of research on the pineal-parapineal problem in lower vertebrates. The summary emphasizes the work of Eakin and his associates, as is appropriate since they have done most of the basic work in this area; experimental work by classical as well as other recent students of the topic is also reviewed, however.

The book deals in sequence with morphological, developmental, and functional aspects. Eakin confirms again the view that the parietal eye is a remnant of the left or parapineal organ seen in agnathans. Not surprisingly he concludes that the eye functions as a dosimeter of solar energy exposure in many Recent reptiles; this view was, after all, developed by his school. The monograph gives evidence that the Recent amphibians are quite aberrant, rather than represent an "intermediate" condition between the patterns observed in lower fishes and those observed in reptiles. It also documents that our knowledge of this system still depends on a phylogenetically most limited sample from among the many groups of lower vertebrates.

The book is written in a style that allows it to be read profitably by undergraduates or by any vertebrate biologist wishing a summary of an interesting subject. Eakin's treatment is historical, and he communicates the ideas that one owes a debt to one's predecessors and that science is an ongoing process that proceeds by successive approximations. He goes out of his way to define terms and to emphasize related matters, but without wasting much space on asides. It is refreshing to read a monograph that starts by thanking the taxpayer who funded the work and ends by thanking the reader.

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Visual Psychophysics

Eye-Movements and Visual Perception. R. W. DITCHBURN. Clarendon (Oxford University Press), New York, 1973. xvi, 422 pp., illus. $30.50.

Helmholtz would have liked this book. As the foremost practitioner of the art of analyzing the physical basis of perception, he would have recognized in the author a kindred spirit. Ditchburn, a physicist trained at the Cavendish laboratory, helped a generation of physics students to a better appreciation of optics through his textbook on light. During the last 25 years, however, his main interest has been the visual effects of stabilizing the retinal image, which he was one of the first to achieve. Now Ditchburn has kept a promise made by so many other scientists, namely to write a book after retirement. What is more, he has written a good book.

It opens with an excellent introduction to the optical and optomotor factors in the formation of the retinal image. There is also a great amount of information on the physiology of visual sensory processes as well as of the eye movement apparatus in man. Most of it, however, is concerned with the effect on visual thresholds of various programs of eye movements, and, in particular, the nulling out of normal micronystagmus. An appendix covers some of the techniques of making tight-fitting contact lenses to help stabilize retinal images. The book is up to date and well documented, though there are occasional mismatches between citations and references.

It is only fair to issue a warning to those who would look for coverage of what has traditionally been understood as perception. To be sure, a few sections of this book deal with changes in pattern perception when retinal images are stabilized, but the vast bulk of the material covers the psychophysicist's preconditions of visual perception—optical images, retinal excitation, thresholds. Ditchburn is at home here because his own contributions, characterized by innovation in technique and precision of attack, are in this area. What about the more global questions of perception? They are hardly touched on in this book, or for that matter in most other books with "perception" in the title. One continues to wonder what the Gestalt psychologists of a generation ago did wrong to leave such an arid heritage. Yet it is a good bet that even the most global formulations of perception will be the more securely based the more consonant they are found to be with the psychophysicists' strictures. In laying these out, both in a general way and through examples of research in the author's field, Ditchburn's monograph will have a lasting place.

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Ecological Simulations

The Structure of Marine Ecosystems. JOHN H. STEELE. Harvard University Press, Cambridge, Mass., 1974. xii, 128 pp., illus. $7.95.

Theoretical ecology got off to a good start in the 1920's with Vito Volterra's seminal, and still central, contributions springing from his interest in fish catches in the Adriatic. There are many subsequent instances of fruitful interplay between ecological theory and marine biology, and John Steele's monograph lies in the mainstream of this tradition. His general aim, which I think is fulfilled admirably, is "to show how theory, observation, and experiment may be combined, and how closely each depends on the other."

Specifically, Steele sets out to build a model describing the dynamical behavior of the populations of phytoplankton, zooplankton, and other beasties in the North Sea in spring and summer. Any such enterprise requires a skilled helmsman to steer between the Scylla of a multiparameter, computerized Goon Show and the Charybdis of total abstraction. As an applied mathematician of note, and deputy director of the Marine Laboratory maintained in Aberdeen by the Department of Agriculture and Fisheries for Scotland, Steele is well qualified for the task.

The study begins (chapter 2) with a descriptive account of the properties of marine food webs in general, and those in the North Sea in particular.

In order to gain some understanding of the dynamical structure of these food webs, the author next (chapter 3) turns to broad questions of stability, diversity, and efficiency. There is a perceptive and original discussion of the intuitive idea that "extra links in the