

atomic form factors, for example, is taken from seven different sources, most of which represent the latest work in this field. An advantage of Dr. Sagel's book is that wave lengths and crystallographic data are given in angströms, rather than in X units.

One rather serious criticism of this book is that it does not present information relative to the Weissenberg and precession photographic techniques. For example, the Lorentz and polarization (PLG in the nomenclature of the book) factor is not tabulated for either the equi-inclination Weissenberg or precession methods. Furthermore, the trigonometric formulas are not given for these important methods.

The usefulness of tables and charts which are intended as aids in indexing powder and single-crystal photographs depends a great deal on personal preferences as well as the nature of the particular problem. Since the selection of material given by Dr. Sagel is somewhat different from that given in *Internationale Tabellen*, the advantage of having both books is apparent.

SCHOOL OF CHEMISTRY
RUTGERS, THE STATE UNIVERSITY
NEW BRUNSWICK, NEW JERSEY

PHILIP A. VAUGHAN

An Introduction to the Chemistry of Fats and Fatty Acids.

By F. D. GUNSTONE, PH.D., A.R.I.C., Lecturer in Chemistry, The University of St. Andrews. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1958. x + 161 pp. 16 × 25 cm. Price, \$6.00.

In his foreword Professor Hilditch states the need for a good textbook on fat chemistry for the use of Honours students in organic or biochemistry and commends the present volume for this purpose. In his opinion the treatment is logical, concise and clear and in this the reviewer agrees.

In the United States there is perhaps less need for this book, since we already have in Deuel's Vol. I a very complete monograph on this subject, but perhaps it may be too detailed for the beginner. In this respect Gunstone's book seems suitable and may serve as an introduction to the more comprehensive monographs.

There are six chapters in the book with a good index making in all 161 pages. The first chapter is given to a discussion of the more important structural units of the fats—nomenclature, classification, saturated and unsaturated and branched chain fatty acids, with determination of structure and finally synthesis.

The second chapter is devoted to the chemical nature of the fats and other lipids with examination of the component fatty acids and the distribution of the various acids in the triglyceride molecule.

The third chapter deals with the physical properties of the fats and fatty acids while the fourth takes up the chemical properties such as hydrolysis, hydrogenation, oxidation and other properties.

Chapter five has to do with the synthesis and utilization of fats in living organisms—biosynthesis in plants and metabolism in animals.

Chapter six is concerned with the technical applications of fats—edible fats, soap and detergents, glycerol, paints, varnishes, etc., with other uses of fats.

Certain tables of composition, as for example on pages 32, 34, 36, in the reviewer's opinion would have been improved by titles or headings, but these are small matters and do not affect the general usefulness of the book.

SCHOOL OF MEDICINE AND DENTISTRY
THE UNIVERSITY OF ROCHESTER
ROCHESTER 20, NEW YORK

W. R. BLOOR

Metals and Enzyme Activity. Biochemical Society Symposium No. 15 held at the University of Leeds on 13 July, 1956. Organised and Edited by E. M. CROOK. Cambridge University Press, 32 East 57th Street, New York 22, N. Y. 1958. 102 pp. 16 × 25 cm. Price, \$3.75.

This little collection of seven papers on the function of metals in enzymes is understandably not a comprehensive treatise. Furthermore, the reader who expects to peruse this book and learn something definite about what metals do in enzymic catalysis will be disappointed. Although many metal chelate compounds are known, we have relatively

little precise knowledge of factors governing chelate stability and reactivity. Thus, the fundamental background for understanding the role of metals in enzymes is incomplete. Furthermore, enzymes contain many groups capable of coordination with metal ions and these bear an unknown spacial relationship to each other. It is, consequently, difficult to discuss the role of metals in enzyme function except in a vague and speculative way. Perhaps a subject is most exciting at this stage, and we can be sure that today's speculation will lead to future understanding. Discussions like the one recorded in this book are a very good way of letting the average chemist in on some of the excitement of a developing new field. Unfortunately, this book has been slow in publication, and the reader may well wonder what has happened in the field in the past two years.

A clear and very condensed introduction on metal-ligand bond types and stereochemistry of complexes by R. S. Nyholm opened the symposium. This was followed by a rambling, but interesting, discussion by L. E. Orgel, covering the dependence of chelate stability on the nature of the metal ion and ligand groups and variation of chelate stability with pH. Other topics considered were the possible roles of metals in bringing reacting groups together at enzyme surfaces and in generalized acid catalysis, and oxidation reactions of copper complexes including copper-containing oxidases and oxygen carriers. The third paper by B. R. Rabin dealt with metal-peptide complexes and proteolytic activity. This is a fine example of the kind of careful work required to arrive at unambiguous answers about the structure of simple chelate complexes, and of the great difficulty in extrapolating from these results to probable mechanisms of metal function in enzymes. Several hypotheses about the role of metal ion activators in peptidase action were considered.

The afternoon session was introduced by Adrien Albert who discussed the significance of heavy metals in biological systems. F. C. Happold and R. B. Beechey provided a stimulating discussion on "univalent metals and other non-specific activations." Data on tryptophanase were presented and interpreted as indicating a role of K^+ and NH_4^+ ions in "organizing the protein" in some way. The activation of enzymes by univalent ions clearly deserves much future study. F. Bergel and R. C. Bray considered metallo-flavoproteins with special reference to the role of molybdenum in xanthine oxidase and in nitrate reductase. In the final paper of the day, E. C. Slater lucidly reviewed the chemistry of the cytochromes. Cytochrome nomenclature and the composition of the main cytochrome chain in the small particles of heart muscle preparations were discussed at length. Briefly considered were the cytochrome chain of intact mitochondria, the oxidation and reduction of cytochrome c, the properties of cytochrome oxidase and the kinetics of its action.

DEPARTMENT OF CHEMISTRY
IOWA STATE COLLEGE
AMES, IOWA

DAVID E. METZLER

The Terpenes. Volume V. The Triterpenes and their Derivatives. Hydroxy Acids, Hydroxy Lactones, Hydroxyaldehyde Acids, Hydroxy-keto Acids and the Stereochemistry of the Triterpenes. By the Late SIR JOHN SIMONSEN and W. C. J. ROSS, D.Sc., D.I.C., F.R.I.C., Reader in Chemistry, Institute of Cancer Research, University of London. Cambridge University Press, 32 East 57th Street, New York 22, N. Y. 1957. ix + 662 pp. 14.5 × 22 cm. Price, \$15.50.

This book represents the last volume of the late Sir John Simonsen's treatise on terpenes. It contains an extensive and very detailed discussion of the chemistry of the triterpene acids and their derivatives. The bulk of the original work on these complicated natural products was done in the laboratories of Barton, Halsall, Jeger, Jones, Ruzicka, Spring and Wieland. The authors were able to do justice to the excellent researches of these investigators. The topics in general are clearly presented and anybody who wishes to learn some good chemistry or refresh his memory should read at least a few of the chapters. Besides reviewing the contents of previously published papers the authors propose structures for some transformation products of bassic acid, ursolic acid and particularly quinovic acid. The book contains also a most welcome 100-page addendum