is a set function, but then what does $(\sin x)/x$ mean? In the second case are there two sine functions, and if not, what does one do about degrees and radians? The author defiantly states that "although purists make a great point of distinguishing between the function f and its value $f(x)$ at x . . . even purists retrogress occasionally and we shall make no excuse for suiting ourselves." This attitude is reasonable; the only question is where one draws the line. To the reviewer it appears that, in many places, students will find comprehension hindered by retrogression.

But these criticisms are small points. Hille's book, which for all its rigor is written in a breezy readable style, indicates that it is possible to teach calculus both rigorously and usably.

J. L. Doob
Department of Mathematics, University of Illinois

Neuroendocrine Mechanisms

Neuroendocrinology. Ernst Scharrer and Berta Scharrer. Columbia University Press, New York, 1963. xiv + 289 pp. Illus. $8.50.

Ernst Scharrer and Berta Scharrer are a remarkable if not unique scientific team, and one whose early collaborative efforts constitute pioneering contributions to the currently burgeoning field of neuroendocrinology. The direct or indirect participation of the central nervous system in endocrine function has become widely recognized during the past few years. Perhaps nowhere is the intimate relationship better seen than in the insect and crustacean, and Berta Scharrer's publications on the localization of neurosecretory cells in the *Limulus* first appeared more than 25 years ago. Ernst Scharrer's interests in the subject are of equal duration, but in recent years have leaned somewhat more to neurosecretion in the mammal. The paper read by the Scharrers at the Laurentian Hormone Conference in 1953 [*Recent Progress in Hormone Research*, vol. 10. Academic Press (1954), p. 183] stands as a classic in the field, perhaps most of all because it brought out the concept that the role of neuroendocrine systems may well be comparable in many species. In the mammal the phenomenon of the production of secretory material by neurons of the supraoptic and paraventricular nuclei, the transport of the secretory material down the neuron, and its release into the blood vessels of the neurohypophysis was (and remains) the best documented example. This concept, the formation of which came largely through the Scharrers' work, met with some scepticism when it was first presented, but is now well accepted.

The Scharrers were expected to write a book on the subject of their mutual interest, and their wide experience well fitted them for such authorship. *Neuroendocrinology* sums up many years of thought and study. There is a wide scope of coverage, with consideration of many species and a real effort to demonstrate the common pattern of neuroendocrine mechanisms as they occur across the animal kingdom. The clear-cut demonstrations of control of maturation, reproduction, and certain metabolic functions by neurosecretion in the simpler life-forms leads one to look for analogous mechanisms in the mammal, and the Scharrers have sought out and attempted to define such analogies. This is perhaps the greatest value of the volume. For example, the regulation of metamorphosis in the insect by a balance of stimulatory and inhibitory hormones under the control of the central nervous system may not be so different from the regulation of sexual maturation in the mammal. It is regrettable that some of the newer information on the synthesis and secretion by the pineal gland of methoxy indoles (apparently under the control of sympathetic fibers) which inhibit gonadal activity in the mammal [*Science* **141**, 277 (1963); **142**, 1071 (1963); **143**, 1328 (1964); **145**, 63 (1964)], strong evidence in support of such a notion, was not available at the time of publication. There is reason to believe that continued research along these lines will reveal other analogous situations and further support the kind of thinking that the Scharrers have been doing for so long.

The reader may find the early chapters—"Afferent pathways," "Integrative centers," "Efferent pathways," and "Target organs"—a little thin. It is only when the authors dig deeply into the experimental evidence, in the chapters on reproduction, growth and development, and metabolic processes, that the full import of their message becomes apparent.

It is not easy reading. There is much concentrated fact, though occasionally a bit of delightful humor appears. The illustrations come out well, but are disappointingly scanty considering the large amount of anatomical material available to the authors. The bibliography is excellent. The cost of the volume is not at all excessive. *Neuroendocrinology* is a worthwhile addition to the library of the biologist, the endocrinologist, and the physiologist, and, for that matter, to the library of anyone interested in the science and the mysteries of life.

Gordon Farrell
Department of Physiology, School of Medicine, Western Reserve University

Space Science

The Physics and Astronomy of Meteors, Comets, and Meteorites. Gerald S. Hawkins. McGraw-Hill, New York, 1964. x + 134 pp. Illus. $2.50.

This excellent paperback, which can almost be tucked in one's pocket, will interest both the layman and the student. Written primarily for a junior or senior undergraduate in the physical sciences, this book presents in clear concise sentences an account of the bodies that move in the regions between the planets. There is special emphasis on those bodies that have direct contact with the Earth—meteors, meteorites, and micrometeorites—because scientists have greater knowledge of these objects. Hence, comets are discussed in only two of the nine chapters, although, owing to the close relation between comets and meteors, and between comets and micrometeorites, reference is often made elsewhere to comets.

The distinguishing characteristics of meteors and meteorites, and the different origins of these two types of bodies, are clearly pictured in words, drawings, and photographs. The student will enjoy the equations and the theory offered as proof of most of the statements. Meteors, comets, meteorites, and micrometeorites are real objects. They exist today as well as in the past and are truly messengers of the evolution of the solar system, if we can interpret them correctly. The author has attempted to present a picture with the pertinent knowledge that scientists now have of these interplanetary bodies. It should stimulate further study and thereby increase our