more informative than a review paper". This aim has been reasonably successful in all chapters except the first ("Transport Processes in Membranes"), which is too concise for all but the highly specialized reader.

The terseness of Chapter 1 contrasts sharply with the very relaxed, almost chatty approach to "Ion-Exchange Selectivity" (D. Reichenberg, Chapter 7), in which the appeal to thermodynamic concepts is rather over-simplified; in which the demonstration (page 230) of the concept of corrected selectivity coefficient is rather unconvincing; and in which his assertion (page 236) of the wide application of a form of approximation which rests on only two quoted examples is somewhat facile.

Further consideration is given to the subject of selectivity in Chapter 8 (Diamond and Whitney). The overlap that occurs between Chapters 7 and 8 has the support of the editor (footnote, page 280) and indeed provides a valuable "second opinion". Their account is both clear and critical; but the introduction of equation (12) on page 290 is quite unnecessary in the light of the mathematical standards required in this book (particularly in Chapters 1 and 9).

The volume also contains generally well written accounts of ion-exchange kinetics by F. Helfferich; ion-exchange studies of complex formation by Y. Marcus; liquid ion-exchangers by E. Högfeld; studies of ion-exchange systems using microscopy by D. H. Freeman; and heterogeneity and the physical chemical properties of ion-exchange resins by L. S. Goldring.

The editor, J. S. Marinsky, provides a satisfactory coda, with a clear and interesting account of modern theories of polyelectrolytes and their extension to the interpretation of ion-exchange phenomena.

The book is generally well produced, with clear diagrams and photographs, but unfortunately not without printing errors; for example, in Fig. 11 on page 245 the abscissa is surely wrong; on page 295, line 18, the word "less" is missing; on page 363 equation (27) is incorrectly type set, and in equation (31) the superscript is missing from n_2^0. It is well to mention, too, that only at the end of Chapter 1 is there a list of symbols used; while in Chapters 7 and 9, symbols are introduced the significance of which is not clarified until several pages later. T. HENSHALL

COPPER IN THE BODY

The Biochemistry of Copper

Edited by J. Peisach, P. Aisen and W. E. Blumberg. (Proceedings of the Symposium on Copper in Biological Systems, held at Arden House, Harriman, New York, September 8–10, 1965.) Pp. xvi + 588. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1966.) 188*s*.

THE proceedings of this symposium is of considerable interest to those research workers who are concerned with the role of copper in metabolic reactions, and to many others interested in the detailed physical chemistry of the formation and reactions of the copper complexes. Since the first symposium held at the Johns Hopkins University in June 1950, the whole concept of research into the metabolism of copper has changed. At that meeting, the main emphasis was on the part played by copper as a micronutrient in plant and animal metabolism, and considerable stress was made of the interrelationships that exist between the various micronutrients.

In this symposium, thirty-seven papers are presented in five separate sections. The first section deals with the way in which studies have been made on the copper chelates such as the copper peptide complexes. Crystal studies by X-ray crystallography and electron paramagnetic resonance spectroscopy have led to a considerable compilation of data on the stability and three dimensional shapes involved in these structures. In the second section the action of copper present in biological tissues is considered with special reference to its effect on the brain. The third section is concerned with the present knowledge of the state and function of the copper component of cytochrome oxidase. In the fourth section the activation and inhibition reactions of the polyphenol-oxidases related to plant biochemistry are considered. These studies show in more detail the way in which the copper is associated with the enzyme moiety and extend considerably the work presented in the first symposium. Both human and animal work are presented in the fifth section; studies on amine oxidases, the haemocyanins from snails, and the clinical and radiochemical work on Wilson's disease are given. The papers presented in the final section are concerned with the structure and reactions of the copper protein found in blood known as ceruloplasmin.

The impressive titles of these papers might suggest to a casual reader that our knowledge of the biochemical reactions in which copper takes a part is almost complete. This impression is soon dispelled when one reads the verbatim account of the discussion which follows each paper. This book is extremely well presented and illustrated, but I fear that its price will considerably limit its sale. P. J. WARREN

ENDOCRINOLOGY TODAY

Recent Progress in Hormone Research

Vol. 22. Edited by Gregory Pincus. (Proceedings of the 1965 Laurentian Hormone Conference.) Pp. viii + 593. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1966.) 200*s*.

AT the 1965 Laurentian Conference fourteen papers were delivered and in this volume they and the ensuing discussions are presented. The standard is high and contents varied. Randall and his co-workers develop with great clarity our understanding of how insulin works in those biochemical pathways which lead to the substitution of glucose for fatty acid as the fuel for respiration in muscle. Daughaday and Kipnis review experimental studies of the action of growth hormone on cartilage, skeletal muscle and adipose tissue.

One of the most interesting papers is the description by Potts, Aurbach and Sherwood of the chemical form and properties of parathyroid hormone—the pure hormone polypeptide with a molecular weight of 8,500 which is single chain in form. It should not be long before we have the entire structural form of the hormone. Bergström also reports progress on the elucidation of the structural formulae of the prostaglandins, although one wonders if discussion of these substances should feature in an endocrinological symposium. Wolfson brings us up to date in his studies of environmental and neuro-endocrine regulation of the annual gonadal cycle of birds.

In common with most other contemporary endocrine conferences the mode of hormone action is discussed. In this colloquium, as in recent years, it is the action of aldosterone on permeability characters of an isolated membrane, the toad bladder, and the action of the insect hormone ecdysone on nuclear changes which command attention. Sharp and Leaf conclude that the primary action of aldosterone is to allow more sodium to enter the mucosal surface of the bladder epithelium, possibly by inducing synthesis of proteins which facilitate this entry, while Karlson and Sekeris regard ecdysone as a hormone best understood by its influence on the induction of messenger RNA synthesis.

Finally, maintaining balance and perspective, three papers deal with the clinical aspect of steroid hormones.

A. J. MATTY