

REVIEWS

Vertebrate Biology.—Orr, Robert T. 1961. Saunders, Philadelphia. \$7.50.—A suitable text for a course in the natural history of the vertebrates has been needed for a long time. The current one, which attempts to fill this gap, is well illustrated, readable, and has a minimum of technical errors (there is but one "s" in Hasler). The literature coverage is good and up to date, and the references recommended at the conclusion of each of the chapters provide an excellent entrée into the literature of the field. The book begins with chapters devoted primarily to the anatomy of fish, amphibians, reptiles, birds, and mammals and then covers a wide variety of topics including systematics, distribution, social organization, population movements, dormancy, reproduction, growth and development, and population dynamics. A chapter devoted to principles of animal behavior would have provided a useful basis for thinking about many of the facts of animal behavior scattered throughout the text. The chapters dealing with anatomy occupy fully 44 per cent of the total space in the book, and it seriously may be questioned whether the material given there, which amounts to a distillation of more comprehensive coverage to be found in comparative anatomy texts, is of sufficient importance to the understanding of what follows to be worth the emphasis given to it.

Current American ecological-natural historical writing is plagued by two critical problems that lead to confusion, and, unfortunately, this text suffers from both of them. It has been hoped that a major source of confusion could be removed by the clarification of the significance of proximate and ultimate factors, but it is painfully apparent, from this text as well as other recent writings, that many more years must pass before the ecological house will be cleansed of this plague. For example, Orr states (p. 235) that the major incentives for migration in vertebrates may be summed up under the headings of climate, food, and reproduction. In the subsequent discussion of these factors there is no attempt made to distinguish between physiological mechanisms in migration and the factors that give it selective advantage. It is not made clear that as a proximate factor climate apparently serves only as a minor modifying influence upon migration, although its role as an ultimate factor is probably much more significant, and that both food and reproduction function largely as ultimate factors in migration. Physiological and adaptational considerations are hopelessly intermingled.

Modern ecology finds its unifying focus in concepts of natural selection, but often the nature of natural selection is misinterpreted in ecological writing. As now understood, evolution is a shift in gene frequencies as determined by the relative survival and reproduction of individuals. There is currently no mechanism known whereby something can be evolved for the good of the species unless it also benefits the individuals concerned. It is therefore disappointing to read, at several places in the book, that various features of the biology of vertebrates are to be understood as having evolved for some benefit conferred upon the species. For example (p. 261), the desire of young mammals to wander when they reach a certain age is said not only to prevent overcrowding but also to perform other services that benefit the species such as repopulating unoccupied areas, preventing inbreeding, and traversing barriers. Also, we read (p. 330) that small rodents must have a high reproductive rate because of the high mortality rate inflicted by predators. Yet Lack has clearly shown that there is no known selective mechanism for such an hypothesis and that the known facts are accountable by current selective theory. In fact, Lack's arguments on reproductive rates are rejected in favor of hypotheses requiring that selection act on populations for the benefit of populations.

The above criticisms can be said to constitute the legitimate portion of this review. What follows deals more with my own personal views on the teaching of ecology and natural history. Ecology is often treated by biologists (many ecologists included) as a fourth field into which to dump everything that does not fit into taxonomy, morphology, and physiology. It thus becomes a vast collection of undigested facts, all interesting and useful but badly in need of organization. Ecology will contribute its potential share in the development of biology only if it refuses to be the zoological dustbin and develops a hard core of well-grounded principles that are mathematically rigorous and up to date. Largely through the efforts of a few people, the consequences of the action of natural selection upon populations are carefully enough worked out to provide a basis for modern ecological thinking, the basic elements of which are readily understood and should be a part of the working knowledge of all biologists. This will never be accomplished, however, if the subject is presented as a fourth field, long on facts but short on theory. It is not the importance of the facts as presented in a book such as the one under consideration that is doubted, but rather the efficacy of the mode of presentation adopted. The wealth of knowledge about vertebrates to be found between the covers of the book should be encompassed by many students, but I believe this is more likely to be accomplished through the provision of a more rigorous framework of theory into which facts can be fitted, and, hence, remembered, rather than through a shot-gun approach of broadcasting facts.—GORDON H. ORIANS.

The Kirtland's Warbler.—Harold Mayfield. 1960. Cranbrook Institute of Science, Bloomfield Hills, Michigan. 242 pp., 12 black and white photographs, 44 tpls., 9 figs., color frontispiece. \$6.00.—There is an element of drama to the study of a rare bird, perhaps a vanishing species. Today there are less than 1,000 Kirtland's Warblers, known to breed only on desolate, fire-scarred, jack-pine areas in northern Lower Michigan where they are regarded as "Michigan's special bird." A few thousand years ago when jack-pine communities were abundant on the sandy moraines and outwash plains left in the wake of the retreating Wisconsin glaciers, the birds were possibly much more numerous.

Although many persons studied the Kirtland's or "Jack-Pine" Warbler, the foremost student among them was the late Josselyn Van Tyne, Curator of Birds at the Museum of Zoology, University of Michigan. In 1930 he made his first trip to the jack-pine breeding areas, soon thereafter decided to make a life history study of the species, and continued his observations until his death on 30 January 1957. Fortunately, his field companion for more than half of those years was Harold Mayfield, who fittingly prepared the final report.

The fact, as Mayfield states (p. 3), that evidence was obtained ". . . in fragments, and in regrettably small quantities for the effort expended" and that these bits of evidence were pieced together into a convincing picture is a creditable reflection on the author. Many statements in the report are supported by references to studies of similar species. The 209 pages of text are well organized and readable, the 22-page bibliography is comprehensive and up to date, and the painting of a family group of Kirtland's Warblers by Peterson for the frontispiece is both attractive and appealing.

In my judgment the discussion on "Song" is of least significance; I found the chapters on "The Cowbird" and "Reproduction and Mortality" of greatest interest and significance. Other readers, having different interests, will not share this opinion. Most readers will agree that the work reported in this book represents devotion to meticulous detail and provides a comprehensive natural history well organized and clearly written.—IRVEN O. BUSS.

Mark Catesby; The Colonial Audubon.—George Frederick Frick and Raymond Phineas Stearns. 1961. University of Illinois Press, Urbana. x + 137 pp. \$5.00.—With the publication of Elsa G. Allen's excellent study of Mark Catesby in her *History of American Ornithology before Audubon* (Trans. Amer. Philos. Soc., n.s., 41(3), 1951), it became apparent that Catesby deserved a full-length portrait. It is a pleasure, therefore, to welcome this book by two professional historians; it is such a biography as was Catesby's due and it is also one that will doubtless remain *the* authoritative study of the "founder of American ornithology," as Mrs. Allen aptly termed him.

Devoted and persevering old Catesby certainly warrants the detailed refurbishing that these authors have given his reputation. The authors have spared no efforts. They have gone to rich manuscript sources abroad, they have combed the correspondence of Continental, English, and American naturalists, published and unpublished. They weigh their evidence carefully; they guess judiciously, for there are plenty of mysteries remaining. Let no naturalist sneer at these writers as "historians": my impression is that they also know the natural history fields well.

It is a story of Catesby and his times. What wonderful times! We learn how rich curiosity seekers in England made it possible for natural history collectors to live as well as do what their souls urged them to do; we see how vital such collectors were to the systematists of the day (who themselves may never have set foot outside the cities of Europe); we relive the magnificent democracy created and sustained by a diverse body of dedicated men (not all of them gentlemen of leisure!) where knowledge was shared by word of mouth and personal letter perhaps often as effectively as by professional journals of today. We see the giants of the day—Sherard, Linnaeus, Sloane, Collinson, and many others—and the points of the compass at which their interests and abilities meshed with those of Catesby.

Mark Catesby visited and traveled in the southeastern United States and the Bahamas in 1712–1719 and 1722–1726; he returned to England where he learned techniques of engraving and hand coloring of plates. He spent the next 20 years on all the minute details of his great achievement, the two folio volumes of plates and text of *The Natural History of Carolina, Florida, and the Bahama Islands*.

As for the present book, the 16 full-page black and white copies of Catesby's plates (10 of them birds) add rather little, for Catesby's charm as an illustrator is lost unless the eyes feel the acid-sharp precision of the copper plate and see the overlaid watercolors. The plates reproduced here are not numbered and are not included in the otherwise admirable index. It is a spacious book, printed in double columns, with a peculiar layout that wastes a good inch and a half at the top of each column. Its text, however, will interest any naturalist (the ample footnotes can be ignored, for the text is smoothly written); it will delight the bibliographer and historian of science; the typography is pleasing and the book is nearly perfectly free from typographical errors.

Having, through the courtesy of Paul Hahn and James L. Baillie, recently seen a copy of Catesby's *Natural History* at the Royal Ontario Museum, I need add only two statements. First, those two striking volumes are Catesby's real monument. And, secondly, naturalists now need a lovingly annotated edition of his *Natural History* with colored plates that capture some of the feel of the originals. This may be asking too much of our day and age, even though one would quickly settle for something less in size than the original folio.—DANIEL MCKINLEY.

Discovery. Great Moments in the Lives of Outstanding Naturalists.—John K. Terres (ed.). 1961. J. B. Lippincott Co., Philadelphia. xiii + 338 pp. \$6.50.—Herein are short articles by 36 naturalists. Of these, 28 are North American authors;

21 of the 36 are ornithologists or primarily interested in birds; Mrs. Nice is the only woman included. The topics of some articles have, naturally, been covered elsewhere previously in technical rather than informal narrative style.

The contents are so diverse that selecting what is most interesting will vary, depending on the reader's tastes. Some sections are "adventure" in the usual sense, and the vertical pronoun is prominent. "On Becoming a Naturalist" (by F. Fraser Darling) is both personal and philosophical. In other sections the subject matter dominates and the authors seem to be nearly absent; examples are the very perceptive account of the hunting methods of Cooper's Hawk (by Herbert Stoddard, Sr.) and the few pages on maternal drives in prebreeding female Common Eiders (by Harrison F. Lewis). There is a smattering of new biological information, as in Chapin's updating the knowledge of the habits of the Lyre-tailed Honeyguide. A most readable and welcome volume.—RALPH S. PALMER.