

allowing equal numbers of males and females, and the young beginning to breed at forty-six days old, the total increase from one pair, if all lived and bred, would be over one million individuals at the end of a year. If these were confined to one acre of ground, this would mean a little more than twenty mice to every square foot.

Mr. Bailey found that the quantity of food eaten is astonishing. In one cage, thirty days feeding of ten mice with all the clover, cantaloupe, grain and seeds they would eat, showed that an average of 55% of the weight of each animal was eaten every twenty-four hours. This was on the richest kind of food, such as they rarely obtain in the wild state. In another cage, during the same period, nine mice that were fed green clover, etc., with no grain or seeds, consumed an average of 100% of their weight every twenty-four hours. This would seem more nearly their normal ration in a wild state. At 30 grammes a day, one meadow mouse would consume 10,950 grammes (23 pounds) of green food in a year, and 100 mice 2,300 pounds, or a little over a ton of green grass or clover, which would make about half a ton of dry hay.

A hundred mice to an acre is not an unusual number in meadows favourable to their habits, while in "mouse years", or during mouse plagues the number has been estimated at thousands to an acre. Even with 1,000 to the acre, it is easily shown that mice consume more vegetation (11½ tons) than would ordinarily grow on an acre in a year.

In thirteen closely printed pages, Mr. Bailey gives concise accounts of mouse plagues, general habits, voices, disposition, individuality, playing, fighting, sanitation, breeding habits, mating, nests, care of young, factors modifying breeding, food habits, stores, habits in captivity, quantity of food required, aggregate destructiveness, methods of control, uses, and a valuable list of literature cited.

Mr. Bailey believes that total extermination of meadow mice would be as impossible as it would be undesirable. They are firmly entrenched in many waste places where they serve to transform vegetation into food for fur-bearing carnivores, and supply the daily bread of numerous birds of prey that agriculture could not spare without great danger from other rodent pests. In agricultural districts, the importance of keeping these mice under control and at a minimum number is clearly seen. The most economical and practical method of control is by natural enemies, i.e., hawks and owls, gulls, herons, bitterns, crows, shrikes, jays, etc. Snakes and even fish help to keep them under control.

Simple cultural methods, clean fields and meadows, clean borders, roadsides, and ditch banks are a great aid in giving these natural enemies a chance to see and catch the mice, solve the problem of control by preventing occasional heavy losses, and add considerably to the yearly farm returns.

The whole paper is an interesting account of one of our most common native mammals, frequently casually observed, but heretofore little known. It is not only a valuable biological study but an important economic contribution, and may serve as an example which might profitably be followed and applied to other of our common native mammals.—R. M. A.

A DISTRIBUTIONAL LIST OF THE BIRDS OF BRITISH COLUMBIA, by Allan Brooks and Harry S. Swarth. *Pacific Coast Avifauna*, No. 17; Contribution No. 423 from the Museum of Vertebrate Zoology of the University of California. Published by the Cooper Club at Berkeley, California, September 15, 1925, pp. 158. Frontispiece in color by senior author. Map of Life Zones of province in colors and many illustrations and line maps in text.

This is probably the most valuable scientific contribution to Canadian ornithology since the publication of the Macoun Catalogue of Canadian Birds in 1909. It should be in the hands of every student of North American Distribution and will be invaluable to the ornithologists of British Columbia and adjoining areas. The authorship assures the accuracy and thoroughness of the work. No collaboration of authorities could be happier for a Birds of British Columbia. The senior author has had a wide experience in the province and the junior author has studied deeply the broader Pacific Coast problems and has a deserved reputation for meticulous care in his work.

The general appearance of the volume is that of a model of clean and dignified typography, material and make-up. After a short Introduction, giving the general plan and methods of Authorship, follows a page of suitable "Acknowledgements". Then comes seven pages of "Previous Work in British Columbia", giving a history of ornithology in the province from the time of Captain Cook's Voyages, published in 1784, to the completion of the manuscript. Unfortunately, this does not include the important work of the two authors in the extreme northern part of the province in the summer of 1924.

A chapter on "Life Zones and Faunal Areas" of the province occupies five pages and from comment in other reviews, seems to have surprised many who did not realize the varied extent of the area in question. A map showing the Life Zones in four colors is a very valuable addition to this

section and presents visually the complication of British Columbian problems. From it we see that the Upper Sonoran Zone intrudes into British Columbia in two small areas near the southern boundary in the Okanagan and Skagit valleys. The main river valleys of the southern parts of the province, the inner coast of southern Vancouver Island and mainland coasts adjacent are Transition. The remainder of the southern two-thirds of the province is Canadian, with Alpine-arctic (Boreal) and Hudsonian at higher elevations and over most of the remaining northern third in the low lands.

The annotated List of Birds, pp. 23-126, covers 409 species and subspecies as stated in the Introduction, an extraordinarily large number for any single political division. The list follows the plan of others that have been published under the same auspices and is purely distributional, with no extraneous matter. It gives full range in the province of each form recognized to occur. A welcome addition is the inclusion in the text of many small outline maps with the occurrence of the more interesting or complicated forms plotted thereon in appropriate symbols.

A list of eight "Introduced Species" follows, then a "Hypothetical List" of twelve species and a "List of Birds Accredited to British Columbia on Unsatisfactory Grounds" of eleven species. This last is a rather unusual feature in such publications, but a good one, as it shows each an obvious act of exclusion and not an accidental omission. An admirable index completes the volume.

While the general reaction to the Birds of British Columbia is most favorable, there are points of possible improvement that the critic can find in the most excellent presentations. It is with the idea of suggesting methods of making the admirable still more so that the following remarks are made.

No two people can ever see simultaneously from the same view-point and, no matter how congenial two authors may be, collaboration always necessitates a certain amount of compromise and deference, one to the other. In many cases decisions are bound to be made that are unsatisfactory to one author or the other, or even to both. It would be well if such conflicts of judgment could be indicated. There are findings expressed in this work hardly in harmony with expressed conclusions of one or the other of the authors and we are left in doubt in particular cases whether this indicates a change of opinion or only deference to a confrere.

In the Introduction we are given to understand that, where the authors have felt unable to make personal decisions, they have followed the A.O.U.

Check List. While, for the sake of uniformity, there are strong arguments for following this authority, unless there is definite evidence for the contrary, we think that where this course is followed it should be so indicated. Where the question is purely nomenclatural, as in attributing priority to this or that particular name, the matter is inconsequential, as no source of confusion is thereby raised. But where questions of fact are involved, as the distinction of certain postulated races, the disadvantages appear. There are a number of subspecies in this list that it is assumed neither author had material for an original decision but from the context we are unable to say which are included as definite acts of judgment and which are mere acceptance of tradition. There should be some way to separate these cases, so that the weight of the really valuable judgment of the authors will not be attributed to cases where it has not been exercised.

The synonymy of the Northwestern Horned Owl, *Bubo virginianus lagophonus*, seems a little unhappy. *B. v. subarcticus*, *B. v. arcticus* and *B. v. pallescens* are all included under this head. This would certainly give the impression that *lagophonus* was a pale, instead of a very dark form. It does not seem at all probable that these pallid birds ever have been included in *lagophonus*.

In the opinion of the reviewer, the usual practice here followed of relying entirely on appended "Introduced", "Hypothetical", etc., lists for mention of certain species could be improved upon. It necessitates the searching of several inconspicuous lists at the back of the volume to find some given species, or to make certain that they are not included. To one familiar by frequent consultation with the list in question, the existence of such appendices is known, but they are very easily overlooked by the occasional consultant and, in any event, are a needless complication. We are entitled to find information in the first logical place we are expected to look for it. There are several methods by which these names could be included in their systematic place in the general list. The whole matter could be transferred there and plainly marked "Introduced", "Hypothetical", etc., as the case may be, by word, special type, marginal inset or other distinction, or the name alone might be introduced in its proper sequence and reference made to the fuller discussion on its subsequent page.

These are minor details in an excellent work, and our only serious disappointment in it is that a work on Canadian birds, largely by a Canadian author, could not have had a Canadian publication. As long, however, as we fail to provide facilities for scientific publication ourselves, we are glad to see it so well done by others.—P.A.T



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