

colony with birds, alligators and reptiles, as well as with associations of 'Turkeys,' monkeys and fish. The volume is a veritable encyclopedia of information on certain phases of biological investigations. The theme is a stirring one, the interest is sustained throughout, the author has a beautiful style and the art of using a word or a sentence to describe a breath taking situation. Its reading is very heartily commended.—JOS. S. WADE.

**Economic Ornithology in Recent Entomological Publications.**—References citable under this head seem less numerous than formerly, possibly because the volume of entomological publications as a whole has been reduced. A few items of interest have accumulated, however, since the last installment (July 1932) of these reviews and they are here presented.

Billbugs (*Calendra*, long called *Sphenophorus*).—These weevils often seriously destructive to corn, timothy, and other crops are the subject of a Farmers' Bulletin<sup>1</sup> by A. F. Satterthwait. The author evidently thinks well of birds as controlling agents for he says: "the protection of birds, especially ground feeders, including the Bobwhite and the shore-birds x x x [is one of the] efficient means of preventing crop losses from billbugs" (p. [ii]). He adds "Many kinds of birds have been found feeding on billbugs. Flocks of them gather where the pests are especially numerous, and birds should be fostered and protected regularly to increase the value of their services" (p. 20). Satterthwait mentions 25 species of birds known to prey on billbugs, and the Biological Survey list extends to 120. These are listed, along with a few similar compilations, and notes on insect pests eaten by a large number of common birds in a leaflet entitled "Bird Allies of the Farmer—an Excerpt from 'Hearing before the Subcommittee of House Committee on Appropriations, in charge of the Agricultural Department Appropriation Bill for 1934'" (Reprint, revised, 10 pp., Feb. 1933).

Black Vine Weevil (*Brachyrhinus sulcatus*).—This weevil, a holarctic species, damages a great variety of ornamental and crop plants and is also a pest in green-houses. Literature on the species including mention of its enemies is digested<sup>2</sup> by Floyd F. Smith, and bird foes observed in Great Britain and France are listed. Only one—the Starling—is named for the United States (p. 33). That record is from a Biological Survey publication and further data in the files of the Survey add two species, namely, the Ovenbird and Robin, to the list of bird enemies of the black vine weevil.

Leaf Hoppers (*Cicadellidae*).—Herbert Osborn presents<sup>3</sup> information on leaf hoppers and their enemies similar to that in his comprehensive bulletin of 1912 which was reviewed in 'The Auk' for January 1913 (pp. 129-132). The same arguments are made deprecating the status of birds as enemies of leaf hoppers and they must be replied to in the same manner as in the 1913 review. Birds eat all kinds of insects and cannot be expected to specialize on any certain group. This is their most important function, in fact, and disappointment should not be expressed that leaf hoppers or any other restricted kind of insects do not figure more largely in avian diet.

Sod webworms (*Crambinae*).—Attacking lawn-grasses so severely as sometimes to cause widespread damage the sod webworms were especially in evidence during

<sup>1</sup> How to Control Billbugs Destructive to Cereal and Forage Crops. No. 1003, U. S. Dept. Agr., 22 pp., 25 figs., May 1932.

<sup>2</sup> U. S. Dept. Agr. Tech. Bul. 325, 45 pp., 16 figs., Sept. 1932.

<sup>3</sup> U. S. Dept. Agr., Circ. 241, Leaf Hoppers Injurious to Cereal and Forage Crops, 34 pp. 13 figs

the dry summers of 1930 and 1931. W. B. Noble reports<sup>1</sup> upon them and says something of interest about birds. "Natural enemies," he states, "play a rather important part in the control of webworms. Birds were particularly active in this respect during the summer of 1931. Blackbirds, Flickers, Robins, and Starlings were attracted to the infested areas in large numbers and ate many of the larvae" (p. 2). In addition to the birds named by Noble, Crows, the Crested Mynah, English Sparrow, and Savannah Sparrow are known, according to Biological Survey records, to feed on the larvae, and the Nighthawk and Roadrunner upon adults of Crambinae. Entomological literature contains a number of references to birds eating moths and larvae of this group, scanning of which adds the following species to those already listed, Bobwhite, Kingbird, Wood Pewee, Red-winged Blackbird, Meadowlark, and Barn Swallow.

Abaca slug caterpillar (*Thosea sinensis*).—This larva a serious enemy of coconut and abaca in the Philippines "is a thorned species of poisonous character" of a group supposed by theorists to be avoided by birds. Pedro Sison, however, in a comprehensive report<sup>2</sup> on the insect says, "The Crows prey upon the larvae by picking them up with their bills and squeezing out the soft content. The thorny skin or skeleton is not swallowed. As many as fifty of them are to be seen in a flock working every day from morning until late in the afternoon. They never leave the field until only a few of the larvae are left." (p. 179).

Elder borer (*Achalodes zeae*).—This insect sometimes forsakes elder to damage corn but is not especially destructive. In making studies of the borer, J. C. Silver found "The Northern Downy Woodpecker x x x attacking young elder shoots in search of x x x [the] larvae. x x x Several clumps of elder in various localities showed distinct signs of attack by birds" (p. 18).<sup>3</sup> The bird work is illustrated.—W. L. M.

Lid on Food of Taimyr Ptarmigans.<sup>4</sup>—This is a very detailed account of crop contents of three Ptarmigans (*Lagopus mutus*) from a remote locality on Taimyr peninsula in northernmost Siberia. This time the food items, consisting entirely of vegetable matter, chiefly leaves and stems of willows and saxifrages, were weighed when dry, counted, measured, and tabulated. No percentages are given. For comparison, literature dealing with the food of Ptarmigans from other northern localities is referred to.—LEON KELSO.

Manuel on Food of the Philippine Weaverbird.—Canuto G. Manuel, educated in part at the University of Michigan, where he carried on food-habits research, is now fortunately able to do similar work in his native country. The report<sup>5</sup> here reviewed is one of the first fruits of his efforts. The methods of study of the Philippine Weaver, a rice pest, are described in some detail and the results given by localities. In about half of the study Manuel used the ordinary volumetric system of stomach analysis and in the remainder adopted a numerical method. He checked the latter,

<sup>1</sup> U. S. Dept. Agr. Circ. 248, Sod Webworms and Their Control in Lawns and Golf Greens, 4 pp., Nov. 1932.

<sup>2</sup> The Slug Caterpillar on Abaca (*Thosea sinensis* Wlk.), Its Life History and Habits as observed in Davao, and suggestions for Control, Phil. Journ. Agr. 3(3), 1932, pp. 163-187. Pls. 1-6.

<sup>3</sup> U. S. Dept. Agr. Tech. Bul. 345, Biology and Morphology of the Spindle Worm, or Elder Borer, 19 pp., 9 figs., Feb. 1933.

<sup>4</sup> Crop Contents of Ptarmigans from Taimyr. By Johannes Lid. The Norwegian North Polar Expedition with the "Maud" 1918-1925, Scientific Results, Vol. V, No. 2, September 20, 1933. Pp. 3-7.

<sup>5</sup> Observations on the Philippine Weaver, *Munia jagori* Martens, II: Foods and Feeding Habits, Phil. Journ. Sci. 53(4), April 1934, pp. 393-418, 1 fig. (map), 2 tables.