specific name *eriphyle,* and which he proceeded to name *Papilio eriphyle* Freyer. Freyer is to be deemed to have described this species under the name *Hipparchia eriphyle* and not under the name *Papilio eriphyle;* A.

Potamis Hübner, *Rusticus* Hübner, and *Mancipium* Hübner to be suppressed in favor of *Morpho* Fabr., *Helicopis* Fabr., and *Pontia* Fabr.; A.

LEPIDOPTERA (RHOPALOCERA).—*Euploea* Fabr., 1807 (*Papilio corus* Fabr., 1793); A, B. *Satyrus* Latreille, 1810 (*Papilio actaea* Esper., [1780]); A, B. *Argynnis* Fabr., 1807 (*Papilio paphia* Linn., 1758); A, B. *Vanessa* Fabr., 1807 (*Papilio atalanta* Linn., 1758); A, B. *Euthalia* Hübner, [1823] (*Papilio lubentina* Cramer, 1777); A, B. *Nymphidium* Fabr., 1807 (*Papilio caricae* Linn., 1758); A, B. *Colias* Fabr., 1807 (*Papilio hyale* Linn., 1758); A, B.

Species in parentheses are to be declared the types: *Lycaeides* Hübner, [1823] (*Papilio argyrognomon* Bergstrasser, 1779); A. *Agriades* Hübner, [1823] (*Papilio glandon* Prunner, 1798); A. *Polyommatus* Latreille, 1804 (*Papilio icarus* Rottemburg, 1775); A. *Euchloë* Hübner, [1823] (*Euchloë ausonia* Hübner, var. *esperi* Kirby, 1871). *Princeps* Hübner, [1807] and *Orpheides* Hübner, [1823] (*Papilio demodocus* Esper, 1798). *Carcharodus* Hübner, [1823] and *Spilothyrus* Duponchel, 1835 (*Papilio fritillarius* Poda, 1761); A.

C. W. STILES,
Acting Secretary, International Commission on Zoological Nomenclature
U. S. NATIONAL MUSEUM
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SCIENTIFIC BOOKS

THE MIGRATIONS OF ANIMALS

The Migrations of Animals from Sea to Land. 1936. By A. S. PEARSE. 176 pp., 4 figs. Duke University Press, Durham, N. C. $3.00.

THIS book expresses a philosophy, no less than an epitome of the researches of its writer and more than 500 other cited authorities into an intricate history. Animals which have struggled up the evolutionary trail from marine habitats to stand on dry land are the dominant ones of the earth. They have achieved success, which Professor Pearse defines as continual improvement. A successful creature is both plastic and progressive; it must live in the world as it is and yet with greater efficiency than its rivals, and must avoid the "soft berths" in which certain degraded forms may exist almost without struggle. On land animals have developed greatest power to solve complex problems. It is with the obstacles that have been met and conquered along the road between primitive aquatic associations and human civilization that this study is concerned.

After an introduction relating to the origin of life in the sea and a comparison of biotic conditions in salt and fresh water and ashore, the author develops his subject in four main chapters covering routes from sea to land, causes of the migrations, the changes in creatures that have crossed one of the several thresholds and a consideration of what land animals have attained. Always the physiological difficulties, requirements, mechanisms and adjustments are uppermost in his plan, and their elucidation makes both terse and rich reading. As nearly as possible the argument is developed in words condensed directly from the sources, and the text bristles with references. Such an eclectic method is not without its pitfalls; we encounter now and then the equal acceptance of more or less contradictory conclusions, as for instance Case's dogma that "environment changes before changes appear in organic forms" (p. 12), together with Banta's belief that "cave species are fitted for cave life before entering caves" (p. 33). Furthermore, Professor Pearse appears ultimately a bit uncertain as to just where he stands with regard to "adaptive" geographic changes. Are not all "adaptations," indeed, to be interpreted as "fortunate accidents," as is done with selected examples on pp. 85 and 115? Perhaps the genetic basis in the general problem of acclimatization might well have been further emphasized. The remark that subspecies "may be so stable that they will breed true for generations when isolated" is surely a marvel of understatement for every tested case.

As life on earth may have come into being on discrete occasions during a favorable stage in cosmic history, so too we find that complex yet diverse organisms later exhibit a marked parallelism in their biophysical responses at equivalent levels of altering environment. Between the extremes of the migration of which this book treats, for instance, the regulation of osmotic concentration and of respiration among various animals constantly calls for active processes in integument, glands, hormones, blood pigments, renal organs, gills, swim-bladder, etc. It is illuminating to learn of the general similarity, or even identity, of the resulting interactions. The gradual transition from aquatic to terrestrial life may be suggested by a series of fishes arranged according to the alkali reserve, *i.e.,* the bicarbonate content, of their blood. Within cer-

tain species-groups of littoral crustaceans that straddle the gap between water and air, we find a progressive reduction of gill volume in the same direction. In his chapter of nearly fifty pages on "changes," from which these examples are drawn, Professor Pearse presents a masterly review of many orders of animals under such headings as integument, respiration, body fluids, metabolism, locomotion, nervous system, excretion, reproduction, food and digestive organs, acclimatization and parasites.

It is very unfortunate that the editorial plane of a work of such consummate scholarship should be so far below its scientific standard. The reviewer has checked three or four times as many typographic errors as the 13 listed on the errata slip, and there is a bewildering discrepancy between the spelling of authors' names in text and bibliography, from the latter of which, by the way, at least a dozen authorities referred to by name and date are omitted altogether. Occasionally a misprint, as near the top of p. 115, has resulted in a meaningless sentence, and it is likely that one or more apparent errors of fact are in reality misprints. For example, the substitution of "common eel" for "conger eel" on p. 9 would make a false statement true. A few other factual details are open to question, such as the allegations that most species of salmon die after spawning and that the usual winter range of highly migratory birds is selected because of "more desirable" attributes. For the sanderling, New Jersey furnishes a no less optimum winter range than Patagonia, even though many more birds migrate to the latter than remain in the former.

The book lends weight to the tenet that the body fluids of the higher animals are still substantially isotonic with the primordial sea; that the migration from saline water to fresh and from the latter to air has been fought out against a steep respiratory gradient, and that "a film of aqueous liquid" has been carried throughout the course of evolution as the only respiratory medium. As a whole, the text, which is admirably lucid, serves up a concentrated "intellectual pemmican," with a challenge to further thought on every page, and with a capable summary, as well as a key to more detailed sources, in almost every paragraph.

ROBERT CUSHMAN MURPHY
AMERICAN MUSEUM OF NATURAL HISTORY

NORTH AMERICAN FOSSILS

Type Invertebrate Fossils of North America (Devonian), Unit 7b, Ammonoidea. By A. K. MILLER. Wagner Free Institute of Science, Philadelphia, 1936, 50 cards, 8″ × 11½″. $2.50, plus postage.

THE Paleontological Society and the Wagner Free Institute of Science have begun the publication of a great card catalog of the fossil invertebrates of North America. With this first unit of 50 cards they have set out to carry through one of the most ambitious programs of research and publication ever undertaken by students of the life of the past. If the paleontologists of North America can keep the future units of their catalog up to the high standard of the first one, their work will rank as a classic and they will have erected a milestone on the highroad of progress of their science.

The program calls for the preparation, by the specialists most competent to do the work, of cards for every species of North American fossil invertebrate, such cards to bear figures of the holotypes or cotypes of the species involved and condensed information about their distinctive characters, original places of description, type localities and occurrences and the locations of type specimens. The first unit, which is made up of the cards for the 50 species of Devonian Ammonoidea which have been described from this continent, was prepared by Professor Arthur K. Miller, of the University of Iowa. The cards for other groups of Devonian invertebrates are being prepared by American and Canadian specialists and will be issued as rapidly as they are completed.

These cards are not to be mere scissors and paste compilations of previously published facts and figures. They are to carry many new and better illustrations of type specimens and previously unpublished information. Aided by grants from the Geological Society of America and the Wagner Free Institute of Science, Professor Miller was able to visit the museums where the type specimens of North American Devonian ammonoids are preserved and study and photograph them. The cards bear eloquent testimony to the thoroughness of his work and the care with which he prepared them.

This portion of the catalog will prove an invaluable tool for students of Devonian fossils, not only in North America, but throughout the world. Accurate, up-to-date, beautifully printed and easy to use, it should both inspire those who use it to better work and help to make that better work possible. The conception of such a monumental undertaking proved that North American paleontologists have vision and enterprise: the quality of its first published unit proves that they have the skill and the determination to carry out their program successfully.

B. F. HOWELL

A BOOK OF WONDER PLANTS

Illustrations of North American Pitcherplants. By MARY VAUX WALCOTT. Published by the Smithsonian Institution, Washington, D. C., 1935. Quarto. Price $25.00.