explanatory scheme is a gratuitous one, and by no means logically necessary as Dr. Peters claims. All that can be said is that certain kinds of scientific explanation are incompatible with goal-seeking and rule-following. Science, however, is not, as Dr. Peters seems to suppose, tied down to any particular form of explanatory model. Perhaps more promising than either the dogmatic dualism to which Dr. Peters himself adheres, or the mechanical monism which he criticizes, is an emergence theory which allows for the development of novel organizational levels, but sees these as fundamentally rooted in a common natural world.

L. S. HEARNshaw

PROGRESS IN VITAMIN AND HORMONE RESEARCH

Vitamins and Hormones

Advances in Research and Applications, Vol. 15. Edited by Prof. Robert S. Harris, Prof. G. F. Marrian and Prof. Kenneth V. Thimann. Pp. xi+355. (New York: Academic Press, Inc.; London: Academic Books, Ltd., 1957.) 9.50 dollars.

IT might have been expected that vitamins and hormones could not remain easy bed-fellows indefinitely, but for fifteen annual volumes there has been no sign of discord. It is perhaps natural that vitamins or nutritional problems often take precedence over hormonal ones in these annual volumes, but in the one under review an equal distribution of articles between the two fields of study has been achieved. Three of the articles are on vitamins and related substances, three are on hormones, one is concerned with both vitamins and hormones, and the remaining one, on the biosynthesis of cholesterol, is relevant to both fields of study in so far as cholesterol is a precursor both of steroid hormones and of vitamins D.

The first article, by A. W. Johnson and Sir Alexander Todd on the "Chemistry of Vitamin B₁₂", includes not only an account of the research on the isolation, structure, and chemical and physical properties of the vitamin and of substances related to it, but also a discussion of the biosynthesis of vitamin B₁₂ and related substances and the chemical determination thereof. "Total Syntheses of Carotenoids" are discussed by O. Isler and P. Zeller in an article which is a masterly chemical condensation. The metabolic importance of carnitine, a subject reviewed by G. Fraenkel and S. Friedman, which since 1952 has been recognized as an insect growth factor, is still not clear, but the relevant information is ably surveyed. In "The Biological Synthesis of Cholesterol", Konrad Bloch considers a subject to which he himself has made most important contributions and which now lends itself to a chemically co-ordinated treatment which is largely based on research of the past ten years. With "Adrenaline and Noradrenaline", J. H. Gaddum and M. Holzbauer deal with a subject in which interest is rapidly growing in many respects, not least with regard to the possible effects of the central nervous system, but the article concerns itself largely with the better known experimental work on this most interesting pair of substances. R. C. de Bodo and N. Altszuler consider "The Metabolic Effects of Growth Hormone and Their Physiological Significance", while "Steroids in Human Blood" (R. Borth) deals with methods and with the interpretation of results in an orderly fashion.

Finally, in surveying the "Influence of Hormones, Vitamins, and Other Dietary Factors upon the Formation of Bone, Dentine, and Enamel", J. T. Irving has brought together much information that would not be easily obtained otherwise within the covers of a single article.

The editors aim at making this publication international in its authorship and authoritative in its statements. In this volume they have clearly achieved both these aims.

F. G. YOUNG

J. L. W. THUDICHUM

Thudichum

Chemist of the Brain. By Prof. David L. Drabkin. Pp. 309. (Philadelphia, Pa.: University of Pennsylvania Press; London: Oxford University Press, 1958.) 40s. net.

THUDICHUM, born in 1829 in Büdingen in the Grand Duchy of Hesse, studied medicine in Giessen, where he came under the influence of Liebig. Soon after graduating, he emigrated to London, probably for political reasons, and built up a successful medical practice. He was a very remarkable man of wide scientific and artistic interests and was possessed of an unfailing energy. He wrote on many medical and other subjects, ranging from books on the pathology of urine, the treatment of nasal polypi, and the origin, nature and variety of wine, to his master work, unacknowledged during his life-time, on the chemical constitution of the brain.

Prof. D. L. Drabkin's interest in Thudichum dates from 1924 when he worked on the urinary pigment urochrome, first so named by Thudichum. In the following thirty years he collected probably all the information available about Thudichum; thus, when invited to give four lectures on Thudichum in 1954, he set himself the task of finding the reasons for the lack of recognition of a man who is now generally acclaimed as one of the pioneers in the field of brain chemistry. The answer is not a simple one. The circumstances in which Thudichum carried out the greater part of his work, in a laboratory in his home, were highly unorthodox. The expenses were met from Government grants and later from the income of his lucrative practice. The results he obtained differed in important aspects from those of his contemporaries and he became involved in polemics which were violent even by nineteenth century standards, thus making powerful enemies. His versatility and large literary output led to the quite unjust charge of dilettantism and, what was worse, the integrity of his work was doubted. This and other evidence convinced Prof. Drabkin of the existence of a conspiracy against Thudichum.

The three main chapters of the book: the man, his times and contemporaries, and his works, make interesting reading although the rather expansive style and the inclusion of not strictly relevant material may not be to everyone's liking. The book, besides being liberally illustrated with 'Thudichumiana', is well documented with references, biographical details, a bibliography, transcriptions of letters, etc. (82 pages). Thus it gives a good deal of information for students of the early history of biochemistry and also contributes to the difficult problem of what constitutes a climate of opinion sufficiently receptive to give recognition to the work of a pioneer.

H. W. KOSTERLITZ