

Messrs. Jones and Mackie, writing of the locust pest in *The Philippine Agricultural Review*¹ (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:² "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"³ and "Some insects and other arthropods in the diet of the western meadowlark."⁴ 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

¹ Review of preliminary paper in *Auk*. 28. Oct., 1911, p. 506.

² *West Indian Bulletin*. XII, No. 3, 1912, p. 311.

³ *Science*, N. S. 36, pp. 873-875, Dec. 20, 1912.

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

last two classes named are by no means distinct categories from the preceding items of the list, as Carabidæ, Tenebrionidæ, Pentatomidæ, bees, wasps, ichneumon flies, ants, centipedes, millipedes, scorpions and spiders (11 out of 15 categories) are themselves classed by the Poulton school as protected insects. If all of the so-called protected classes of insects were really protected from the attacks of birds, the latter certainly would be hard put to it to find a living. But they do live and feed, I may safely say, without prolonged consideration of the theoretically protected condition of so much of their prey. The special instances of supposedly protected insects being eaten that are pointed out by Mr. Bryant, are the following: "millipedes . . . usually considered to be well protected . . . by certain secretions which produce a pungent odor"; cow killers (*Mutillidæ*); and the very hairy larva of *Ewanessa antiopa*.

In a review in the last number of 'The Auk' of one of Mr. Bryant's papers, the writer thoughtlessly did an injustice by contrasting one of Mr. Bryant's statements about conditions in California with conclusions drawn entirely from Eastern experience. This was in regard to food supply being in the last analysis the most important factor limiting the numbers of birds. In the humid east there is no doubt that food supply is *not* of primary importance in determining the numbers of at least the *seed-eating* birds. Regarding a climate where long and continued droughts prevail, a different conclusion is no doubt justifiable. Especially if a drought begins early in the summer after most of the seeds have sprouted, and new ones are not yet formed, the crop of seeds for that and the succeeding year will be very greatly reduced. Under such circumstances it is conceivable that seed-eating birds if present in abundance might have difficulty in finding sufficient food. We know that in Australia where droughts and rainy seasons endure for series of years, that almost the whole bird population shifts from place to place and that with many species, reproduction is carried on only in the rainy districts where food is plentiful.

The reviewer regrets his careless comment on this point, and hopes the present explanation will make clear that his purpose at least is to stick as close to facts as possible.—W. L. M.

Relation of the Turkey-buzzard to Diseases of Live-stock.—In the past few years wide currency in the South has been given to the accusation that Turkey-buzzards spread such diseases of live-stock as hog-cholera, black-leg and anthrax. This scavenger therefore has been threatened with persecution in the land where heretofore it has received the most zealous protection. It is of great interest that the results of a scientific study of "Anthrax of animals in Panama, with a note on its probable mode of transmission by buzzards"¹ show that the transmission of the disease probably never occurs in the way ordinarily supposed, *i. e.* by the voiding of live bacilli in the feces of buzzards. The authors, Drs. S. T. Darling and L. B. Bates, describe their results as follows, beginning with observations on the

¹ Amer. Vet. Rev. 42, No. 1, Oct., 1912, pp. 70-75.