Book Reviews

Physiologists' Recollections

The Pursuit of Nature. Informal Essays on the History of Physiology. A. L. HODGKIN, A. F. HUXLEY, W. FELDBERG, W. A. H. RUSHTON, R. A GREGORY, and R. A. MCCANCE. Cambridge University Press, New York, 1977. vi, 180 pp., illus. $15.95.

This collection of "informal essays on the history of physiology" was written as part of the celebrations of the centenary of the Physiological Society in 1976. The authors were not only eyewitnesses of major developments in their respective fields but key contributors to them. Their approaches and styles of writing are quite varied, ranging from the rather straight historical reviews of the development of research (R. A. Gregory on secretory hormones and R. A. McCance on perinatal physiology) through personal and anecdotal accounts (W. H. A. Rushton on vision and M. Feldberg on acetylcholine transmission) to a more global view of how the direction of research is influenced by available instrumentation and by the interactions of people (A. H. Hodgkin on nerve and A. F. Huxley on muscle).

McCance organizes his description of developments in perinatal physiology along different avenues of scientific approach or states of fetal development. His own work is referred to mostly in the third person. His final section, entitled "The Future," acidly attacks committees on ethics for their restrictions on fetal research.

Gregory gives an interesting account of the development of research on gastrointestinal hormones, which was started by a single afternoon's experiment by Baylin and Starling. Gregory's style is to mention his own work only by citing his review articles.

Feldberg writes a very personal and anecdotal account of the brief and exciting period of his work with Sir Henry Dale on acetylcholine transmission and of the struggle to obtain recognition and acceptance of their work by electrophysiologists (at whom he launches a few arrows).

In his inimitable style, Rushton presents some personal and vivid memories of his vision research over the past 50 years. His essay appears to make no attempt to be systematic or to give a uniform treatment of the whole field (for example, he gives only a few lines to Hubel and Wiesel), but his account is rich with his own pithy recollections of striking or unusual demonstrations and lectures.

In his essay, entitled "Chance and design in electrophysiology," Hodgkin sets out to correct the impression of directness and logical planning that characterizes so many scientific papers (including his own, which often have been held up as models of systematic and logical research). Hodgkin gives a number of examples of the part chance and good fortune played in his ground-breaking experiments with nerve, carried out over two decades and culminating in his 1952 series of papers with Huxley. He makes a strong case for knowing the right people at the right time, both for scientific and for financial aid. Nor does he neglect the role that development of instrumentation and methods played. His essay is a delightful mixture of description of experiments and of his interactions with many persons whose names are familiar in the field and to whom he gives much credit for helping him on his way.

Huxley, "Looking back on muscle" in his usual scholarly way, describes the development of interference microscopes (including his own) and how their images overturned the existing ideas about muscle ultrastructure. Huxley relates that, when he found new experimental results that conflicted with the then-current texts in physiology, he delved into the history of striated-muscle research, starting in mid-19-century microscopy. He traces the changes in ideas of how muscle contracts; the description accepted today was established in the 1870's but questioned in the 1880's, contradicted on the basis of observation by new methods in the 1900's, and forgotten until rediscovered with the interference microscope in the 1950's. Huxley makes an excellent case for his conjecture that this sequence of events occurred not only because the microscope had gone out of style, but, especially, because of the ascendancy of the principle of "uniformity of nature."

Huxley raises the question whether such unjustified tides in the acceptance and rejection of observations and hypotheses occur in other areas of biology. He gives an affirmative answer with examples familiar to him from neurophysiology and the development of microscopes. He concludes with a chilling warning: "I think it is clear that there are at least two places in the story where a theory was accepted with such enthusiasm that it influenced the observations that were reported. I sometimes wonder whether the danger of this kind of error may be increased by the numerous symposia and conferences that are held nowadays. The same story is told at each, usually by the same people, until on the Bellman's principle ('what I tell you three times is true') it becomes impossible even to contemplate any alternative." Huxley's provocative ideas invite us to join him in his contemplation of possible self-deception, questioning his own work by wondering whether "we are all busy reinforcing each other in our belief in the present day cross-bridge story."

This book is provocative, enjoyable, and useful for students of all seasons.

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Insect Physiology

The Circulatory System of Insects. JACK COLVARD JONES. Thomas, Springfield, Ill., 1977. xvi, 256 pp., illus. $24.50.

"More information exists on the circulatory system of more species of insects than for any other single group of animals, including the vertebrates." So states the preface, and the 50-page bibliography that makes up one-fifth of this book would seem to bear that claim out. There is indeed much material, extending back to the observations of William Harvey and Swammerdam, on the structure and function of the insect heart and associated organs, and these data are comprehensively cataloged to provide a useful handbook of facts and references. But the comparison with vertebrate studies raises a question about the relative significance of all this knowledge. So much of the information on insect hearts stems from the sheer diversity of the group. Pulse rates for over a hundred species are listed together with hemo-