lates the distribution coefficients of simple and complex ions of all of the elements. It also describes how these distribution coefficients can be applied to predict separations. An example of a qualitative separation scheme for a mixture of 10 elements from various groups is given. The Introduction is followed by more detailed descriptions of methods for separating the elements of each of the groups. One of these sections describes the separation of the actinides and compares their order of elution with that of corresponding members of the rare earths series.

Chapter 16, "Chromatographic Separation of Anions," is also new although part of its content was included in the first edition. It considers the more common anions; separation of the metal complex anions was covered in Chapter 15.

Chapter 17, "Inorganic Qualitative Analysis," appears in both editions but has been somewhat expanded in the latter. It is not apparent why the author retained this chapter in the new edition rather than presenting the material in earlier chapters where it would appear to fit. The description of the use of exchangers in "Spot Tests and Indicators" in this chapter is new and summarizes numerous publications describing these applications which have appeared since the first edition.

In conclusion, "Ion Exchange Separation in Analytical Chemistry" appears to be a well-organized presentation of the use of exchange resins for chemical separations. It should be of considerable value to analytical chemists and is a good general reference for all chemists.

Edward R. Tompkins

U. S. Naval Radiological Defense Laboratory
San Francisco, California 94135

Progress in Solid State Chemistry. Volume 1. Edited by H. REISS, North American Aviation Science Centre, Canoga Park, Calif. The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. 1964. vii + 536 pp. 16.5 × 24 cm. $17.50.

It is not so long since the phrase "solid state" automatically implied a branch of physics; in retrospect this is a puzzling act of surrender on the part of chemists who have been concerned with the solid state since the inception of their subject. As pointed out by Professor Tompkins in the preface, the division of the subject between physicists and chemists—in so far as workers in either of these groups accept *any* division—is that physicists are interested mainly in the theory of the subject and an understanding of its implications; for the chemist, however, the subject is a much wider one, being concerned with the correlation of structure, energetics, reactivity, etc.—in short, almost the whole of physical chemistry.

This series sets out to provide at regular intervals a series of reviews on topics of current interest. In this first volume there are a large and varied number of articles. The Reviewer does not pretend to be knowledgeable on more than a few of these and, therefore, his remarks are restricted to a few articles in particular and to providing a summary in general of the book. In all there are eleven contributions. In a brief Chapter I, H. P. Kirchner discusses "The Thermal Expansion of Ceramic Crystals." Much original experimental data are provided and such theoretical understanding as is available is introduced. A good chapter is provided by M. F. C. Ladd and W. H. Lee dealing with "Lattice Energies." The latest experimental data are given and the variations between these values are discussed. A. Kjekshus and W. B. Pearson discuss phases with nickel arsenide structures in a long chapter in which structural data and magnetic and electrical properties are brought together. D. Grieg discusses "Lattice Imperfections and the Thermal Conductivity of Solids," while in the fourth chapter D. W. G. Ballentyne surveys briefly "Photoluminescence, Electroluminescence and Structure." "Ferroelectricity in Crystals" is surveyed by C. F. Pulvan in a long article in which a considerable amount of original work is presented. J. C. Woolley discusses alloy semiconductors; naturally most of the attention is devoted to the (post-) transition elements of interest in transistor work. Some aspects of organic semiconductors are examined by H. A. Pohl; there are no less than 176 references to this subject even though most of the work has been carried out in the past 10–15 years. L. V Azaroff discusses "X-Ray Diffraction Studies of Crystal Perfection," and the "Applications of Nuclear Quadrupole Resonance" are reviewed by G. A. Jeffrey and T. Sakurai. I found the latter chapter very stimulating; one hopes that perhaps this technique will help in the assignment of structure in the solid state in the future as n.m.r. has done for liquids and solutions. The final chapter by D. K. Huggins and H. D. Kaesz discusses the use of "Infra-red and Raman Spectroscopy in the Study of Organometallic Compounds." A wealth of original experimental data are presented and, although the limited space available prevents detailed discussion, the authors are able to show how widely applicable these techniques are for structural assignments.

This book is one which libraries will need to make available to chemists, but later volumes will prove more useful if fewer, but longer articles are provided. In articles such as these, it seems to the reviewer that the writers should be given scope to develop *ideas* as much as to present *facts*. One looks forward to Volume II wondering whether the Editor will be able to continue the superb impetus of Volume I.

R. S. Nyholm

Department of Chemistry, University College
London W.C.1, England

Mammalian Protein Metabolism. Volumes I and II. Edited by H. N. MUNRO, Department of Biochemistry, The University, Glasgow, Scotland, and J. B. ALLISON, Bureau of Biological Research, Rutgers, The State University, New Brunswick, N. J. Academic Press Inc., 111 Fifth Ave., New York 3, N. Y. 1964. 16 × 23.5 cm. Vol. I: xv + 566 pp. $18.50. Vol. II: xv + 642 pp. $21.00.

This two-volume treatise by a distinguished international group of authors will be of considerable value to the advanced student or investigator interested in mammalian protein metabolism. Volume I contains an excellent introductory historical chapter and Part I, "Biochemical Aspects of Protein Metabolism," comprising 10 chapters which cover all aspects of the field. These chapters include: digestion and absorption (two chapters), free amino acids and peptides in tissues, metabolic fate of amino acids, protein biosynthesis (two chapters), metabolism of plasma proteins, regulation of protein metabolism (two chapters), and elimination of nitrogen from the body. Volume II contains Part II, "Nutritional Aspects of Protein Metabolism," in six chapters and Part III, "Pathological Aspects of Protein Metabolism," in six chapters; this volume will be of particular interest to those concerned with problems in human metabolism and nutrition.

It would be unjust to single out for special mention specific chapters in a treatise by more than 30 authors. In general, the work is authoritative and clear in presentation. Some chapters are succinct in presentation summarizing major aspects of very large and general fields, but all chapters contain adequate references to other reviews as well as to specific papers. Other sections of the work, mainly in the more specialized areas of mammalian protein metabolism, are more complete in coverage. Fortunately for the progress of science and unhappily for authors, the interval between writing and publication of bound volumes inevitably leaves some gaps between the printed page and the actual state of knowledge in rapidly developing areas of investigation. The present work is no exception, but fortunately only a few chapters appear somewhat dated.

The volumes display careful editing and each contains complete author and subject indexes.

Emil L. Smith

Department of Biological Chemistry, School of Medicine
UCLA Center for Health Sciences, Los Angeles, California

Molecular Complexes in Organic Chemistry. By LAWRENCE J. ANDREWS and RAYMOND M. KEEFER, Department of Chemistry, University of California, Davis, Calif. Holden-Day, Inc., 728 Montgomery St., San Francisco, Calif. 1964. vii + 196 pp. 18 × 25.5 cm. $8.75.

This book was read with the bias of one who from 1953–1957 had occasion to determine many association constants by the spectrophotometric method using a modification of the Benesi–Hildebrand treatment proposed by the authors of the present text; who found that the constants obtained frequently varied with the wave length of measurement and the concentration ranges of the components; who observed cases where the spectrophotometric method gave values in disagreement with those obtained by other physical methods; who noted instances where the treatment appeared to indicate the presence of complexes where none in fact existed; and who was led, finally, to question the significance of many of these spectrophotometrically determined values. In all of these