

Bird Enemies of Brine Shrimps and Alkali Flies.—Sweeping statements based on negative evidence are dangerous, and no exception may be noted for one which claims that "enemies play no part in keeping down the numbers of *Artemia* (Brine Shrimps), or of *Ephydra* (Alkali Flies) in the larval stage."¹ Dr. Alex. Wetmore, of the Biological Survey, who has had considerable experience about Great Salt Lake to which locality the quoted assertion relates, has pointed out² that *Artemia* and *Ephydra* are by no means free from enemies. Shovellers, Lesser Scaups, Goldeneyes, Green-winged Teal, Wilson's and Northern Phalaropes, Avocets and Black-necked Stilts all feed extensively upon both of these animals. But for the fact that stomach analyses have not been made of other birds collected at the same place, it would undoubtedly be possible to add the names of a number of species to this list. Dr. Wetmore states that "the toll taken by birds from the brine shrimp and alkali fly larvæ and pupæ during the course of a season constitutes a mass of individuals almost beyond comprehension. . . . The immense number of these creatures . . . must be attributed to the large number of offspring produced rather than to an absence of enemies."

If misinformation and mis-statements based thereon, are as prevalent throughout biological science, as they are in the field that has been most cultivated by the reviewer,—the food-habits of birds—the way of the student toward truth is indeed beset with pitfalls and obstacles, almost impassable.—W. L. M.

Bird Enemies of the Varying Hare.—Mr. Norman Criddle in connection with an account of the destructiveness of snowshoe or bush rabbits, points out the value of their bird enemies. He states: "Three birds are prominent in the destruction of rabbits. The Goshawk which is also very destructive to grouse; both eagles are largely rabbit feeders, and lastly there are the Great Horned Owls. These owls have unfortunately been reduced much by man of late years, though there are no birds that take a heavier toll of bush rabbits. Preserve these birds and we should in time reduce rabbits very materially and by this means at least aid in conserving our forests."³ (p. 262.)

To the birds named by Criddle as enemies of bush rabbits must be added the Great Gray Owl and the Snowy Owl. Mr. E. A. Preble reported⁴ that the stomachs of the latter species collected by him almost invariably contained the remains of varying hares.—W. L. M.

Curious Hoarding Habits of Birds.—Dr. L. O. Howard reports⁵ the recovery of moonstones, kernels of corn and wheat, and small acorns

¹ Vorhies, Chas. T. "Notes on the Fauna of Great Salt Lake. Amer. Nat. 51. p. 498. August, 1917.

² Amer. Nat. 51, pp. 753-755. December, 1917.

³ Varying hares of the prairie provinces. Agr. Gaz. Canada, Vol. 4, No. 41. April 1917.

⁴ N. A. Fauna, 27, 1908, p. 375.

⁵ Entomological News, 29, No. 1, January, 1918, pp. 15-16.

from cocoons of Emperor moths (*Samia cecropia*). The probability is that these objects are placed in the cocoons by birds addicted to hoarding. No very definite observations on the agents have been made, the most satisfactory being those of Dr. Alex. Wetmore of the Biological Survey who has seen Bluejays stuff grains of corn and small acorns into large cocoons.—W. L. M.

Bird Enemies of Tree Hoppers (Membracidae).—In an admirable paper on the 'Biology of the Membracidae of the Cayuga Lake Basin,'¹ Dr. W. D. Funkhouser discusses the relations of birds to these insects. He presents records of seven definitely named species of birds feeding on tree hoppers, in addition to warblers (various species) and thrushes (various species), which we wish were particularized.

The greatest interest in connection with the records relates to the alleged protective adaptations of Membracids. Dr. Funkhouser states:

"Very few of the local species are molested by birds. A few species of birds have been observed feeding on the nymphs but usually neglecting the adults, the latter being probably sufficiently protected from bird enemies by the hard pronotum and sharp processes. Various species of adult membracids have been thrown to birds in captivity; in general these have been refused but in a few cases they have been picked up only to be dropped again. Evidently the strong pronotal processes, which are often sharp and hard enough to pierce the skin if the insect is seized suddenly, are unpalatable and irritating." (pp. 416-7).

In these remarks Dr. Funkhouser evidently has fallen, probably unconsciously, into the habit of speculation, which selectionist doctrine has almost ingrained in biologists and especially in biological teaching. That Dr. Funkhouser does not accept these views at face value is shown by the following further quotation from his paper: "Poulton * * * has called attention to the fact that it is hard to deny the theory of protective resemblance when the same object is accomplished by both the nymph and the adult but in different ways. In the case of the local forms mentioned above, the nymph imitates the uncurling leaf or the irregular bark by spines on both thorax and abdomen—chiefly the latter—while the adult imitates an entirely different part of the plant by the development of an entirely different part of the body. On the other hand, some of the commonest of the local species of Membracidae in no respect seem to resemble any part of the host on which they live, although their shapes are decidedly peculiar. The high dorsal crest of the *Telamonas*, for example, can only by a stretch of the imagination be made to resemble any peculiarity of the oak twig on which the insects rest, and in fact they are very conspicuous on their host. Likewise the *Ceresas*, perhaps the most widely distributed genus in the basin, are plainly seen when in their natural surroundings, and the two prominent suprahumeral horns do not in the least resemble plant structures with which the insects are associated. The answer of

¹ Mem. 11, Cornell Univ. Agr. Exp. Sta. June, 1917.