aspects presented. Hence, only a few comments may be permitted: Chapter II contains a wealth of valuable information. The space saving device of presenting much of the chemical material in the form of charts makes the reading somewhat difficult. Not all of the errors appearing in this chapter have been corrected by the insertion of "Notes." The author of Chapter VIII, who has published similar review articles elsewhere, has once more succeeded in conveying a lucid picture of our present day concepts concerning the biogenesis of the steroid hormones, especially in its relationship to cholesterol. In Chapter XV the editor deals with some aspects which do not "fit in" with the foregoing chapter headings. Remarking on the whole book, he aptly states, "We have been presented to a molecule which can be synthesized from small units, metabolized to a variety of compounds, is interrelated structurally and metabolically with other constituents, and which in the myelin sheath remains apparently static." The book concludes with an "Appendix of Practical Methods" (pp. 481–498), which will be of value to the clinical chemist.

In view of the wide coverage of the subject matter and the excellence of its organization, this book will doubtless be appreciated by a variety of investigators, in particular organic, biological and clinical chemists, as well as by physiologists, pathologists and clinicians. It may be added that printing and binding of this monograph are up to standard

DIVISION OF STEROID RESEARCH
DEPARTMENT OF RESEARCH MEDICINE
HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA
PHILADELPHIA 4, PENNSYLVANIA
MAXIMILIAN EHRENSTEIN

Handbook of Chemical Microscopy. Volume I. Third Edition. Principles and Use of Microscopes and Accessories. Physical Methods for the Study of Chemical Problems. By ÉMILE MONNIN CHAMOT, B.S., Ph.D, Late Professor of Chemistry, Emeritus, Cornell University, and CLYDE WALTER MASON, A.B., Ph.D., Émile M. Chamot Professor, Chemical Microscopy and Professor of Metallography, Cornell University. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1958. xii + 502 pp. 15.5 × 23.5 cm. Price, $14.00.

For investigators and advanced students in diverse fields of science and technology, wherever a critical study of the structural and optical properties of microscopic objects are called for, this volume should prove a practical handbook and an extremely valuable reference source. The handbook starts with a survey of the optical system and the mechanical attributes of the light microscope, followed by a fairly detailed discussion of the important problem of illumination. The chapter on illumination of opaque objects is especially well written, although the chapter on trans-illumination could have incorporated more reference to recent theories of image formation. Also with respect to field brightness there is a confusion between the practical and theoretical effects of the size of the source (pp. 104, 105). Principles and applications of dark-field, phase contrast and fluorescence microscopy are described in this chapter. These are followed by descriptions of a wide variety of general and specific microscopic techniques—preparation of material (not conventional histological techniques), special methods for interpreting physical (form, color, mechanical, thermal) properties of objects, ultramicroscopy or study of colloidal phenomena, photomicrography and microprojection. Then follows a short chapter on electron microscopy which may serve to introduce the reader to some general reading material on this vast topic. The latter half of the book is mostly concerned with studies of crystals and aggregates with the polarizing microscope. In addition to a well-documented chapter on the polarizing microscope and its principal applications, there are chapters dealing with the quantitative determination of the optical properties of microscopic objects and the relation of optical properties to crystal and aggregate structure. These are followed by a chapter on special methods for preparing crystals for microscopic study. The final two chapters deal with methods of measurements (linear, of area and volume, and angular) and the determination of particle size. Appended is a Michel–Levy color scale for estimation of birefringence whose usefulness is likely to be primarily educational. Compared to the earlier edition, those portions of the text dealing with methods (but not so much on principles), the bibliography and diagrams were brought up to date and the quality of the paper improved. Very few typographical errors (page 101, page reference; page 262, particle size of polystyrene latex polymer should be in *microns* rather than in *millimicrons;* page 336, rods or plates with a dimension *about* the wave length of light should be *smaller than*) were noticed. In all, the handbook is filled with useful information not only with respect to techniques but also on such basic matters as sampling errors and problems on purity of crystals. It is, however, somewhat weak on optical theory. As in the earlier edition, the abundant source of reference material is extremely valuable, although in some chapters more reference to recent work could have been incorporated. Especially noticeable was a lack of mention of the application of the interference microscope in which Davies and others have succeeded in measuring dry mass of microscopic objects to better than 10^{-12} gram precision. Also it would have been helpful to advanced readers if initials were shown on all names of investigators referred to.

DEPARTMENT OF BIOLOGY
UNIVERSITY OF ROCHESTER
ROCHESTER 20, N. Y.
SHINYA INOUÉ

Chemical Constitution. An Introduction to the Theory of the Chemical Bond. Second Revised Edition. By J. A. A. KETELAAR, Professor of Physical Chemistry, University of Amsterdam, The Netherlands. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, N. J. 1958. viii + 448 pp. 16× 23 cm. Price, $8.95.

J. A. A. Ketelaar is Professor of Physical Chemistry at the University of Amsterdam and is perhaps best known to American chemists for his elucidation of the structures of certain complex inorganic structures. He has written a splendid textbook of theoretical chemistry using as his Leitmotiv the four types of bonds of interest to chemists, namely, the ionic bond, the atomic bond (principally the electron pair bond), the metallic bond and the van der Waals bond (particularly of the London type).

The author recognizes at the outset that any chemical bond arises from coulombic interactions of outer electrons. After a short and rather conventional account of the periodic table (he could have discussed ionization potentials and approximate methods for many-electron atoms, for example) he launches into a superb chapter on the ionic bond. He applies elementary electrostatics to a wide variety of chemical problems including acid strengths and the solubility and hydration of salts. As the author points out, the approximations made in such problems are no worse than those made in quantum chemistry.

Nearly half the book is devoted to the covalent bond and its application to the properties of organic compounds. Quantum mechanics is neatly summarized without, as is unfortunately the common practice, devoting more time to the solutions of certain linear differential equations of early 19th century vintage than to the physical significance of the results. What few mathematical arguments are presented are confined to small type. The formalistic nature of resonance is explained in crystal clear terms. Among the features of this chapter is a very detailed account of the theory of color. Here one can successfully make reasonable predictions from rather simple theoretical arguments.

The section on the metallic bond contains a short but clear account of the Sommerfeld theory of electrons in metals and the Brillouin zone theory. There is a cursory treatment of semi-conductors which could have been considerably extended in view of the large interest which was developed in this subject in recent years.

The last section (van der Waals bonding) deals with a wide variety of phenomena including molecular compounds (clathrates, urea compounds, etc.), solubility and cohesive energies and the hydrogen bond. Although the electrostatic origin of the inverse sixth power of the distance for van der Waals forces is outlined, there is no derivation of London forces which, after all, is usually far greater than the Keesom and Debye contributions.

This book lies somewhere between Pauling's classic and the treatise of Syrkin and Dyatkina in that the physical arguments are better presented than in the former and the chemical arguments are better presented than in the latter.