to be published by the National Academy of Sciences and which, it is expected, will be available early this summer. The publications are now accessions of the Entomology Library, University of Minnesota, St. Paul.
3. Huang Ming-dau, Mai Siu-hui, Wu Wei-nan, Poo Chih-lung, "The bionomics of *Anastatus* sp. and its utilization for the control of lichee stinkbug, *Tessaratoma papillosa* Drury," *K'un Ch'ung Hsueh Pao* (*Acta Entomol. Sinica*) **17**, 362 (1974).

Pleasures of Entomology

Mites of Moths and Butterflies. ASHER E. TREAT. Comstock (Cornell University Press), Ithaca, N.Y., 1975. 362 pp., illus. $35.

"The magic of the microscope is not that it makes little creatures larger, but that it makes a large one smaller. . . . The microscope takes us down from our proud and lonely immensity and makes us, for a time, fellow citizens with the great majority of living things."

Asher Treat then leads the mite-sized reader into a moth's ear and reveals sights blind mites can never see. But the book is not just a popularization. It is an impeccable work of science that reveals a search for understanding. It is not surprising to find this from a naturalist. Naturalists may well be the most contented scientists. In their enterprise there are no prizes to seek and no grand theory to create or pick apart, and they quietly search for insight and understanding in other worlds.

The book is designed for use by people who find mites on Lepidoptera, to provide them with "basic information . . . regarding the chief characteristics, biology, and known history (in relation to Lepidoptera) of each mite species thus far reported from these insects." There is an elegantly simple key to living mites that will usually permit a prompt determination of the group to which a mite belongs. The timid can look at a list that gives all the records of mites from each host species and, since all the mites are well illustrated, a glance at the sketches will make it easy to guess at the identity of the mite. The masochist has the choice of using a technical key for mounted specimens.

After making a presumptive identification, the text gives a full accounting of taxonomy and nomenclatural status, followed by detailed information on the biology. I know of no acarological writings that are as clear and easy to follow as Treat's. Tedious nomenclatural matters are covered with grace and clarity. Life histories and biology are explored with ingenuity and enthusiasm to define opportunities that should stimulate others.

In an early chapter Treat writes,

The search for mites on insect hosts is an adventure as exciting as any treasure hunt. Every insect, looked at closely enough to reveal a mite, is an exotic island whose bays and coves may harbor a lurking pirate or the telltale traces of some hidden thief. Date and locality labels on pinned specimens carry the imagination to olden times and far-off places. Collector's names evoke memories of old friends and thoughts of colleagues unknown or perhaps forgotten. The thrill of discovery is always imminent and, once experienced, is ample reward for hours of unproductive search. As an old seeker after buried treasure, I can tell you what is needed for such a voyage of discovery and how to pursue the hunt.

This Treat has done beautifully. His book is one to emulate for both its science and its humanity.

RODGER MITCHELL
Department of Zoology,
Ohio State University, Columbus

Origins of a Neuroscience

Pioneers in Neuroendocrinology. JOSEPH MEITES, BERNARD T. DONOVAN, and SAMUEL MCCANN, Eds. Plenum, New York, 1975. viii, 328 pp., illus. $22.50. Perspectives in Neuroendocrine Research, vol. 1.

Neuroendocrinology, a relative newcomer to the established hybrid subcategories of neural science, is the study of relationships between the nervous and endocrine systems of biological information transfer. It deals with physiologic, anatomic, and biochemical approaches to such problems as hypothalamic regulation of the anterior and posterior pituitary, environmental influences on reproductive and metabolic phenomena, and the relationships between hormones, brain, and behavior. While neuroendocrinology has shared in the explosive growth of many scientific fields in the last quarter century, there has been a further impressive spurt in activity in the field during the 1970's, resulting from the isolation and synthesis of three of the highly elusive hypothalamic factors that control anterior pituitary function (the gonadotropin and thyrotropic-hormone releasing factors or hormones, and a growth-hormone inhibiting factor, somatostatin). Two international societies with their own scientific journals have recently been founded. In short, a new scientific miniestablishment is becoming institutionalized and has now called upon its founding fathers to preserve for posterity the circumstances surrounding the genesis of the field.

Pioneers in Neuroendocrinology is a collection of reminiscences by an assortment of distinguished neurophysiologists, endocrinologists, anatomists, and pharmacologists, who did early work relevant to the field. The term "pioneers" is apparently meant to designate early explorers who opened pathways, not necessarily those who made the major discoveries. The book will nevertheless be used as a chronicle of neuroendocrine origins, and from this point of view the choice of contributors shows errors of both commission and omission. Of the 21 contributors, fewer than half remained, or in some cases ever were, in the mainstream of the development of neuroendocrinology, and behavioral endocrinology is represented only by Bard's tangentially related work on sexual reflexes. The editors wished initially to obtain personal accounts from some of the older investigators and intend to produce other, similar volumes in which the omissions should be corrected. Actually, some of the authors who did not make major contributions to the field (and some who did) play a role as representatives of colleagues who are no longer with us. The image of Markee is invoked by Hinsey, of Pincus by Hoagland, of Moore by Price, of Ernst Scharrer by Berta Scharrer, and of Harris by Jacobsohn.

The book will be of little interest to neophytes. For workers in this and related fields, however, it provides a palatable mixture of information on the origins and development of neuroendocrine concepts supplemented with some entertaining material on the lives of leading scientists in the first half of the century.

A book like this should be read continuously rather than piecemeal, so that recurrent themes will have full impact. One such theme is the overwhelming role of chance factors in the determination of scientific careers. The often cyclic nature of investigational activity is another theme that careful reading will reveal. For example, the role of biogenic amines was actively investigated at both

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.

JULIAN M. DAVIDSON
Department of Physiology,
Stanford University,
Stanford, California

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.

C. G. BEER
Institute of Animal Behavior,
Rutgers University,
Newark, New Jersey