ends of neuroendocrinology's quarter-century history, with a hiatus in between until the application of new histochemical methods. Agreement on any specific neurotransmitter seems no closer today then it did during the earlier period of activity in the early 1950's. Many other major problems that motivated the early work, like that of the sites of feedback actions, are still unsolved, though they often have appeared to be solved, and these will no doubt go through further cycles as new approaches arise.

The shadow of the late Geoffrey Harris looms large throughout the book. But it will come as a surprise to many neuroendocrinologists and others who (with justification) consider Harris to be the founder of modern neuroendocrinology that he did not originate the neurohumoral concept of anterior pituitary control. An idea of this magnitude and timeliness seldom originates in, and is never the property of, a single mind, and various chapters in this book make it clear that many other workers were dealing with the same problem during and even before the time Harris was doing his original, excellent work. Price's discussion of the discovery of gonadal steroid-pituitary feedback (which provided the basis for development of the birth control pill) brings out particularly well the point that " 'firsts' are very hard to pin down" (p. 234). Scientists are no less human than nonscientists and, especially in a book of highly personal accounts such as this, the promotion of ego is often only slightly obscured by wrappings of false modesty. Although it is not fair (or possible) to judge the authors' motivation, the reader cannot help noting with curiosity the treatment of feedback by Price and by Hohlweg, neither of whom mentions the simultaneous work in the other's laboratory. Selective attention to scientific events on one's own side of the Atlantic is, however, a common phenomenon, and the choice of authors for this book ensures that credit will be given to investigators on both sides.

The editors pride themselves on having done a minimal amount of editing. This seems all too true in places where tedious details about the personal and professional history of the authors and descriptions of their long-past, inconclusive or trivial experiments make the book harder reading than it need be. On the other hand, there are gems to be mined even from the apparently less neuroendocrinologically relevant chapters, including Ingram's description of the reintroduction of the Horsley-Clarke stereotaxic instrument in Ransom's laboratory in the 1930's, Price's description of medical attempts at sexual rejuvenation in the 1920's, and others.

In the words of Brooks (p. 74), neuroendocrinology "has united neural science and endocrinology." The tendency to grow into a separate and somewhat exclusive subdiscipline should be resisted. The field will continue to justify its existence as a separate subdiscipline only to the extent that it continues to remain open and responsive to all relevant developments in the neural and behavioral as well as the physical sciences. *Pioneers in Neuroendocrinology* makes a useful contribution by demonstrating the interdisciplinary origins of the field and showing how fruitful can be the application to common problems of investigative talents from different sources.

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Memorial to Lehrman

Neural and Endocrine Aspects of Behaviour in Birds. Papers from a conference, Edinburgh, July 1974. PETER WRIGHT, PETER G. CARYL, and DAVID M. VOWLES, Eds. Elsevier, New York, 1975. x, 408 pp., illus. $40.95.

The late D. S. Lehrman inspired many of those who are now working on the behavioral physiology of birds, both through his conceptions of the problems and through his approaches to their solution. The book reviewed here is dedicated to his memory. It is based on papers presented at the second of two conferences, held in Edinburgh, on research with which Lehrman was directly or indirectly associated.

The topics range from general conceptual and methodological issues to specific matters of physiological mechanism, from molar behavior to molecular metabolism, and the papers include studies of nest-building, learning, perception, vocalization, and feeding. New data settle some questions and raise others. For example, R. E. Zigmond makes a case for the possibility that testosterone and progesterone are "prehormones" rather than the substances that directly produce the effects on their target tissues. R. E. Phillips and F. W. Peek review work on the control of vocalization, emphasizing the close association between vocal and breathing mechanisms in birds and in many other vertebrates as well. As the authors say, this observation offers an exciting prospect for further research; but it should be borne in mind that it pertains to how sound is made, not why. The questions of motivation and the functions of vocalization are the concern of R. J. Andrew, who draws on a wide variety of evidence—neuroanatomical, neurophysiological, behavioral, comparative—to work up a theory in which specific neural interpretation is given to the proposition that calls are expressive and hence informative of emotional state. Part of Andrew's case has to do with visual detection and recognition of stimuli, and this matter of how birds use their eyes is the subject of an elegant series of precise observations on reciprocity between vision and movements in doves, elegantly reported by M. B. Freedman.

As this sampling from the book indicates, the chapters tend to complement one another. They are arranged accordingly. The result is a well-integrated survey of the front line of an important sector of research on bird physiology and behavior, in which recent developments in the field are deployed to advantage. Among these are Nottebohm's discovery of lateralization in the neural control of vocalization in birds, Karten's redrawing of structural homologies between bird and mammal brains, and the work on neural transmitters that has carried understanding of the functional anatomy of the vertebrate brain into a new phase. It is evident from the work included in this book that the lead that the study of mammal brains has held over the study of bird brains has been cut considerably, and consequently that the comparative neurophysiology of mammals and birds may be in for a new lease of life.

As a bonus for those doing research on ring doves, the favorite subject of study for the Edinburgh conferees, the book ends with a stereotactic atlas of the brain of this species. The book is thus, in part, a working reference for experts in the field covered by its title. Indeed, some of the chapters will be accessible and of interest only to such cognoscenti. But there is enough that is within reach of the less well informed reader for the book to be recommended to the attention of anyone concerned with birds, animal behavior, or behavioral physiology. Lehrman had profound interests in all these subjects. He would have been delighted with the book.

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