low cost, corrosion resistant nickel coatings on geometrically complex surfaces. Electroless plating is currently in practical industrial application for chemical process vessels as well as for small, complex shapes.

The major use of nickel, as the commercially pure metal or as an alloying material, is associated with corrosion resistance. The newly revised Circular 592 contains short, well written sections on the corrosion resistance of nickel and ferrous and non-ferrous alloys containing nickel. However, considering the importance of the subject, these sec-

tions are rather too brief, particularly with reference to the commercially pure nickel and the non-ferrous alloys.

For those interested in almost any aspect of nickel use, this circular at sixty cents is a fine investment. Although necessarily brief, it is an excellent treatment of the subject and because of the large number of references will serve as a good starting point for more detailed reading.

THE PFAUDLER CO.  
A DIVISION OF PFAUDLER PERMUTIT, INC.      D. K. PRIEST  
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**Methyl Glucoside. Preparation. Physical Constants. Derivatives.** BY G. N. BOLLENBACK, Corn Products Refining Co., Argo, Illinois. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1958. 183 pp. 16 × 23.5 cm. Price, \$5.50.

Coal and petroleum have each long been sources for organic chemicals. The world's renewable carbohydrate crops offer promise as sources for the organic chemicals of the future. In this country the industry concerned with the wet milling of corn has been one of the most successful in pioneering such uses, mainly because its component companies have supported research and development. Methyl  $\alpha$ -D-glucopyranoside is an "organic" obtainable from corn and this treatise compiles the scientific data concerning it, its close relatives and their derivatives. The book serves as a successor to the one (Artz and Osman, 1950) by the same publishers on D-glucuronic acid, another compound obtainable from this plant source. The compilation is excellent and complete, the formulas and reactions are well depicted, and the nomenclature is modern and correct. The book contains many tables and diagrams, including infrared data. The treatment is critical and the patent literature is especially well handled. Considerable hitherto unpublished data from the files of the Corn Products Refining Company are included. The omission of an author index is unfortunate. This publication will indeed be useful to the carbohydrate chemist and it is to be hoped that the industrial chemist may find it a source of information which may eventually lead to new uses for the substances treated.

DEPARTMENT OF CHEMISTRY  
THE OHIO STATE UNIVERSITY      M. L. WOLFROM  
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**Electronic Theories of Organic Chemistry. An Introductory Treatment.** BY JOHN WILLIAM BAKER, Reader in the Mechanism of Organic Reactions in the University of Leeds. Oxford University Press, 114 Fifth Avenue, New York 11, N. Y. 1958. vii + 224 pp. 14.5 × 22 cm. Price, \$4.80.

Dr. Baker's objective in writing this volume was to bridge the gap between classical organic chemistry and modern comprehensive treatises on electronic theories of organic chemistry such as Ingold's monumental work. More specifically one could say that his interest lay more in showing the systematization brought into organic chemistry by the electronic theory than in the development and substantiation of a theoretical method which can be used to predict the course and products of organic reactions.

He has achieved his objective with remarkable success. The details of the theory are marshalled with the sure hand of the master and grouped with regard to economy of treatment and illumination of interrelations. Although but little experimental evidence is given for the basic principles employed, they are not for the most part presented dogmatically but are rationalized on the basis of well known theoretical concepts. This procedure gives a unity of approach which makes for easy comprehension.

The educational background expected of the reader is perhaps indicated by the following phrases which are used without explanation: ground state, quantum numbers, bond polarization, bond order, Thiele's theory of partial valence. It is further indicated by the inclusion at the end of Chapter V of an appendix explaining elementary details of chemical kinetics, *viz.*, "Kinetic Order of a Chemical Reaction," "Experimental Determination of the Velocity Coefficient of a Reaction" and "The Energy of Activation of a Chemical Reaction."

The first four chapters of the book are devoted to outlining the theoretical principles needed. These include the Lewis octet theory, bond polarity, atomic orbitals, molecular orbitals, heterolytic and homolytic fission, nucleophilic and electrophilic reagents and the four modes of intramolecular electronic displacement used by the English School. The remainder of the book is given over to the organization of organic chemistry in terms of the electronic theory. Chapters V to XI deal with nucleophilic substitution reactions at saturated carbon, elimination reactions, additions to unsaturated compounds, tautomerism, esterification, hydrolysis of esters, aromatic substitution and saturated rearrangements. These chapters include many examples of experimental data which show accord with theoretical predictions of the effect of substituents or of alteration of the thermodynamic environment on the equilibria, rates and courses of chemical reactions. It is rather surprising that he consistently relates changes of electron density to rate constants without any hint that this procedure involves the neglect of the entropy of activation which only too frequently outweighs the activation energy in determining the rate constant.

I would stoutly defend Dr. Baker's right to decide which subject matter is to be included in his book and which is to be ignored. But I would also stoutly maintain that the prospective reader of the book has the right to know which subjects, of those pertinent to the field covered, are omitted. With this in mind, it might be mentioned that, with the sole exception of the contributions made by Lewis and Pauling to theories of atomic and molecular structure, no mention is made of any basic electronic principles contributed by Americans. Thus, one finds no mention of the neighboring group theory or of the various stereochemical principles developed in our country nor is the theory of concerted (push-pull) reactions employed as a general principle, although in the Chapter dealing with tautomerism one concerted reaction is quite incidentally included. It is, perhaps, also significant that in the lists of suggested further reading to be found at the end of each chapter all references except one are to papers by English authors.

This book on the electronic theory of the English School is highly recommended to all chemists interested in theoretical organic chemistry. Those approaching the subject for the first time will find it an authoritative and clear introduction to the subject; those already acquainted with the field will find it an aesthetic delight of perfect organization and an excellent review.

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A. EDWARD REMICK

**Chemical Analysis. Volume VIII. Colorimetric Determination of Nonmetals.** Editor, DAVID F. BOLTZ. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1958. xii + 372 pp. 16 × 23.5 cm. Price, \$8.50.

This book may be considered a companion volume to the well-known monograph by Sandell on the "Colorimetric Determination of Traces of Metals" published in 1944 as Volume III of this Series; a second edition, revised and enlarged, appeared in 1950; the third edition is scheduled to be published late in 1958 or early 1959. Because of the success and popularity of Sandell's book it seemed advisable to make available a supplemental one devoted to the nonmetals.

Volume VIII of this Series is a collective monograph to which fourteen authors have contributed "the colorimetric methods, based upon their experiences and/or judgment, which they believe to be the most suitable." There are eleven chapters as follows: Chapter I (D. F. Boltz), Principles and Practices in Colorimetric Analysis; Chapter II (D. F. Boltz and C. H. Lueck), Phosphorus; Chapter III (G. V. Potter), Silicon; Chapter IV (M. J. Taras), Nitrogen as Ammonia, Nitrite and Nitrate; Chapter V (D. F. Boltz and W. J. Holland), Chlorine; Chapter VI (E. R. Wright, R. A. Smith and S. Black), Bromine; Chapter VII (B. Zak), Iodine; Chapter VIII (S. Megregian), Fluorine; Chapter IX (G. D. Patterson, Jr.), Sulfur; Chapter X (R. A. Johnston), Tellurium and Selenium; and Chapter XI (G. Porter and R. C. Shubert), Boron. The editor has followed the

same style and order of presentation of subject matter as used by Sandell; *i.e.*, separations, methods of determination, and applications. Three to eleven methods are given for each of the eleven nonmetals and each chapter has an extensive bibliography at the end, there being a total of 718 references. The book is well illustrated with figures and graphs, and a transmittance-absorbance conversion table is given as an Appendix. Author and Subject Indexes conclude the book.

The printing, paper and binding are good. The monograph will make a useful companion to Sandell's "Colorimetric Determinations of Traces of Metals."

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JOHN H. YOE

**Dislocations and Mechanical Properties of Crystals.** An International Conference held at Lake Placid, September 6-8, 1956. Sponsored by Air Force Office of Scientific Research, Air Research and Development Command, and the General Electric Research Laboratory. Editors: J. C. FISHER, W. G. JOHNSTON, R. THOMSON and T. VREELAND, JR. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1957. xiv + 634 pp. 16 × 23.5 cm. Price, \$15.00.

Dislocations were invented some 30 years ago to explain the low strength of crystalline solids compared to theoretical estimates. Although occasional experimental results appeared in the intervening time, it is only within the last ten years or so that direct proof of the existence of dislocations has been obtained. Many theoretical concepts have been justified and new experimental results have given fresh impetus to theoretical work. This book appears at a particularly appropriate and interesting time for dislocation theory. Quoting from the foreword: "Perhaps the most striking contribution to the conference dealt with the observation of dislocations, which formed the subject of the first morning's discussion. Photographs of dislocations, slipband formation, Frank-Read sources, prismatic dislocations, and even motion pictures of dislocation motion were shown. Here was remarkable and breathtaking confirmation of much previous theoretical work, and a wealth of new experimental material which has given the experimentalist a period of supremacy."

This book includes the proceedings, discussions and post-conference remarks of a small international conference on the mechanical aspects of dislocations. Forty-two papers, covering a wide range of interest, are presented by a cross-section of excellent investigators. The material covered is not only required reading for anyone immediately interested in mechanical properties, but might well be used by others as an initiation into the rapidly evolving field. Much significant recent work is covered and the bibliographies are extensive and include the necessary background material.

The book has been divided into eight sections: I. Direct Observation of Dislocations; II. Deformation of Pure Single Crystals; III. Work Hardening and Recovery; IV. Alloy Crystals, Impurities, Yield Point Phenomena; V. Dislocation Damping and Fatigue; VI. Theory of Dislocations; VII. Whiskers and Thin Crystals; and VIII. Radiation Damage. The classification of papers under these headings is necessarily somewhat arbitrary since material included in any particular section often contains information that would apply to other sections. Some duplication naturally occurs but is usually a matter of complementary work.

Since the large number of papers precludes reporting on all, discussion will somewhat arbitrarily be limited to those aspects that appear to the reviewer to be of most general interest.

Section I includes many striking photographs of dislocations and dislocation etch pits brought out by diverse techniques. S. Amelinckx considers the mechanism of decoration of dislocations by precipitated particles and includes photographs of different types of dislocation networks brought out by this technique in transparent crystals. W. C. Dash observed decorated dislocations in silicon using an infrared image tube in conjunction with a microscope. Hirsch, Horne and Whelan show photographs of dislocations observed by transmission electron microscopy on thin foils of aluminum. Results of etching techniques are pre-