

its alloys, will be of greater interest to the average chemist outside the atomic energy program.

Chapter nine, on chemical properties of uranium, unfortunately opens with a table containing at least three misprints of the sort which the reader cannot easily correct for himself. The reactions of uranium with other elements are discussed first, then reactions with compounds. The discussions include products and, where available, the energies of the reactions. The ions of uranium in aqueous solution are discussed next. Some of the properties of the ions which are described include color, reactivity and stability, and oxidation-reduction potentials. Hydrolysis of the various uranium species and complex-ion formation are treated in several pages.

Analytical behavior of uranium is discussed under the headings of separation, gravimetric and volumetric determination, and determination by means of optical methods. Physical methods of analysis are then described such as polarography, coulometry, emission spectroscopy, neutron activation and isotopic dilution analysis.

Chapter six contains 137 pages discussing alloys of uranium, including almost every possible binary alloy and many ternary alloys. This chapter should be especially useful to the metallurgist.

As in previously issued volumes of this treatise, references follow each section of text and are given with the closing date for the compilation. This date is December 30, 1958, for most sections, and no list of references was closed earlier than January 1, 1958.

The reader will find this volume to be similar in style to the other volumes of the Treatise which have already appeared. It has the customary defect of a rather inadequate index, but covers the literature pertaining to uranium quite thoroughly.

INORGANIC CHEMISTRY SECTION  
NATIONAL BUREAU OF STANDARDS ROLF B. JOHANNESEN  
WASHINGTON 25, D.C.

**Que Sais-Je? No. 874. La Chimie Électronique et ses Applications Industrielles.** By ANDRÉE GOUDOT, Chercheur au C.N.R.S. Presses Universitaires de France, 108, Boulevard Saint-Germain, Paris 6, France. 1960. 128 pp. 11.5 × 17.5 cm. Price, NF2.

The title of this book is certainly too general. The real aim of the work is to introduce the reader to the field of organometallic complexes and their many applications in chemistry. Topics treated include ion exchangers, electro-deposition of metals from complexes, dyestuffs and catalysts. The book starts with a necessarily short review of the electronic structures of atoms and concepts related to the chemical bond. A considerable amount of knowledge is thus concentrated in a few pages. It will very likely stimulate the reader to study further some of the many subjects touched upon in this book.

DEPARTMENT OF CHEMISTRY  
UNIVERSITY OF MONTREAL C. SANDORFY  
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**Statistical Theory and Methodology in Science and Engineering.** By K. A. BROWNLEE, Associate Professor of Statistics, The University of Chicago. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1960. xv + 570 pp. 16 × 23.5 cm. Price, \$16.75.

Professor Brownlee's goal in preparing "yet another elementary textbook on statistical methods" is "to convey understanding of principles rather than practice." His method of accomplishing this goal is to establish as much of the mathematical theory of statistical methods as possible using only college algebra and some elementary calculus. Although this leads to some rather tedious mathematical passages, the result is, on the whole, satisfying. The topics covered are substantially the same as those in other current books on statistical methods; the treatment careful, competent and comprehensive.

DEPARTMENT OF RADIATION BIOLOGY  
THE UNIVERSITY OF ROCHESTER LEE CRUMP  
ROCHESTER, N. Y.

**Substitution at Elements other than Carbon.** Being the Fifth Weizmann Memorial Lecture Series, May, 1958. By C. K. INGOLD, University College, London. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1960. 52 pp. 14 × 22 cm. Price, \$3.50.

This book of only two chapters contains the four lectures given by Sir Christopher Ingold as the Chaim Weizmann Lecturer for 1958. Two of these lectures on "Nucleophilic Substitution at Octahedral Metal Atoms" make up the first of the two chapters of the book. Sir Christopher describes how he became interested in such reactions for central atoms with coordination greater than four and why he chose cobalt (III) for this study. In his well-known forceful manner he compares the conclusions reached from the data obtained at University College, London, with those reached by Adamson, Basolo and Pearson. Although he points out that much work is still necessary to reach conclusions which can be considered fully proven; he also believes that the S<sub>N</sub>2 mechanism does more correctly describe these substitution reactions.

Chapter Two contains the third and fourth lectures; in it electrophilic substitution at nitrogen and oxygen are discussed. The vulnerability of the unshared 2p electrons of trivalent nitrogen and bivalent oxygen is compared to that of the 2p electrons of unsaturated carbon. It is shown that nitration at N and O goes *via* the nitronium ion in all cases. The conjugate acid of nitric acid undergoes itself an S<sub>N</sub>1 substitution and the nitro group is carried by the nitronium ion.

The author next reviews the history of the kinetic investigations on nitrosation from Hantzsch through Hughes to Bunton and demonstrates that nitrosation is carried out by S<sub>N</sub>2 substitutions in mostly the nitrous acidium ion.

In a short appendix Sir Christopher refutes some of the recent arguments of Pearson and Basolo against the S<sub>N</sub>2 mechanism proposed by the author in Chapter One of this book.

This little book is well written and should be of value to scientists interested in this field.

DEPARTMENT OF CHEMISTRY  
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**The Chemistry and Biology of Sialic Acids and Related Substances.** By ALFRED GOTTSCHALK, M. D. (Bonn), D. Sc. (Melbourne), F.R.I.C., F.R.A.C.I., F.A.A., the John Curtin School of Medical Research, Australian National University, Canberra, A.C.T. Cambridge University Press, 32 East 57th Street, New York 22, N. Y. 1960. ix + 115 pp. 14.5 × 22 cm. Price, \$4.50.

This monograph is the first of its kind which deals with the chemistry and biological significance of the sialic acids (also known as the neuraminic acids). It therefore represents the timely appearance of a relatively short but comprehensive text on a new class of biochemical compounds which hold great promise with respect to their biological function as receptor sites for some viruses and their role in the mucopolysaccharides and mucoproteins.

The context of this monograph is as follows: Chapter I, historical aspects of mucoproteins and mucopolysaccharides; Chapter II, the isolation, composition, structure, physical and chemical properties and distribution of sialic acids; Chapter III, the preparation and analysis of sialic acids including various color reactions and paper chromatography; Chapter IV, the mode of linkage of sialic acid in oligosaccharides, mucoproteins and gangliosides; Chapter V, the role of sialic acid in some biologically active mucoproteins and mucolipids; Chapter VI, the sialic acid content of tissues and body fluids in normal and pathological states; Chapter VII, the neuraminidases and a brief comment on aldolases; Chapter VIII, short treatise regarding the isolation and chemistry of muramic acid; and Chapter IX, brief comments on the biological function of sialic acid and muramic acid. Chapters I-X have a valuable list of references. The only error to this reviewer's knowledge is the structure of muramic acid on page 110 in which an ether oxygen has been left out.

The monograph is well written and deals with most of the important aspects of these biochemical compounds. However, an exhaustive coverage of the literature apparently was not intended. For example, the isolation and immunological

activity of a sialic acid polymer of *Meningococcus* has not been mentioned. Furthermore, very little is included on the biosynthesis of sialic acid.

The subject material in this book and the manner in which it is presented should give this monograph wide appeal to both the novice in this field and to those who are more familiar with these compounds. Persons interested in virology, immunology, biochemistry and bacteriology will find many parts of this book interesting and informative. This reviewer recommends the publication of short monographs of this kind since they cover the major aspects of a selected field in a clear and concise fashion and hence can serve to inform many persons who are not intimately acquainted with the field with the vital substance of the particular subject.

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DEPARTMENT OF BIOCHEMISTRY  
ROCHESTER, NEW YORK

GUIDO V. MARINETTI

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