

are applied to the various parts of the grass plant. The difficulties in the taxonomic study of grasses encountered by the average student are, in "Grasses of Indiana", in quite a large measure removed by an article on "The Grass Plant", by Paul Weatherwax, which precedes the descriptive part of the book by C. C. Deam himself. In this article a brief, clear, and concise account of the structure of the various parts of the grass plant is given. By necessity, this account has to make use of quite a number of technical terms the meaning of which, however is elucidated by 14 excellent text figures, also by Paul Weatherwax. For further explanation of technical terms the reader also has recourse to a glossary at the end of the book.

In "Grasses of Indiana" 201 species, 19 varieties and 7 forms of grasses are described, for the most part from specimens collected by Mr. Deam within the State. The measurements, which are taken from herbarium specimens, are given in the metric system. For the guidance of those not familiar with the metric system a comparison between it and the English system is given on page 349. In the nomenclature the International code is followed, and when any name used differs from that of Gray's Manual, Edition 7, and Britton and Brown's Illustrated Flora, Edition 2, the names of those works are given as synonyms. The author refrains and, in the reviewer's opinion, quite rightly so, from the extensive use of so-called common or popular names of grasses, on the ground that they are not universal, "frequently misapplied, commonly misunderstood, often fanciful and meaningless, and usually undignified". He advocates the greater use of scientific, latin names, reminding those who object to them that "they are no more unfamiliar and difficult to learn than some meaningless trademark names such as "kodak" and "postum" and that "they are no more difficult than 'carburetor', 'differential', and 'static'".

For the identification of the various grasses keys to the tribes, genera, and species are provided. These keys which, as the author points out, are entirely artificial, are on the whole simple and easy to work. In a few instances, however, the clearness of the characters separating sections of the keys is somewhat dimmed by the use of such words as "usually", "generally", and the like. This is pointed out, not in a spirit of finding fault, but merely to advise students, in case any doubt should arise as to in what section of a key

a plant under examination ought to be placed, to study carefully the very full and comprehensive descriptions of the species prepared by the author, and the numerous, excellent plates* by Paul Weatherwax.

To sum up, the book is a valuable contribution to the knowledge of the flora of Indiana, very creditable to the author and to the Department under whose auspices it has been prepared. And it is more than that. It is an up-to-date treatise on grasses which, as such, should commend itself to botanists all over both the United States and Canada.

The book is attractively made up and neatly bound in strong cloth of a pleasing dark-green colour.—M. O. MALTE.

FIELD BOOK OF NORTH AMERICAN MAMMALS—

Descriptions of every mammal known north of the Rio Grande together with brief accounts of habits, geographical ranges, etc. By H. E. Anthony, M.A., Curator, Dept. of Mammals, American Museum of Natural History. With 32 coloured plates and 175 photographs, pen-and-ink sketches, and maps. G. P. Putnam's Sons, New York-London, The Knickerbocker Press, 1928. 12mo. cloth, xxv, 625, price \$5.00.

This compact little book of 7 x 4½ x 1 inches will prove a boon to all persons interested in the study of mammals, being the only modern handbook which gives description, range, common and scientific name of all the species and subspecies of mammals, 1,445 in all, recognized as inhabiting this territory. The descriptions of our mammals have been scattered in various books and periodicals comparatively inaccessible to most young students, and in many cases too technical for ordinary use. The various popular books, while useful for life histories, are practically useless for the purpose of determining an unknown specimen in hand. The progress in study of mammals has been so rapid and extensive in recent years, and so many new species have been discovered and named, that even the best of the early books fall far short of modern needs.

The size of this book prevents the treatment from being completely monographic, and while it would not be possible positively to identify all specimens by aid of this book, sufficiently clear characters are given for recognition of all the important forms, and for many of the subspecies. References are given where the subjects may be pursued farther if necessary. As few skull characters are given, some forms based on such characters can not be adequately de-

*A typographical error occurs on page 25, bottom line, where the reader is referred to Plate 71 for illustrations of *Danthonia*. It should read Plate 31. The mistake is somewhat unfortunate as *Danthonia* by a curious coincidence is omitted from the Index.

terminated. The lack of systematic keys is a defect in many eyes, although the descriptions of families and major groups are as a rule full enough for practical purposes, and the generous use of illustrations and distributional maps will generally enable the user of the book to run down the species. The numerous distributional maps are particularly useful in giving the ranges of the species and subspecies at a glance. As they display few serious inaccuracies, and as most mammals are quite rigidly fixed in their habitats, provisional identification by ranges is much more dependable than it is with birds or other widely migratory animals. It is only fair to state that the few slight inaccuracies in mapping ranges are largely due to lack of publication of known records and detract little from the value of the book as a field manual or key. The description of habits of the groups and species are very characteristic and readable, reflecting the wide field knowledge of the author, and give briefly the most interesting and essential facts. In a word, the chapter introductions and running comments here and there give the general information about mammals which everyone ought to know.

The tones of some of the coloured plates leave much to be desired, and the line drawings while generally aptly illustrative, and in many cases admirably catching the spirit of the subject, would appear more artistic in a larger, wider-margined book on rough paper. The distribution maps, while serving their purpose very well also have a somewhat crude appearance in a small book on thin India paper. The publishers informs us, however, that the plant cost of producing the book was about \$7,500 irrespective of the running cost of printing and binding. As a book of this character is necessarily of comparatively limited circulation, minor criticisms on technique are superfluous, and the publishers should be heartily commended and thanked for their courage and enterprise in bringing out such a neat and useful volume at the price asked.

From the standpoint of scientific nomenclature, G. S. Miller's "List of North American Recent Mammals, 1923" has been taken as the basis although some new data involving changes of names have been incorporated. Miller's List was purely technical and gave no English or vernacular names. The reviewer believes with Anthony that common names are a necessity in a book of this type. The selection of suitable names of this character is by no means an easy task, and while we believe that the author has made by all means the best selection of names up to the present time, it is not difficult to raise objections to some of the names given. Where

obviously inappropriate names have actually come into common use and are *de facto* in the vernacular there is admittedly nothing that can be done about it, but the reviewer has a deep-seated prejudice against stilted and artificial inventions like the "Cantankerous Meadow Mouse" of Elliot. Is there not some hidden vernacular limbo or synonymy into which we can drop such ridiculous appellations?

In addition to notes on habits, food, etc., the author has given a brief summary of the enemies of each group, but has fallen into a common error in listing "Wolves, Polar Bears, and possibly (when young) Snowy Owls" as enemies of the Arctic Fox. It is well known in the North that the wolf is essentially a big-game hunter, and while an occasional aged or wounded wolf may eat dead foxes found in traps, the healthy fox is far too alert to be caught by a lone wolf and the skimpy carcass of the little white fox is an uneconomical quarry for hunting by wolves in packs. On the contrary, where caribou are common, the foxes follow them and glean much of their winter food from the wolves' abandoned kills. Foxes often live on the sea ice far from land, and habitually follow the polar bear as a parasite which is at least tolerated, living largely upon the remnants and spilled blood of seals killed by the bear. The Snowy Owl doubtless picks up an occasional fox cub, but as the snowy owls, foxes, and lemmings reach their peak of abundance about the same time and the lemming is the principal food of both the others, the owls do not appear to bother the foxes very much. However, as there is a notable movement of arctic foxes as well as owls to the southward following the periodic decline of the lemming population, and as these migrating foxes do not appear to return again to the North and never get a permanent foothold in the South, it may be a case of "dog eat dog" at such times, with the foxes coming out second-best.

A few cases may be mentioned where deviations are made from Miller's 1923 List. The reviewer has for some time held Anthony's idea of making *Ovis stonei* a subspecies of *Ovis dalli*, as every shade of intergradation, including the so-called *Ovis fannini*, is found between the two. *Ovis dalli fannini* seems hardly worthy of retention unless we adopt the principle of naming intergrades, and that logically leads to describing *intergrad.s between intergrades*. Anthony is undoubtedly right in considering *Ovis canadensis nigra* Millais as a synonym of *Ovis dalli stonei*, but *Ovis canadensis samilkameenensis* is certainly not the same as *stonei*, as it belongs to the heavy, thick-horned group. *Samilkameenensis* may not

be worthy of subspecific recognition, but there is still some doubt whether it belongs with *Ovis canadensis canadensis* Shaw or *Ovis canadensis californiana* (Douglas). We also agree with the author in dropping four of Matschie's species of wolverine, *Gulo auduboni*, *bairdi*, *katschemakensis* and *niediecki* being all synonymous with *G. luscus* (Linnaeus). The so-called Southern Wolverine, *Gulo luteus* Elliot, separately largely on grounds of paler colour pattern, is said to range from California to Alaska, but is matched in pale colour by many specimens throughout the range of *luscus*, and if recognizable at all must be purely a geographic race or subspecies of *Gulo luscus*.

A few other supplementary points may well be called to the attention of Canadian mammal students without any spirit of criticism. *Microtus drummondii* (Audubon and Bachman) is now quite widely recognized as a subspecies of *M. pennsylvanicus*.

Three alleged Canadian species of bats have recently been placed in synonymy (Miller and Allen, "American Bats or the genera *Myotis* and *Pizonyx*", 1928): *Myotis pernox* Hollister = *Myotis lucifugus alascensis* Miller; *Myotis altifrons* Hollister = *Myotis volans longicrus* Miller; and *Myotis californicus cilialabrum* Merriam = *Myotis subulatus subulatus* (Say). Miller lists the Pacific Raccoon, *Procyon psora pacifica* Merriam but Anthony places it as a subspecies of the Eastern form, *Procyon lotor*. The Black Bears of North America as a whole have not been worked up thoroughly, and although the reviewer agrees with Hall (Univ. California Publ. Zool. 1928) in considering them all subspecies of *Ursus americanus*, the author conservatively retains them under six species of *Euarctos*. On the other hand he has more or less arbitrarily cut down the 84 forms of Grizzly and Big Brown Bears of Merriam (N. A. Fauna, No. 41, 1918) to 18 forms which he retains. The reviewer has no faith in two recognizable subspecies of Musk-oxen occupying substantially the same Canadian range near Hudson Bay and would relegate *Ovibos moschatus niphoeus* Elliot to synonymy. The small amount of white on head and face of some continental specimens probably shows intergradation with *O. m. wardi* Lydekker of the northern islands.

Grinnell and Dixon (1926) place the Queen Charlotte Marten, *Martes nesophila* (Osgood) and their newly described subspecies *vancouverensis* as subspecies of *Martes caurina*. The Labrador

Marten, listed as *Martes brumalis* (Bangs) is also almost certainly a subspecies of *Martes americana*.

The Puget Sound Weasel, *Mustela streator* (Merriam) is apparently a subspecies of *M. cicognanii*. The reviewer is unable to recognize any valid distinctions between the Canada Lynx, *Lynx canadensis canadensis* Kerr and the so-called Arctic Lynx, *L. c. mollipilosus* Stone. The northern lynxes make periodic irruptions in large numbers to the Arctic coast when the varying hares fail in the interior districts, but there is little to show that the lynxes differ (See Annual Report, for 1927, Nat. Mus. of Canada, 1929, pp. 98-99). We are also unable to make any distinctive characters hold between the circum-polar Bearded Seal, *Erignathus barbatus* (Erxleben), and the Pacific form, *E. b. nauticus* (Pallas), the characters specified by Osgood (N. A. Fauna, No. 24, 1904), in reviewing the latter name being evidently based on juvenile characters in a few specimens and these are not at all constant. Ellesmere Island Caribou is hardly a satisfactory name for the polar caribou, as they are also found on the Sverdrup Islands, and apparently intergrade with *Rangifer arcticus*, in which case the form should stand as *Rangifer arcticus pearyi* (Allen).

The Oregon Mole, *Scapanus townsendii* (Bachman) has recently been found to occur in extreme southwestern British Columbia (Ann. Report 1927, Nat. Mus. Canada, p. 20), specimens being taken at Huntingdon, B.C., in 1927. Anthony's distribution map of Prairie-dog does not show this species as reaching the Canadian border, but recent researches and collections made in 1927 and 1929 show that there are several colonies of *Cynomys ludovicianus ludovicianus* (Ord) in southwestern Saskatchewan. This species is also said to have formerly been found in southwestern Alberta, and while the records are not very definite and are perhaps not authentic, they are worth investigating further. The little short-tailed Shrew *Cryptotis parva* has also recently been taken in Ontario. (Cross and Dymond, Mammals of Ontario, 1929, p. 23).

In conclusion the reviewer wishes to state that he has tried out this Field-Book thoroughly in the field and in the laboratory and can conscientiously say that it is a most valuable and reliable text which no working mammalogist in Canada can afford to be without.—R. M. ANDERSON, National Museum of Canada, Ottawa.



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