

at C-2 or C-4. While we are attempting to distinguish rigorously between the two possibilities for B, we consider the α, α' -dipyrromethene III, formed from A + B, to accommodate the properties of prodigiosin better than the α, β' -alternative II.

We thank Drs. M. Bunting, D. Bonner, U. Senter, H. Vogel, and the Lederle Laboratories of the

American Cyanamid Co. for generous assistance in the microbiological phases of this work.

CONTRIBUTION No. 1590
DEPARTMENT OF CHEMISTRY
YALE UNIVERSITY
NEW HAVEN, CONNECTICUT

HARRY H. WASSERMAN
JAMES E. MCKEON
LEWIS SMITH
PETER FORGIONE

RECEIVED OCTOBER 26, 1959

BOOK REVIEWS

Elasticity, Plasticity and Structure of Matter. Second Edition. By R. HOUWINK. Dover Publications, Inc., 920 Broadway, New York 10, N. Y. 1958. xviii + 368 pp. 13.5 × 20.5 cm. Price, \$2.45.

This book, which had been received with acclaim when first published in 1937, may now be considered a classic. It represented a rather successful attempt to present a physical outlook on diverse chemical and rheological observations of such systems as clays and doughs, synthetic and natural polymers and crystals.

Although the theories advanced two decades ago may appear inadequate today to describe "structure," the work provides a good survey of the phenomena of elasticity and plasticity. The revisions incorporated into the second edition (1952) still kept the point of view of 1937, although a section on the statistical theory of rubber elasticity was added.

In spite of its age, the book presents the field of rheology in a manner worth reading today. A reissue is thus amply justified. This economical, paperbound reproduction of the second edition should find itself in the libraries of rheologists who will find in it valuable history and of others who will discover a readable account of an important field.

RESEARCH SERVICE DEPARTMENT
AMERICAN CYANAMID COMPANY DONALD L. SWANSON
STAMFORD, CONNECTICUT

Organic Sequestering Agents. A Discussion of the Chemical Behavior and Applications of Metal Chelate Compounds in Aqueous Systems. By STANLEY CHABEREK, The Dow Chemical Co., and ARTHUR E. MARTELL, Clark University. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. xv + 616 pp. 16 × 23.5 cm. Price, \$25.00.

In this book the authors have accomplished their stated aim admirably, namely, "to employ the principles required for an understanding of the behavior of aqueous metal chelates as a basis for understanding the varied functions and uses of chelating agents and metal chelate compounds." The book is definitely not a mere revision of "The Chemistry of the Metal Compounds" by Martell and Calvin.

The first third of the book, Chapters 1-4, may be considered as a presentation of fundamental principles involved in the stoichiometry, structure and stability of metal chelates and the methods used in determining these properties. There is no discussion of the theories of the coordinate bond, this subject being considered by the authors as beyond the scope of the book. There are excellent discussions of hydrolysis of metal chelates.

Chapter 5 is a good treatment of "metal buffer" systems, in which chelating agents regulate metal ion concentrations.

The remaining three chapters, comprising over half of the text, is devoted to the role of chelating agents in analytical chemistry, in industry, and in biological systems. The subject is discussed from both theoretical and practical points of view.

In the appendix the authors have tabulated about 2000 reported stability constants.

The book is profusely documented, although the reviewer found no satisfaction in being referred on page 39 to "un-

published results" for the demonstration of the related cyclic trimer, $(Cr(tren)(OH))_3$.

Every book contains some unavoidable errors, but a few in this book leave the reviewer puzzled. For instance, on page 34 a structural formula is given for a (biscitratodioxouranate(VI))⁻⁶ ion, although there is long-standing evidence in the literature that citrate does not chelate the uranyl ion in greater than a 1:1 citrate/uranium ratio even in eight-fold excess citrate. Also, on page 308 the weaker chelation tendency of tartrate ion relative to that of the citrate ion is explained on the basis of tridentate chelation by two alcoholic OH groups and one carboxyl group in the case of the tartrate ion in preference to chelation by one ethanolic group and two carboxyl groups as depicted for the citrate ion. There is no evidence in the literature for the type of tridentate chelation attributed to the tartrate ion. On the contrary, the literature shows that tridentate chelation by tartrate is similar in type to that by malate and citrate, *i.e.*, involving two carboxyls and one alcoholic hydroxyl, as is shown on page 448 for ferric citrate. In fact, the authors abandon their own arguments of page 308 in citing on page 448, as a possible structure for the magnesium citrate chelate, formula IX.

This book should be of greatest value to the beginner in the field of metal chelates and to those primarily interested in applications. Even the tyro should find it to be smooth reading and easily understandable, although he may in a few cases have difficulty in distinguishing between proven explanations and unsupported speculations.

The book is quite free of typographical errors. The quality of the binding and paper is good, but the price of the book seems inflationary.

DEPARTMENT OF RADIATION BIOLOGY
SCHOOL OF MEDICINE AND DENTISTRY ISAAC FELDMAN
UNIVERSITY OF ROCHESTER
ROCHESTER, NEW YORK

Anleitungen für die Chemische Laboratoriumspraxis. Band X. **Gaschromatographie.** By ERNST BAYER, Privatdozent an der Technischen Hochschule Karlsruhe, Institut für Organische Chemie. Edited by H. Mayer-Kaupp. Springer-Verlag, Heildelberger Platz 3, Berlin-Wilmersdorf, Germany. 1959. viii + 163 pp. 16 × 23.5 cm. Price, DM 39.60.

This little monograph describes the correlation of an obviously extensive literature survey. It is divided into four chapters and two lengthy appendices.

The book is designed to deal with the practical aspects of the analytical applications of gas chromatography. This point is exemplified by the length, 12 pages, of the chapters devoted to introductory material and to the theoretical foundations of the technique. The principles of linear, ideal chromatography are clearly enunciated and equations given for the calculation of the number of theoretical plates, etc. Linear, non-ideal chromatography receives passing mention by quoting the van Deemter equation. Although the implications of this equation are not discussed in detail, a copious selection of references to the bibliography is given. An interesting anecdote is the revelation, page 6, that a form of gas chromatography was reported in the year 1512.