

strong articles from the leaders in this movement and direct appeals for the passage of desirable legislation now before the state law-makers. The illustrations and diagrams are striking and convincing.

Mr. E. H. Forbush<sup>1</sup> in his fourth annual report as state ornithologist of Massachusetts, considers bird boxes, English Sparrow traps and the economic importance of certain species of native birds. Most interesting however is the account of the presence of a flight of White Egrets in the state during parts of July and August. Four of the birds were shot and three of the shooters were arrested. With increased protection in the south these visitations should soon be of annual occurrence.—W. S.

#### **Economic Ornithology in Recent Entomological Publications.**—

Since the first investigations of the gypsy moth in the United States birds have been given a greater or less share of the blame for the continued spread of the pest. The evidence that has been brought forward is reviewed by A. F. Burgess in his recent bulletin<sup>2</sup> on 'The Dispersion of the Gypsy Moth' and in summing up he concludes that birds are practically guiltless.

Mr. Burgess takes about the same view of the experimental evidence that birds may distribute gypsy moth eggs, as that expressed by the reviewer in the April, 1911, *Auk* (pp. 285-286). With regard to Collins' experiments on English Sparrows and pigeon he says: "These experiments indicate the extreme improbability of either of these birds selecting gypsy moth eggs for food, and the chances of the insect being disseminated in this way appear very slight" (p. 13). With regard to Reiff's experiments Mr. Burgess says: the "conclusions seem too sweeping because of the large percentage of the eggs [that had passed through the digestive tracts of the birds] that failed to hatch, and when the conditions under which the birds were fed is considered it is doubtful whether comparable result would be secured under natural conditions" (p. 14).

The chances of the dispersion of the moth through the dropping of caterpillars picked up and carried to a distance by birds are considered very remote. Of all the suggested modes of distribution by birds, the only one held at all probable is the carrying of twigs bearing egg clusters, by crows, hawks and other large birds, and the opinion is expressed that although "this may happen in some cases . . . it would result in local rather than long distance dispersion." The final conclusion is that "the evidence is wholly inadequate to prove that birds were responsible for distributing the gypsy moth to the large area which was annually becoming infested" (p. 15). The chief means of the dispersion is the wind which carries about the young larvae. The latter are provided with aerostatic hairs.

Wild birds receive much credit as enemies of locusts in the Philippines.

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<sup>1</sup> Fourth Annual Report of the State Ornithologist. By Edward Howe Forbush. Fifty-ninth Annual Rept. State Board of Agriculture. [Mass.] 1912. pp. 1-32.

<sup>2</sup> Bull. 119, U. S. Bureau of Entomology. 1913. 62 pp.

Messrs. Jones and Mackie, writing of the locust pest in *The Philippine Agricultural Review*<sup>1</sup> (Vol. VI, No. 1, Jan. 1913) say that the migratory locust is, and for many years has been, the worst destructive insect pest of the Philippines, and that their enemies the wild birds "are of more importance than is generally believed for they, from the very first appearance of the young locusts as they issue from the ground, wage a continuous warfare upon the swarm." (pp. 18-19.) The chief locust destroyers are the Luzon Shrike (*Otomela lucionensis*), Carabao Bird (*Bubulcus coromandus*), two species of kingfishers, Variegated Curlew (*Numenius variegatus*), Golden plover (*Charadrius fulvus*), two species of quails, the Jungle Fowl (*Gallus gallus*), Roller (*Eurystomus orientalis*) and two species of bee eaters.

In an account of the insect enemies of cacao, P. L. Guppy says:<sup>2</sup> "it would seem that all birds are useful to the cacao planter, especially those of the woodpecker type, even though some of the latter do occasionally make holes in pods." The King-of-the-Woods (*Momotus swainsonii*) also accused of eating pods, is shown to be chiefly insectivorous and to be an enemy of the cacao beetle, the plant's most serious insect pest. "Birds and lizards" says the author "are the planter's best friends." — W. L. M.

**More Economic Papers by Bryant. A Correction.**—Mr. H. C. Bryant's activity in his capacity as a research assistant, under the auspices of the California State Fish and Game Commission, has been so great and the results so promising, that ornithologists will regret to learn of the discontinuance of the work. Two papers incidental to the investigation of the food of the western meadowlark have recently appeared. These are: "The number of insects destroyed by western meadowlarks"<sup>3</sup> and "Some insects and other arthropods in the diet of the western meadowlark."<sup>4</sup> In the first it is shown that western meadowlarks in certain localities in California consumed on the average 10 cutworms or 10 grasshoppers per meal, exclusive of other food. Thus each bird at the lowest estimate was destroying from 40 to 80 of one or the other of these groups of insects per day throughout the summer, and according to Mr. Bryant such cases prove that birds "play a much more important part as checks on the numbers of insects than many people have hitherto believed."

In the second paper the author gives a general review of the arthropods found in stomachs of the western meadowlark. "The ordinary articles of diet are ground beetles (Carabidæ, Tenebrionidæ) grasshoppers, crickets, cutworms, wireworms, plant bugs (Pentatomidæ) certain bees, wasps and ichneumon flies and ants. The extraordinary articles of diet can be summed up as: centipedes, millipedes, scorpions, certain crustacea, snails, spiders, and protected and stinging insects." It should be noted that the

<sup>1</sup> Review of preliminary paper in *Auk*. 28. Oct., 1911, p. 506.

<sup>2</sup> *West Indian Bulletin*. XII, No. 3, 1912, p. 311.

<sup>3</sup> *Science*, N. S. 36, pp. 873-875, Dec. 20, 1912.

<sup>4</sup> *Pomona College Journal of Entomology*. Vol. 4, No. 3, Nov. 1912, pp. 807-809.