

the commercially important antifungal Rifamycins, now known to be ansa compounds, bearing a structural resemblance to the macrocyclic antibiotics, in which the extremes of a naphthalenoid nucleus are spanned by a many-membered aliphatic bridge. W. B. Whalley similarly gave an account of the detailed investigations of his and A. Robertson's group at Liverpool on the determination of the structure and biosynthesis of the sclerotiorin group of pigments, all of which contain a previously unknown type of benzopyrono nucleus, and represent further examples of biosynthesis by a polyketide pathway. A. J. Birch reviewed research by his and other groups on the mechanism of biosynthesis of gibberellic acid, penicillin, the tetracyclines, mycophenolic acid, novobiocin, and fumagillin, and pointed the way to future commercial exploitation of such data in a fascinating series of speculations on how to manipulate the processes involved so as to obtain improved yields, and, by minor structural modifications, possibly more useful products. In the fourth contribution, A. W. Johnson reviewed recent findings on the structure, partial synthesis, and chemical properties of the vitamin B<sub>12</sub> coenzyme, a fungal metabolite and the first natural product known to contain a covalent metal-carbon bond (between cobalt and the 5'-carbon of a 5'-deoxyadenosyl residue). If such were needed, this work serves as a further reminder of the burgeoning importance of organometallic aspects in chemistry and biochemistry.

The second section, as befits the venue of the symposium, dealt mainly with problems germane to the peat industry. E. Küster discussed the influence of peat and peat substances on the metabolism of fungi (one surprising result here is that some peat extracts are more effective as stimulants than nutrients in the growth of microorganisms); (Miss) E. K. Henderson described the fungal metabolism of vanillin, ferulic acid, and other aromatic compounds related to lignin, and D. Gottlieb presented a most useful and concise review on the general question of the catabolism of carbohydrates by fungi.

In the third section, attention was focused by several lecturers upon research areas crucial to the best exploitation of yeasts in the brewing and baking industries. A. H. Cook discussed the relevant problems in terms of the synthesis of proteins in yeast and its relationship to the initial growth of yeast cells in fresh wort, the development of the correct fermentative enzyme systems, and the maintenance of the catabolic activities required for alcohol production; and H. Suomalainen did so by relating changes in the chemical make-up of the cells to different phases of development during the industrial propagation of baker's yeast. On the level of molecular mechanisms, G. Ehrensvar reviewed studies with labeled substrates elucidating the extent and precise mode of metabolism of acetate and formate, and the changing enzymic environments, at different phases of growth. Other aspects covered, respectively, by G. A. Maw and D. H. Northcote, included the utilization of sulfur by yeast (chiefly for synthesis of cysteine, cystine, and methionine), and the structure and organization of the three polysaccharides, glycogen, mannan, and glucan, which are extractable from yeast.

The clearly defined scope of this symposium, the high quality and generally close interrelationship of the contributions, and the review nature of many of them, make this a most useful reference volume, particularly for the organic chemist of limited familiarity with the various biochemical fields covered. It has the pleasing format, clear printing, and well-drawn structural formulas of previous volumes recording IUPAC nomenclature, but, like them, no index.

Herchel Smith

Wyeth Laboratories, Inc.  
Philadelphia 1, Pennsylvania

**Synthesis of Organosilicon Monomers.** By A. D. PETROV, B. F. MIRONOV, V. A. PONOMARENKO, and E. A. CHERNYSHEV. Consultants Bureau Enterprises, Inc., 227 West 17th St., New York, N. Y. 10011. 1964. 492 pp. 17 × 25.5 cm. Price, \$22.50.

This monograph is a valiant attempt to compile and organize an immense amount of information in selected areas of the organic chemistry of silicon. The authors have reviewed the literature exhaustively. Journal articles, patents, books, and even trade literature are included in the largest bibliography ever gathered together for the subjects treated. They enriched their presentation of the data by including observations and opinions based on their own work even when this is unpublished. The authors worked a long time on the synthesis of monomeric organosilicon compounds and are expertly familiar with their subject matter. Their book is not like any other, both in the subjects covered and in the manner

of treatment. The authors wrote a big book (492 pages in the English translation) which has very small print, tiny graphs and figures, and exhaustive tables of data. Anyone with a serious interest in the synthesis of monomeric organosilicon compounds or in the chemical reactions and physical properties of these compounds will find this book invaluable. He will find it well worth his time to read it, even though the effort required to do this will prove to be great.

The monograph was divided into four parts. Part I has one chapter of outstanding merit dealing with the so-called "direct process" for the manufacture of organohalosilanes from organic halides and silicon. Details which apparently were not previously published are given here and the discussion of the process is excellent. It seems that it should be of most value to those interested in the industrial chemistry of organosilicon compounds. Part II is a comprehensive review of the synthesis and the chemical and physical properties of unsaturated silicon compounds. These compounds all have a carbon-to-carbon double or triple bond. A table 40 pages long lists the physical properties of these, and a bibliography of 536 references is included. This reviewer knows of no comparable source of data about such compounds. Part III describes all the known methods for making aromatic or alkylaromatic silicon compounds other than the "direct process." The reactions of these compounds are discussed. Another long table (44 pages) lists their physical properties, and 406 references are listed. Part IV deals with all methods for making organosilicon hydrides, the reactions of these, and their importance as intermediates for the manufacture of a wide variety of organosilicon compounds. This is an excellent review with 675 references.

The closing chapter compares in brief the chemistry of organosilicon, -germanium, -tin, and -lead compounds, and it adds some recent data that were obtained after the other parts of the book were completed.

Somewhere in this monograph, nearly every aspect of organosilicon chemistry is discussed. This monograph is a gold mine of up-to-date information for one who is willing to dig for it. There is no index. The arrangement of the book makes it quite likely that one will have to read in all parts to find relevant data pertaining to just one compound. This reduces the value of the book as a reference source.

Despite some shortcomings such as smallness of print, lack of an index, and sometimes tedious style, this book nevertheless should make an invaluable addition to the library of any chemist with an interest in either laboratory methods or industrial methods of making or using monomeric organosilicon compounds.

This book has no equivalent in the English language and it can be a most useful guide to both Russian and non-Russian literature. The book struck this reviewer as having been written from an optimistic or enthusiastic point of view. Along with the painstaking detail found in each part, the authors convey the feeling that these chemicals are both interesting and valuable even though very little is written about the commercial use of any of them.

John L. Speier  
Dow Corning Corporation  
Midland, Michigan

**Electronic Charges of Bonds in Organic Compounds.** By G. V. BYKOV. The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. 1964. vii + 191 pp. 14.5 × 22 cm. Price, \$9.00.

As Dr. G. V. Bykov has written in the preface, the book is based on "a sufficiently well-founded hypothesis that the electronic charges of bonds represent a real and substantial feature of the molecules, on which their physical and chemical properties largely depend." In the first chapter the author compares the results of the various methods which have been proposed to calculate the distribution of the  $\pi$ - and  $\sigma$ -electron charges which can be associated with the bonds of a molecule. He observed that quantum mechanical calculations of  $\pi$ - and  $\sigma$ -electronic bond charges are laborious and are practically inaccessible to chemists who have not had a special mathematical training. This is why Dr. Bykov tried to establish semiempirical methods of estimating these charges. The main purpose of the book is to describe these methods and their results.

In Chapters II-VI a set of simple linear relationships are proposed between the electronic bond charges and electronegativities, force constants, interatomic distances, and heats of formation. The theoretical basis of these relations is not clear but their practical interest is tested in two ways. The relation between electron bond

charge and electronegativities is used to calculate the dipole moments of various molecules like the halogenomethanes, and the results are in good agreement with the experimental values. Furthermore the distributions of charges calculated by Bykov are in satisfactory agreement with those coming from wave mechanical calculations.

Chapters VII-X are mainly concerned with questions of chemical reactivity. As a whole this book can be useful as a starting point for other investigations, and, as the author claims, "must help the coordination of work on the subject of electronic bond charges."

**Raymond Daudel**

*Sorbonne and Centre de Mecanique Ondulatoire Appliquee  
Paris, France*

**Problems of the Biochemistry of the Nervous System.** Edited by Professor A. V. PALLADIN, Member of the Academy of Sciences of the U.S.S.R. and the Academy of Sciences of the Ukrainians S.S.R. The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. 1964. xii + 330 pp. 16.5 × 23.5 cm. Price, \$11.50.

This volume is the translation of the papers presented at the Second Conference on the Biochemistry of the Nervous System, which was held in Kiev in February 1957 under the auspices of the Institute of Biochemistry of the Ukrainian Academy of Sciences.

The book presents 33 papers. The first three deal with brain proteins, their isolation, and their changes in functional states, and the incorporation of amino acids in the tissue. They follow the general trend of thought and methodology in the West at the time. Five papers on the metabolism of phosphorus compounds follow, which again show adequate awareness of information and of thought then current among us. Three papers on carbohydrate and one on adrenaline and noradrenaline are up-to-date. Four papers on brain ammonia in different functional states show a definite emphasis on the possible metabolic effects of conditioning, a trend which is peculiar to Soviet biochemistry. Two papers on oxidative phosphorylation and on the influence of temperature on labile phosphorus metabolites, and three papers on histochemistry, covering lipoproteins, certain enzymes, and nucleoproteins, offer no special clue to a difference in emphasis from the West. The last three sections deal, respectively, with four papers on the metabolism of brain during hypothermia, three papers on the effect of radiation, and four papers on changes in brain in relation to illness. The volume closes with a review by A. V. Palladin on the "Functional Biochemistry of Brain."

The volume is well presented, and the translation is such that there is no difficulty in following the results and the reasoning of the authors.

The time elapsed since the symposium was held has permitted a sizable part of these contributions to appear in regular scientific periodicals, or under other forms of publication. Therefore it is not so much the actual results reported in this volume that render it interesting to the American reader, but rather the presentation in a single volume of a representative cross section of neurochemical work and ideas of Soviet scientists of that time. From this point of view, the volume is exceedingly worthwhile and its simple

perusal is of interest. It is clear that the Soviet scientists were at the time quite well informed about happenings in the West, and they usually quote adequately the western references pertinent to their work. However, the degree of this awareness varies markedly from paper to paper, some of the papers being just like any western paper, while others are clearly influenced by the Soviet emphasis on Pavlovian doctrine. There is no relation between this emphasis and the degree of technical excellence, which appears quite adequate in the case of most papers.

This book is also interesting in illustrating the degree of interest in neurochemistry in the Soviet ambiance. Of the 33 papers, 22 come from the three main centers, Moscow, Leningrad, and Kiev. The other 11 come from seven Soviet centers, and from Prague. Thus there is both a concentration of neurochemical work (and, presumably, of facilities) in the main three centers and a fairly wide diffusion in smaller centers throughout the U.S.S.R. This indicates a fairly active interest in neurochemistry, which most likely has increased since the date of the symposium.

In summary this is a book of interest to the specialist who is concerned with the evolution of neurochemical concepts and to the general scientific reader who wishes to learn about scientific progress in the U.S.S.R.

**J. Folch-Pi**

*Research Laboratory, McLean Hospital  
Belmont, Massachusetts 02178*

## BOOKS RECEIVED, December 1964

JERE H. BROPHY, ROBERT M. ROSE, and JOHN WULFF. "Thermodynamics of Structure." John Wiley and Sons, Inc., 605 Third Ave., New York, N. Y. 1964. 216 pp. \$2.95.

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N. F. MOTT and R. W. GURNEY. "Electronic Processes in Ionic Crystals." Dover Publications, 180 Varick St., New York, N. Y. 1964. 275 pp. \$2.00.

JOHN R. PLATT. "Systematics of the Electronic Spectra of Conjugated Molecules." John Wiley and Sons, Inc., 605 Third Ave., New York, N. Y. 1964. \$6.95, paper; \$10.95, cloth.

Y. K. SYRKIN and M. E. DYATKINA. "Structure of Molecules and the Chemical Bond." Dover Publications, 180 Varick St., New York, N. Y. 1964. 509 pp. \$1.75.

HAROLD F. WALTON. "Principles and Methods of Chemical Analysis." Second Edition. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1964. 481 pp. \$14.60.