

that will affect such patterns for many years to come. All will agree, too, that his work has indicated clearly the importance of coordination in many seemingly otherwise unrelated areas of the science. Professor Schwarzenbach's application of quantitative techniques to coordination chemistry alone has been a major factor in charting its progress.

The volume is introduced by a summary of Professor Schwarzenbach's contributions, ranging from "the proton to the metal ions." There follows an intriguing discussion by Professor L. G. Sillén on "Thoughts during a Walk in Lapland," after which there are papers dealing with a wide variety of topics—from stabilities of complex species to bonding, from structures to reaction mechanisms, from analytical applications to chromophores, from physical measurements to biochemical implications, to cite but a few. The roster of authors is a listing of the names of many of the important workers in coordination chemistry from around the world. The styling and referencing are uniform, but each contributor has been given freedom to include what he deemed desirable. Articles are in either English or German.

It is neither possible nor profitable to attempt a detailed criticism of every contribution. The reviewer's general impressions are excellent. The individual papers are well conceived and executed. Many tabulations and carefully prepared drawings appear throughout the volume. The referencing appears to be up to date and adequate. The printing, binding, and other mechanical details have been handled with unusual care. Errors are few and quite generally insignificant.

In the opinion of the reviewer, this volume is not only a fine memorial but also a significant contribution which every scientist who is concerned with coordination chemistry will wish to consult.

Therald Moeller

*Noyes Chemical Laboratory, University of Illinois
Urbana, Illinois*

The Macromolecular Chemistry of Gelatin. By ARTHUR VEIS, Department of Biochemistry, Northwestern University, Chicago, Ill. Academic Press Inc., 111 Fifth Ave., New York, N. Y. 10003. 1964. x + 433 pp. 16 × 23.5 cm. \$14.50.

This is the latest in a series of volumes being published by Academic Press under the general title "Molecular Biology: An International Series of Monographs and Textbooks." The subjects covered to date have ranged from protein structure through polyelectrolytes, fluorescence assay methods, and molecular genetics, to gelatin chemistry and structure. This divergence of topics certainly testifies to the breadth of molecular biology, but provides little in the way of a detectable theme to interrelate the books themselves.

In the Preface, Dr. Veis states that he had two primary objectives in writing this monograph. He intended "... to analyze the outstanding attributes of the gelatins in terms of specific chemical or structural features ... and to point out those areas of study concerning the gelatins which may be used to further our understanding of the parent, biologically significant, collagen fiber systems. ..." Dr. Veis, by virtue of his years of experience in many aspects of gelatin research, is uniquely qualified to write such a book, and he has succeeded impressively in attaining his announced goals. Numerous books and reviews, focused primarily on collagen and dealing only tangentially with gelatin, have appeared in recent years. But this is the first major monograph in some time which is addressed to a general audience, and in which gelatin holds the center of the stage.

The book is divided into five major chapters. The first, entitled "Collagen," provides a brief, clear, and elegant synopsis of what is currently known of the chemistry and structure of collagen in solution and in fibers. This chapter serves the rest of the book as a point of reference to relate the various properties of gelatin to the parent material. The second chapter, on "The Molecular Characterization of Gelatin," is an extensive description of the numerous physico-chemical measurements which have been made on gelatin in solution. Discussion of the results obtained with each method (*e.g.*, osmotic pressure, light scattering, viscometry, sedimentation analysis, and so forth) is prefaced in each case by a three- or four-page summary of the principles of the technique. These summaries, unlike those found in most books of this type, are genuinely helpful in that they really pinpoint and clearly describe the physical essence of each approach. This section also contains an interesting, though far too brief, description of the uses of complex coacervation in fractionating gelatins. A good deal of the most

useful work in this area has been done in the author's laboratory, and it is a pity that he has not taken the opportunity to deal more extensively with this potentially very useful, but very little known, technique. However, taken all together and despite the intrinsic interest of the subject matter, the over-all impression left by this chapter is a sense of frustration at how little (per unit effort invested) the methods of solution physical chemistry have added to our knowledge of gelatin structure.

Chapter III deals with "The Conversion of Collagen to Gelatin" in terms of two extreme starting materials: the acid-soluble monomeric collagen macromolecule and the completely insoluble collagen fabric of mature mammalian connective tissue. The chapter concludes with an interesting introduction to the principles of the commercial manufacture of gelatin. There are many facts in the industrial gelatin literature which would be of considerable interest to the molecular biologist concerned with collagen, if only he were aware of them. This section provides a useful point of departure for looking into this literature.

Chapter IV concerns "The Degradation of Gelatin," and considers both chemical and enzymatic methods of cleaving the peptide backbone of the gelatin molecule, and of modifying various of its functional groups.

Chapter V, which comprises the last third of the book, covers in detail "The Gelatin → Collagen Transition"; that is, it deals with the problem of how random coil gelatin, on cooling, gets itself part-way or completely back to the native collagen structure. This subject is of particular interest because it is the partial return to the collagen structure which is responsible for many of the unique properties of gelatin, including its gelling behavior, its ability to function as a glue, and so forth. In addition, studies of the kinetics of the reversion process offer particularly useful insights into the mechanisms by which the collagen structure is set up and stabilized *in vivo*. In terms of structure (both molecular and literary) this chapter closes the ring, bringing us back again to the original collagen with which we started Chapter I.

Taken as a whole, the book is very well written and profusely illustrated. The extensive bibliographies alone (ranging well into 1963) make it invaluable to workers in the field. However, it should be pointed out that this book is *not* a definitive compendium dealing only with well-established principles. Rather, it is a highly personal document in which the field (including currently controversial areas) is described as seen through the eyes of one highly qualified, but not infallible, individual. This statement is not intended as criticism, especially since this approach makes the book very readable, and since the author himself announces in the Preface that he intends to proceed in just this way. But it is a fact of which the reader should remain aware, in that this approach sometimes leads Dr. Veis to views and interpretations which are by no means universally accepted. One case in point (particularly jarring to this reviewer since it concerns his own work) begins with the erroneous assertion that melting (phase transition) temperatures, measured in solution on cooled gelatins which have not attained their final degree of helicity, differ from those obtained at equilibrium. This misconception tends to confuse some of the ensuing (pp. 374–384) discussion of mechanisms of the effects of neutral salts on the collagen-type helix.

However, this is a minor point, and it should be reiterated in closing that Dr. Veis has written a very interesting and important book which should be in the library of every research worker seriously concerned with the structure and properties of collagen and gelatin.

Peter H. von Hippel

*Department of Biochemistry, Dartmouth Medical School
Hanover, New Hampshire*

Guide to Activation Analysis. Edited by WILLIAM S. LYON, JR., Leader, Nuclear-Radiochemical Group, Analytical Chemical Division, Oak Ridge National Laboratory. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. 1964. xix + 186 pp. 16 × 24 cm. \$5.95.

Radioactivation has become a standard method of analysis, not only for the determination of trace elements, but also for rapid non-destructive analysis of minor and even major constituents in appropriate matrices. The technique is of great value in such diverse fields as biology, metallurgy, geochemistry, crime detection, solid-state physics, and space science.

The idea for a Guide to Activation Analysis was first proposed by the Advisory Committee on Isotope and Radiation Development of

the Atomic Energy Commission. The resultant compact volume is authoritative, having been written and edited by members of the staff at the Oak Ridge National Laboratory, a center where an enormous number of radiochemical analyses has been performed. The book is intended to provide the uninitiated with sufficient information for him to plan and commence operation with only limited direct assistance from experts. Clearly not all relevant material could be included in a relatively small guide, and the authors have restricted the more detailed discussions to those subjects that have been incompletely treated in other compilations or have been discussed primarily in scientific journals and reports. Nevertheless, appropriate lists of references are provided throughout.

Although most of the chapters in the book have been written by different authors, the subject has been approached in a systematic and consistent manner. To indicate the arrangement it is convenient to list the titles of the different chapters: (1) "Basic Nuclear Properties and Activation Analysis," by Harley H. Ross; (2) "Reactor Neutron Flux: Characteristics and Uses," by Frank F. Dyer; (3) "Nonreactor Neutron Sources," by James E. Strain; (4) "Radiochemical Separations," by Harley H. Ross; (5) "Radiation Detectors and Counting Statistics," by Richard L. Hahn; (6) "Scintillation Counting Techniques," by James S. Eldridge; (7) "Present Byways and Future Trends in Activation Analysis," by William S. Lyon, Jr.; and (8) "Practical Examples of Activation Analysis," by E. Ricci.

There are two appendices. Appendix A tabulates the theoretically calculated sensitivity for each element and also concentrations of the element found in a wide variety of materials. Copious references to the original investigations are listed. Appendix B presents a brief general survey of safety measures and licensing requirements.

Some features of the book deserve particular mention:

The energy distribution of neutrons in reactors and flux monitoring are dealt with in greater detail than in other books on activation analysis.

A realistic appraisal of the use of 14-Mev. neutron generators is made and limitations as well as advantages are clearly presented.

Brief information regarding the use of semiconductor detectors is given. Although such solid-state devices may not be very useful in activation analysis at present, they possess potential for future development.

The applicability of NaI(Tl) crystal scintillation spectrometry in activation analysis is well illustrated, and factors governing the choice of a multichannel analyzer are given.

In Chapter 8, four well-chosen examples of activation analysis are dealt with in detail. Relevant calculations are presented in full, and the account provides the beginner with a clear insight into "how it is done."

The general standard of the book is high and it would be invidious to select points for criticism. However, I consider that the principle of substoichiometric separations should have been discussed (in Chapter 4). Also, the extension of gamma spectrometry by the use of coincidence techniques could have been mentioned with advantage in Chapter 6.

The printing and production of the volume are good. Proof-reading has been done quite well. (It is perhaps ironical that on page 12, Mg²⁸ has been written for Mg²⁴ in a subsection headed Errors!)

All persons who are concerned with activation analysis should be glad to possess a copy of this book.

D. F. C. Morris

*Department of Chemistry, Brunel College
London, W3, England*

The Nuclear Properties of the Heavy Elements. Volume I. Systematics of Nuclear Structure and Radioactivity. Volume II. Detailed Radioactivity Properties. Volume III. Fission Phenomena. I and II by EARL K. HYDE, Senior Chemist, and ISADORE PERLMAN, Associate Director and Professor of Chemistry, Lawrence Radiation Laboratory, University of California, Berkeley, and GLEN T. SEABORG, Chairman, U. S. Atomic Energy Commission, Professor of Chemistry, University of California, Berkeley. III by EARL K. HYDE. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1964. I: xv + 407 pp. 16 × 23.5 cm. \$15.00. II: xvi + 698 pp. 16 × 23.5 cm. \$25.00. III: xviii + 519 pp. 16 × 23.5 cm. \$18.00.

The understanding of the properties of nuclear matter is expanding rapidly, paralleling the increasing multiplicity of available high-

speed digital computers and nuclear particle accelerators. The literature on any given topic, as in most fields, tends to be spread in bits and pieces throughout a variety of journals, and to make a bad situation worse, a large amount of significant work is to be found only in laboratory reports which are never quite submitted for publication. The three volumes under discussion represent an attempt to correlate and integrate all the pieces of information, both theoretical and experimental, pertaining to the nuclear properties of the heavy elements; the authors have succeeded in providing a good perspective and in an authoritative manner.

Volume I reviews nuclear stability and nuclear mass equations, the independent particle model, the unified model, and theoretical models of α - and β -decay. The experimental knowledge of these processes is summarized, and the strengths and weaknesses of various theoretical treatments are illustrated with respect to the available experimental data. Volume I concludes with a discussion of general methods of synthesis of radioactive isotopes.

Volume II concentrates on an isotope-by-isotope summary (historical review, methods of synthesis, nuclear properties) of all isotopes of $Z \geq 82$. Not having any favorite isotopes to look up, the reviewer found the chapters on applications of heavy elements to geochronology and on synthesis of the transuranium elements of particular interest.

Volume III starts with a review of several models used to explain certain aspects of nuclear fission, followed by a quite complete summary and correlation of existing data on low, moderate, and high-energy fission, including fission induced with complex particles, mesons, and photofission. In keeping with the thorough and logical correlation provided by the authors, an excellent discussion of spallation mechanisms is also included in Volume III.

The material is presented in a logical sequence; the text has been skillfully woven with a profusion of lucid tables and plates to give "The Nuclear Properties of the Heavy Elements" an uncommon clarity of expression. The documentation is superb.

The authors have succeeded admirably in providing a perspective of the historical development and present understanding of certain features of nuclear matter, as well as pointing out the open problems for future solution. The reviewer looks forward to using Volumes I and III as supplements to the text in his nuclear chemistry course; all three volumes are invaluable as references for chemistry, physics, geology, or radiation biology research libraries.

Marshall Blann

*Department of Chemistry, University of Rochester
Rochester, New York*

Experimental Chemotherapy. Volume III. Chemotherapy of Bacterial Infections. Part II. Chemotherapy of Fungal Infections. Chemotherapy of Rickettsial and Viral Infections. Edited by R. J. SCHNITZER, formerly Chemotherapy Department, Hoffmann-LaRoche Inc., Nutley, N. J., and FRANK HAWKING, Division of Chemotherapy and Parasitology, National Institute for Medical Research, London. Academic Press, Inc., 111 Fifth Ave., New York, N. Y. 1964. xviii + 647 pp. 16 × 23.5 cm. \$22.00 (until Dec. 31, 1964); \$25.00 (thereafter).

It can be predicted with considerable assurance that any chemist or biologist who is seriously interested in chemotherapy will find Volume III, as well as Volumes I and II of this outstanding series, irresistible. The series is outstanding because in it the wealth of otherwise widely scattered information on all important aspects of experimental chemotherapy has been collected, classified, condensed, described in meaningful fashion, and made readily retrievable by means of excellent subject indexes. In recent years, many first rate reviews of the chemotherapy of infectious diseases have appeared and several reviews on the characteristics and uses of specific groups of chemotherapeutic agents have been published. All of this material, and much more, has now been crystallized in three handy volumes. Nowhere else can one expect to find so much information on so many aspects of experimental chemotherapy in such concentrated form. Every medicinal chemist needs these books on his main shelf. The distinguished editors, the authors, and the publishers of this series all merit the highest commendation for a job well done.

In the first volume, parasitic diseases (protozoan and metazoan) were covered by eighteen chapters on the chemotherapy of specific kinds of infections, along with four ancillary chapters on historical aspects, toxicology, statistics, and "drug resistance." In the second volume, the chemotherapy of bacterial infections was dealt with,