Book Reviews

Static and Dynamic Electron Optics. An account of focusing in lens, deflector, and accelerator. Cambridge Monogr. on Mechanics and Applied Mathematics. P. A. Sturrock. Cambridge Univ. Press, London, 1955. x + 240 pp. $5.50.

The range covered by this book is indicated more clearly by the subtitle "An account of focusing in lens, deflector, and accelerator." On the other hand, the subtitle should not mislead the reader into thinking that the book is concerned with devices. It is not. The emphasis is on the focusing. Furthermore, as the author makes plain in the preface, if not in the title, this is a theoretical treatise. Examples illustrating the theory are used sparingly.

In brief, the book is a treatise on geometric electron optics based, almost entirely, on the use of variational principles and the Hamiltonian characteristic functions in particular. The portion on static electron optics proceeds, after a brief introductory chapter, to a general treatment of path ensembles in the electric and magnetic field; imaging along curvilinear axes; the focusing properties of rotationally symmetric fields, including a derivation of third-order geometric, chromatic, and "relativistic" aberrations and the effect of space charge and asymmetries; and focusing in fields with mirror symmetry as encountered in deflection fields and particle spectrometers.

In the second part, on dynamic electron optics, time is introduced as an added variable in the characteristic function, and emphasis is placed on the "stability" of path ensembles—that is, the convergence or divergence of their envelopes. Its two chapters deal, respectively, with uniform focusing in particle accelerators, as illustrated by the original synchrotron and linear accelerator, and periodic focusing, exemplified by the strong-focusing synchrotron.

The scope of the book does *not* include the determination of focusing fields, focusing by electron mirrors, and the behavior of beams in fields in which there is a dynamical interplay between space charge and electrode potentials.

Even so, confining the information contained in it to 240 pages is a remarkable accomplishment. It is made possible in part by making greater claims than usual on the reader's familiarity with theoretical mechanics and matrix and vector operations, in part by the practically complete avoidance of repetition. Finally, choices of units that eliminate constant coefficients simplify formulas and equations. This may well be worth while, even though it robs the reader of the comfort of dimensional checks and makes casual reference somewhat more difficult.

In summary, Sturrock's book is a unique and valuable contribution to the literature of electron optics. It is not an easy book to read. However, a careful perusal is likely to prove both stimulating and highly rewarding.

E. G. Ramberg

RCA Laboratories

Vitamins and Hormones. vol. XIII. Robert S. Harris, G. F. Marrian, and Kenneth V. Thimann, Eds. Academic Press, New York, 1955. xi + 382 pp. $9.

The marriage between the sciences of nutrition and endocrinology, arranged by the editors in 1943, in volume I of this series, continues to show no signs of strain or dissolution, like any good *mariage de convenance*. The present volume contains nine chapters by authors in four countries, five related to vitamins, two dealing with other nutritional topics, and two with hormones.

The eclecticism that results in the assembling of nine diverse surveys really means that within the covers of this volume one has nine small books—which would demand, at least, nine small reviews. But this, like small praise, would be damning, and the reader will understand if I settle for a brief run-through.

A. E. Axelrod and J. Pruzansky have set forth "The role of the vitamins in antibody production" and, by dissecting their analysis away from the thorny problems of resistance to infection, have succeeded in giving the subject a degree of definition that it has heretofore never possessed.

Harry J. Deuel, Jr., and Raymond Reiser review the physiology and biochemistry of the essential fatty acids. This is straightforward and is in the nature of a progress report involving the application of the newer technology in lipid chemistry.

L. W. Mapson has totted up the present information on the biosynthesis of ascorbic acid, from D-glucose to the completely inverted L-ascorbate.

J. E. Ford and S. H. Hutner have pulled together the many diverse aspects of the role of vitamin B_{12} in microorganisms, especially as tools in the penetration into the nest of the rapidly spawning multiplicity of pseudovitamin B_{12} compounds.

Charles C. Ungley's thoughtful essay on the chemotherapeutic action of vitamin B_{12} contains an interesting synopsis of the present knowledge of Castle's intrinsic factor and nails to the mast, once more, the dictum that, with the exception of the action of vitamin B_{12a} in cyanide poisoning, the only certain chemotherapeutic action of vitamin B_{12} seems to be the correction of the metabolic disorder that results from an existing deficiency of the vitamin.

Lionel B. Pett, in a pithy piece, says some things about vitamin requirements of human beings that have needed saying. As Pett points out, we tend to ignore in these matters (i) biological variation, (ii) the phoniness of the view that consuming several multiples of demonstrable needs results in a kind of superhealth, and (iii) the undemonstrated basis of the view that to grow faster and larger is, *ipso facto*, an advantageous goal.

Dean A. Smith, in his view of parasitic infections and nutrition, is at his ease in dealing with the effect of the parasite on the nutrition of the host—which he finds is bad—but stumbles when he deals with the effects of host nutrition on the parasite and the disease it brings about.

W. S. Bullough concentrates on hormones and mitotic activity, but his contribution is overshadowed by the masterly essay of Oscar Hechter entitled "Concerning possible mechanisms of hormone action." Indeed, if the present volume has any claim to being memorable, it will be for its inclusion of this article by Hechter. Proceeding from an analysis of the operational bases of endocrinology, Hechter advances in the best scientific tradition to recover some important questions that have been lost in the modern mumble of answers. Like the best of philosophers, this author generates a certain disquietude and courageously, but modestly, stands against the stream of present preoccupation with energetics as suitable answers to all biological questions.

The widely accepted hormone-enzyme hypothesis here undergoes a searching cross-examination—and emerges scathed.

To this poverty of theoretical thought, Hechter brings some enriching gifts of his own and finally, having shown that the "old" pharmacologist's concern with cell membranes was not so naive after all, we are left with some hard-headed criteria against that day when we think we understand how a hormone "acts."

HOWARD A. SCHNEIDER
Rockefeller Institute for Medical Research

Recent Progress in Hormone Research. vol. XI. Proceedings of the 1954 Laurentian Hormone Conference. Gregory Pincus, Ed. Academic Press, New York, 1955. 518 pp. Illus. $10.

The Hormones. Physiology, chemistry and applications. vol. III. Gregory Pincus and Kenneth V. Thimann, Eds. Academic Press, New York, 1955. xiii + 1012 pp. Illus. $22.

The ten previous volumes of *Progress in Hormone Research,* the proceedings of the Laurentian Hormone Conferences, provide the best interpretative record in existence of the progress of endocrinology during the decade in question. The new volume, XI, maintains the fine tradition of those that preceded it. In a more encyclopedic vein, volume III of *The Hormones* presents the combined efforts of a distinguished group of investigators, ranging from botanists to internists, to record the current status of studies of internal secretion in plants and invertebrate and vertebrate animals. They, too, have succeeded well.

I was introduced to endocrinology at a time when the pioneer teachers, such as W. W. Swingle, covered all important aspects of their subject in the lectures of one course. A glance at these two volumes shows that such feats are no longer possible. The field must now be subdivided into its own specialties, which in turn pervade almost all branches of biological science. Volumes like the two under consideration provide the indispensable reference tools through which some degree of unity and coordination can be achieved.

The Laurentian volume contains reviews of work on the following new substances by the investigators most directly involved: crystalline neurohypophyseal hormones (van Dyke *et al.*), amphenone (Hertz *et al.*), halogenated corticoids (Fried *et al.*), and aldosterone (Simpson and Tait). In addition, there are authoritative presentations on the regulation of ACTH secretion (Munson and Briggs), metabolism of anterior pituitary hormones (Sonenberg and Money), hormones and abnormal growth (Furth; Rawson and Rall), the relation of hormones to aging (Engle; Pincus *et al.*), the mechanism of action of insulin (Levine and Goldstein), effects of ions and hormones on carbohydrate metabolism (Hastings *et al.*), and of humoral cardiovascular relationships (Stammler *et al.*; Shorr *et al.*). The value of each paper is enhanced by the inclusion of extensive and well-edited discussions in which many new contributions are noted.

The Hormones is in the tradition of the German *Handbuchs* and includes comprehensive chapters, each with an extensive bibliography, on the following broad topics: plant growth hormones (Thimann and Leopold), invertebrate hormones (Scharrer), neurohormones (Welsh), parathyroids (Greep and Kenny), insulin and glucagon (Stetten and Bloom), chemistry of the anterior pituitary hormones (Hays and Steelman), growth hormone and corticotrophin (Astwood), gonadotrophins and lactogen (Cowie and Folley), posterior pituitary (Landgrebe *et al.*), thyroid (Rawson *et al.*), steroid chemistry (Hirschmann), steroid metabolism (Dorfman), ovary and testis (Pincus), adrenal cortex (Noble), and clinical endocrinology (Paschkis and Rakoff).

ROBERT GAUNT
*Research Department,
CIBA Pharmaceutical Products, Inc.*

Protein Malnutrition. Proceedings of a conference in Jamaica sponsored jointly by the Food and Agriculture Organization of the United States; World Health Organization; and Josiah Macy, Jr., Foundation, New York. J. C. Waterlow, Ed. University Press, Cambridge, England, 1955. xvi + 277 pp. Plates.

This monograph covers the proceedings of a conference on malnutrition held in Jamaica in 1953. The discussion is divided into the biochemical aspects, the pathology, the clinical aspects and treatment, and the epidemiology and prevention of protein malnutrition. The conference is carried on in the manner characteristic of the Macy conferences. The participants discuss the presentation freely. The reader becomes part of the conference and is exposed to the different points of view of the various members.

The biochemical aspects are presented by J. C. Waterlow of the University College of the West Indies in Jamaica. A good deal of his discussion is concerned with the clinical condition known as *kwashiorkor,* which occurs in children in certain parts of the world and is associated with liver damage. In considering the state of protein depletion, he points out that the degree of depletion, the pattern of depletion, and its chronicity must be considered. The ultimate aim should be to find some means of assessing these three factors and studying how they interact in any given case.

The pathology of protein malnutrition is discussed by G. R. Bras of the University College of the West Indies in Jamaica. He describes venous occlusive disease (V.O.D.), a condition not seen in this part of the world. V.O.D. leads to severe pathological changes in the liver, sometimes indistinguishable from other infantile cirrhoses. It is frequently preceded by an acute infection, but it is always associated with malnutrition.

The clinical aspects and treatment of protein malnutrition are presented by M. V. R. Rao of the Haffkine Institute, Parel, Bombay, and are discussed in great detail by the group.

The epidemiology and prevention are presented by R. F. A. Dean of Uganda, East Africa. Discussion was aimed at the broad principles of prevention and treatment of malnutrition of children all over the globe. The question of the relation of the onset of the disease to the time of weaning was discussed at great length. It was obvious from the discussion that parasitic infestation and infection play a considerable part in the onset of the protein malnutrition diseases. Most of the members of the panel felt that it was important to derive protein from foods that could be grown locally.

This conference is excellent. The interruptions are sometimes a little disconcerting but always provocative. There is a tremendous amount of information in this monograph that will be of interest, not only to the individuals inhabiting the areas of the world where protein malnutrition in children has a high incidence, but also to those of us in this part of the world interested in the nutritional aspects of disease.

ELAINE P. RALLI
*Deparment of Medicine,
New York University College of Medicine*

Microscopy of Ceramics and Cements. Including glasses, slags, and foundry sands. Herbert Insley and Van Derck Fréchette. Academic Press, New York, 1955. xii + 286 pp. Illus. $7.50.

This book brings together the extensive data on ceramics and inorganic cements and the fundamental knowledge and techniques necessary for their study. Although the book is devoted chiefly to light microscopy, electron microscopy is discussed in several connections.

The fundamentals of crystal optics are not treated at length. Indeed, these essential principles are stated so tersely that