

Harrison's studies in this interesting subject may continue as additional data will be valuable.—A. WETMORE.

MCATEE ON THE EFFECTIVENESS IN NATURE OF THE SO-CALLED PROTECTIVE ADAPTATIONS IN THE ANIMAL KINGDOM, CHIEFLY AS ILLUSTRATED BY THE FOOD HABITS OF NEARCTIC BIRDS.¹—In this important contribution to ornithology in particular and to zoology in general, Mr. McAtee has made available to zoologists the results of an amazing amount of data on the food habits of Nearctic birds—data which have been accumulating in the records of the United States Biological Survey for the past forty-five years. This report should be of value to all students of natural history whether interested in vertebrates or in invertebrates.

The data presented in this report are based on records of animals identified in the stomach contents of about 80,000 Nearctic birds. The stomachs were examined in the Biological Survey and the determinations of species were made by specialists there in the various fields represented. The 80,000 stomachs represent a wide range of species of all of the families of birds occurring in the region, the birds being collected at all seasons and in practically all parts of temperate America.

The total number of identifications of animals from the stomachs, counting those of whatever degree, once for each time identified irrespective of the number of individual specimens concerned, was 237,399. Ten phyla ranging from Protozoa to Chordata were represented. The phylum Arthropoda was represented by the largest number of identifications, with 210,752, and Porifera by the smallest number, with two identifications. In no other institution in the country has such a volume of data been collected on food habits of birds. It is therefore extremely valuable to students throughout the country to have this mass of data digested, summarized, and made available for use as Mr. McAtee has done.

In his discussion of the animals used as food by birds Mr. McAtee treats each phylum separately. He has followed a uniform system throughout with the following sub-headings under each group considered: Protective Adaptations, Bird Enemies, Other Enemies, Discussion. In the phyla

Protozoa, Porifera, Coelenterata, Nematelminthes, Trochelminthes, Molluscoidea, Echinodermata, which represent a relatively small per cent of the food of birds, he has treated each phylum as a unit, whereas in the phyla Arthropoda, Mollusca, and Chordata he has considered each order separately and in many cases has listed in tables the families of certain orders showing the number of identifications and the percentage of identifications among those of the entire order. He has not discriminated, however, between types of predators within each group, but has lumped them all together. His results might be somewhat different were he to consider each species of predator separately.

At the end is a useful bibliography of over 500 titles. Mr. McAtee states that these titles are chiefly those from which notes supplemental to his tabulations were gleaned. The bibliography is primarily one of predation, pertaining to literature on predatory animals and their foods, and so far as possible, entries are distributed according to the thing eaten and are arranged according to the phyla or orders to correspond with divisions of the text.

Throughout the text Mr. McAtee stresses the principle that predation is in proportion to population—that the ruling criterion in choice of food is availability, and that the so-called *protective adaptations* in animals are of little or no significance as far as the predators are concerned. Further he indicates that indiscriminate rather than discrimination in the attack upon animal food is the rule in bird predation. To quote from his summary on page 144:

"Considering bird predation alone this principle [predation in proportion to population] leads to a high degree of indiscriminancy in attack upon the whole kingdom of animal life. The combined attack of birds plus all other predators still more closely approaches complete indiscriminancy. In other words there is utilization of animals of practically every kind for food approximately in proportion to their numbers. This means that predation takes place much the same as if there were no such thing as protective adaptations. And this is only another way of saying that the phenomena classed by theorists as protective adaptations have little or no effectiveness.

"Natural Selection theories assume discrimination in the choice of prey. The

¹ Smithsonian Misc. Coll., 85, March 15, 1932, 201 pp.

principle of proportional predation so obvious from the data contained in this paper vitiates those theories for it denotes indiscrimination, the very antithesis of selection."

The above statements about the ineffectiveness of protective adaptations and about Natural Selection theories being vitiated by the evidence produced in the paper, call for a brief discussion of the evidence and its interpretation. I do not offer the following as a criticism of the value of the paper; I am merely suggesting what seems to me to be a more logical interpretation of the data presented, only as it concerns protective adaptation and Natural Selection.

If I interpret Mr. McAtee correctly he is thinking of *inter-specific* rather than *intra-specific* competition when he speaks of the ineffectiveness of protective adaptations. Inasmuch as the incipient stages in the formation of a new variety or subspecies are to be found within the population of the species, it seems that here is the place to look for the rôle, if any, that is played by Natural Selection. We should naturally expect that a species whose numbers of individuals were great would be subject to more predation than one whose numbers were small, and Mr. McAtee produces evidence to bear this out, but why should this vitiate the theories of Natural Selection?

On page 129 we find the following: "The sparrows, most persecuted of all [birds], because most available, represent almost the acme of protectively colored birds . . ."; and on page 133, "Muridae [Crictidae] (mice and rats) are secretive, elusive animals with what would be called highly protective coloration, but this does not prevent their being the staple mammal food of birds."

These and similar examples in other groups of animals are apparently used as evidence against the theories of protective adaptations and Natural Selection. Might not the mere fact that certain species of animals are so numerous indicate that their large numbers are due in part to protective adaptations, be they color, structure, or fecundity, else they might, with their numerous enemies, be reduced to small numbers or even extinction? Certainly the rate of mortality and the rate of reproduction must be about the same, to preserve a uniform number of individuals which make up the species. Furthermore, granting that these abundant forms which are supposed to be pro-

tectively adapted are eaten in greater numbers than species which occur in lesser numbers, and which are perhaps less protectively adapted, I fail to find convincing evidence to indicate that the *per cent* of the total population of the species eaten is as great or greater in the species with the greater numbers. It seems to me that it is important to know the ratios of individuals eaten to the total population of the species before one uses this as critical evidence one way or the other.

That birds tend to be indiscriminate in their attack upon animal life, as far as food species are concerned, is shown by Mr. McAtee, but that they are indiscriminate as far as individuals within a species are concerned is not, I believe, shown by his data. Mr. McAtee cites Pearl on "Relative Conspicuousness of Barred and Self-colored Fowls" (Amer. Nat., 45, 1911, pp. 107-117) as evidence against the theory of protective coloration. Pearl reported that "natural enemies" captured in one year 325 individuals out of a total of 3443, a flock which contained both barred and self-colored fowls. To quote again from McAtee, page 131, "By all theories of protective coloration, the latter [self-colored fowls] are the more conspicuous and should pay a higher toll to predatory enemies. Of the total number of birds 10.05 per cent were self-colored and of all the eliminated birds 10.77 per cent were self-colored. Thus these monochrome birds were taken almost exactly in proportion to their numbers in the whole flock." As a matter of fact the self-colored birds did pay a slightly higher toll. This difference, although slight, if it were found in nature and continued over a sufficient period of time might be sufficient to cause the extinction of the one variety and the perpetuation of the other, assuming, of course, that all other conditions were equal in the two varieties. At any rate I cannot see that this is conclusive evidence against the theory of protective adaptation. It is an experiment carried on under artificial conditions over a short period of six months and the only factor considered was color. Might not there have been other factors, such as alertness, speed in retreating from enemies, or pugnacity on the part of the fowls being preyed upon, which were quite as important as color?

The reader should not be misled by the positive manner in which Mr. McAtee attempts to force his point throughout the paper. He denounces emphatically the theories of protective adaptations and

Natural Selection, but offers no alternative explanations in their stead. If we are to discard these theories, as Mr. McAtee would have us do, we should appreciate having him give us substitutes as good or better than the ones discarded.—WILLIAM HENRY BURT.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

MARCH.—The March meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, March 24, 1932, at 8:00 p. m. in Room 2003, Life Sciences Building, Berkeley, with President Linsdale in the chair and about fifty members and guests present. Minutes of the Northern Division for February were read and approved. Minutes of the Southern Division for February were read. Mervyn Annis Ortez, 2127 Oregon St., Berkeley, was proposed for membership by Joseph S. Dixon; and Mrs. Elizabeth H. Price, 2243 College Ave., Berkeley, by E. L. Sumner through the Western Bird-banding Association.

Dr. Linsdale announced the appointment of the Committee on Conservation authorized by action of the January meeting, the personnel being Brighton C. Cain, Alden H. Miller, and W. I. Follett, chairman. Dr. and Mrs. Lynds Jones of Oberlin, Ohio, were the Club's guests for the evening.

Miss Rinehart reported a Mockingbird in full song at the California Nursery, Niles, on March 23, and a flock of Evening Grosbeaks seen at Kentfield, Marin County, on March 7. Mr. Grinnell asked whether anyone could contribute an observation which would make it possible to add the Evening Grosbeak to the list of Campus birds. Alden Miller replied that in October, 1931, he saw two of these birds on the University grounds near the Life Sciences Building. Mrs. Mead told of seeing about fifty Swans, in three flocks, from the railway train between Chico and Marysville on February 22. Miss Sherman reported a Northern Flicker at her feeding table in Oakland. Mr. Grinnell told of noting a Warbling Vireo in Faculty Glade on March 22. Mrs. Bracelin reported seeing a Saw-whet Owl near the Point Bonita target station, and a flock of about one hundred Cliff Swallows on a barn near the San Rafael ferry.

Mr. Raymond M. Gilmore then gave a most interesting, illustrated talk upon his summer cruise of the west coast of Alaska aboard the coast guard cutter "Northland." His trip occupied the period from May 5 to November 15, so he became familiar with many species of northern birds, whose habits he described entertainingly. Incidentally, he told also something of the habits of the Eskimo.

Adjourned.—HILDA W. GRINNELL, *Secretary*.

APRIL.—The April meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, April 28, 1932, at 8:00 p. m., in Room 2003, Life Sciences Building, Berkeley, with President Linsdale in the chair and about sixty members and guests present. Minutes of the Northern Division for March were read and approved. The name of Paul Lester Errington, University of Wisconsin, Madison, Wisconsin, was proposed for membership by J. Grinnell.

At the request of the Chairman, Mr. Alden Miller reported upon the Annual meeting of the Club, held in Los Angeles, April 22 and 23. Mr. E. L. Sumner told of banding a Forbush Sparrow in Strawberry Cañon on the morning of April 28. Mrs. Bracelin announced that Mr. Joseph Mailliard had reported a Cardinal as seen by Mr. Tose in Golden Gate Park on April 27. Mr. Bunker requested an explanation as to why a Golden-crowned Sparrow in his garden should give the "oh-dear-me" call when about to spar with a Nuttall Sparrow, but no explanation was forthcoming. Alden Miller stated that on April 17 his wife found a Lutescent Warbler's nest in Strawberry Cañon, containing five eggs. Mrs. Kelly told of seeing a Mallard's nest in a eucalyptus tree in Golden Gate Park. The nest was discovered in a crotch of the tree ten or twelve feet above the ground, and at the time of the discovery, April 23, the head of the female was seen over the nest rim.

Following the discussion of field notes, Dr. Carl P. Russell of the National Park Service gave a talk upon "The Yellowstone Museum Program." This exposition of the admirable work being done by the Park Service for the benefit of the thousands of summer visitors was illustrated with an excellent series of slides.

Adjourned.—HILDA W. GRINNELL, *Secretary*.