

logical theories, model universe and the red-shift, and the selection of a model universe. The final chapter is a short summary and conclusion. The author concentrates on general relativity, the steady-state theory, and, briefly, kinematical relativity. He is not a devotee of the latter two theories, but he correctly points out that their controversial natures have forced all cosmologists to refine and to make precise their own ideas.

The book would be improved by illustrations and by a more complete discussion of distance determination technique, such as moving cluster parallaxes and the use of the zero-age main sequence. A second edition should necessarily include a discussion of the exciting new radio data on the numbers, diameters, and duplicity of these strange, incredibly distant sources.

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Encyclopedic, Indispensable

British Prosobranch Molluscs. Their functional anatomy and ecology. *Publication of the British Ray Society*, No. 144. Vera Fretter and Alastair Graham. Published for the Society by Quaritch, London, 1962. xvi + 755 pp. Illus. £8 8s.

Molluscan shells have long been attractive objects to man, but the soft, often slimy, body within is more apt to be greeted with repulsion or indifference by everyone except a few molluscan specialists. This is ironic, for the classification of the whole ancient and important phylum of the Mollusca, and especially the Gastropoda, is based upon anatomical features. The tendency has been, among zoologists, to generalize upon an occasional study of soft parts and to group by analogy or by the use of a few easily seen structures. Paleontologists, of course, are obliged to do this, but now that this book is available, neontologists no longer have an excuse, for this book will stand as a landmark in the interpretation of functional morphology, which may differ rather widely between one species and the next.

In part 1, the introduction, a selected prosobranch, *Littorina littorea*, is used to demonstrate organization and structure of the gastropod body in detail.

Then, in the second part, on functional anatomy and development, each of the organ systems is given elaborate treatment, with a review of pertinent literature. One or more chapters are devoted to the shell, the mantle cavity, the skin, the muscular system, the alimentary system and feeding, the vascular, excretory, nervous, and reproductive systems, and spawning, development, and larval forms. Although research on British mollusks forms the primary reservoir of the literature discussed, the work of malacologists elsewhere is not neglected, so these chapters (16 in all) are applicable far beyond the limited area of the title.

Part 3 (6 chapters) deals with the ecology of British mollusks. With the preceding parts as background, the significance of the adaptations to habitat stands out more clearly. The parasites of these prosobranchs are listed and discussed in one unusual chapter.

For the lay malacologist, perhaps the meat of the book is in part 4, on relationships. Here the authors suggest the classification they prefer. No new groupings or terms are proposed, but a different emphasis is reached on the basis of functional morphology and anatomy: Gastropoda are divided into three subclasses—Prosobranchia, Opisthobranchia, and Pulmonata. The Prosobranchia are subdivided on heart and pallial structure primarily, on radulae secondarily. The primary divisions are Diotocardia (which includes Rhipidoglossa and Docoglossa, the equivalent of Thiele's Archaeogastropoda) and Monotocardia. The latter are again divided into two parts, the Taenioglossa (Mesogastropoda of Thiele) and the Stenoglossa (synonym, Neogastropoda). The authors furnish evidence to show that the family Pyramidellidae, formerly considered a prosobranch group, probably should be transferred to Opisthobranchia. There are, it seems, several families in each of these two subclasses which have the morphological characters of the other; hence, differentiation is not altogether clear-cut.

This monumental work will be a great boon to the nonspecialist, for it brings together a wealth of scattered literature on the anatomy and physiology of these organisms. So diverse has the field become that few workers can evaluate the significance of researches outside their immediate domain. Here, however, one sees that histology and biochemistry can contribute to an un-

derstanding of molluscan structure and function. The bibliography alone (its content is well summarized in the body of the text) amounts to some 35 pages. The 317 illustrations are original line drawings, well planned to clarify the descriptions of soft parts.

Except for its summary chapters, this book, which is encyclopedic in scope, is not easy reading, but the scope makes it indispensable to all serious students of malacology. The book does not pretend to be a work on nomenclature or taxonomy, but one may easily predict that it will have no little influence in future systematic studies.

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Current Research

Rare Earth Research. Proceedings of the symposium held at Glenwood Springs, Colorado, September 1961. Joseph F. Nachman and Charles E. Lundin, Eds. Gordon and Breach, New York, 1962. xv + 354 pp. Illus. \$14.50.

This volume, the proceedings of the second conference on rare earth research, differs from the volume published following the first conference in several respects: the editors and the publisher are different, and the volume is slightly longer and appreciably more expensive.

The five half-day sessions of the conference were devoted to the following topics: chemical properties of the rare earths and their compounds; mechanical and metallurgical properties of rare-earth metals and alloys; thermodynamic properties of rare-earth metals, alloys, and compounds; physical properties of rare-earth metals and their compounds; and rare-earth chalcogens, borides, and nitrides.

In the introductory address it is pointed out that only a few chemists and physicists were interested in these elements during the first 140 of the 160 years that have followed the discovery of the first true members of the rare-earth series. Although the rare earths "represent about one-eleventh of the known naturally occurring elements, the properties of their metals, alloys, compounds, and solutions are relatively unknown." However, the numerous papers