

Iowa 3, Kansas 2, Michigan 1, New York 3, Ohio 2, Pennsylvania 3, Wisconsin 4."

Incriminated in this case means suspected, for to this day there has been no adequate investigation of the means of spread of foot-and-mouth disease, and statements as to their identity and importance reflect opinion more than anything else. The inadequacy of the ordinary observational approach to this problem is shown by a recent English paper¹ on the subject. The authors, one a distinguished veterinarian and the other experienced in ornithology, conclude that "There would appear to be most remarkable relations, both as regards seasons and localities between the movements of birds and the initial outbreaks of invasion in foot-and-mouth disease in Great Britain" (p. 693).

However, Mr. A. Landsborough Thomson, an eminent British naturalist, after a careful examination of the data upon which this dictum is based does not consider² the correspondence between the two sets of phenomena, when examined in detail, so remarkable as the authors contend, and here the reviewer, upon inspection of the maps and other information given, certainly shares this opinion.

The most striking thing about the whole subject of the relations of birds to the foot-and-mouth disease is the lack of definite evidence. From the standpoint of cure of the malady as well as of preventing its spread, rigidly controlled experimental investigation of possible carriers would seem most desirable. When the relation of the tick to Texas fever of cattle was discovered, the way was opened for control and extirpation of that pest of southern livestock. Similarly, when the rôle of the yellow-fever mosquito became known that disease lost its terrors. Until adequate investigation of alleged bird carriers of the foot-and-mouth disease is made, at every recurring outbreak we shall be in the same position of uncertainty as now, and the hysteria of the public will continue to be matched by the ignorance of scientists. Mr. Thomson strikes a hopeful note in his final sentences when he says that "Sir Stewart Stockman is now experimentally investigating the possibility of the infection being carried by birds. The question remains open, and further research may well be useful." He then concludes as to birds carrying the disease (and it would seem that the conclusion is applicable in the United States as in England), that the "evidence put before us does very little towards establishing a *prima facie* positive case."—W. L. M.

Economic Ornithology in Recent Entomological Publications.—As the results of research accumulate it becomes more and more evident that practically all insect pests have their bird enemies. Intensive study

¹ Stockman, S., and Marjory Barnett. Bird Migration and the Introduction of Foot-and-Mouth Disease. Journ. Ministry Agr. (London), 30, No. 8, Nov., 1923, pp. 681-695, 6 maps.

² Bird Migration in Relation to Foot-and-Mouth Disease. Nature, 113, pp 52-54, Jan. 12, 1924.

brings out the fact also that in many cases birds are a large if not the largest single factor in natural control. All such information is certainly good for the cause of bird protection and the reviewer hopes to bring installments of it to the attention of ornithologists as frequently as practicable.

False wireworm (*Eleodes suturalis*).—In connection with an account of the biology of this insect, which is a serious menace to the production of wheat and other small grains in the Middle West, Messrs. Wade and St. George note that various species of birds feed upon beetles of the same genus (others of which also are injurious) and that probably this particular species is eaten.¹ A list is given of 13 kinds of birds that have been found by the Biological Survey to feed upon beetles of the genus *Eleodes*.

Argus tortoise beetle (*Chelymorpha cassidea*).—This insect feeds upon the foliage of sweet potatoes. It is red or yellow with black spots, typically warning coloration and belongs to one of the supposedly specially protected families (Chrysomelidae) of insects. Yet according to the author of a recent paper² on the beetle, "The Biological Survey has found the Argus tortoise beetle in the stomachs of 14 species of birds, most often in those of the starling (*Sturnus vulgaris*) and kingbird (*Tyrannus tyrannus*)."

Codling moth (*Carpocapsa pomonella*).—This is the worst pest of the apple, and birds are its most important natural enemies.³ A recent regional study adds to knowledge of the value of birds, as it was found in Arkansas, that "Probably by far the most important natural enemies of the codling moth in this region are woodpeckers, particularly the red-bellied woodpecker. This species is abundant locally, and in some orchards which adjoin woodlots the majority of cocoons of the codling moth are apparently opened by this bird."⁴

Oak sapling borer (*Goes tessellatus*).—"No insects predacious or parasitic upon the oak sapling borer have been discovered. Woodpeckers destroy many of the larvae and pupae by drilling through the wood and removing them from their burrows. The species of bird responsible for the destruction of the borers was not determined, but the marks made in removing the insects were noticed frequently in woods where both the hairy woodpecker, *Dryobates villosus* (L.), and the downy woodpecker, *Dryobates pubescens medianus* (Swains.), were abundant."⁵

Larch sawfly (*Lygaeonematus erichsonii*).—The ever-interesting notes on natural control by Acadian workers supply the data quoted relative to this and the subsequently mentioned insect pests. The larch sawfly periodically ravages the stands of its food plant in southern Canada and the northern United States, the outbreaks usually ending only when a

¹ Journ. Agr. Research, 26, No. 11, Dec. 15, 1923, p. 562.

² Chittenden, F. H. Journ. Agr. Research, 27, No. 1, Jan., 1924, p. 50.

³ See McAtee, W. L. Yearbook, U. S. Dept. Agr. (1911) 1912, pp. 237-246.

⁴ Isely, D., and Ackerman, A. J. Life history of the codling moth in Arkansas. Bull. 189, Ark. Agr. Exp. Sta., Dec., 1923, p. 48.

⁵ Brooks, Fred E. Oak Sapling Borer, Journal of Agricultural Research, Vol. XXVI, No. 7, Nov. 17, 1923, pp. 317.

high percentage of the trees have been killed. In the course of a recent infestation in New Brunswick, Mr. A. B. Baird observed Vesper and Song Sparrows, the Palm Warbler, and Black-capped Chickadee feeding on the larvae, and gives birds credit¹ for consuming about 10 per cent of them. "The work of birds was much more noticeable on the edges of clearing and in old pastures than in the more typical tamarack swamps."

Larch case-bearer (*Coleophora laricella*).—While this insect is not such a scourge as the larch sawfly, it kills some of the trees and is an ever-present drain on their vitality. Regarding it Mr. Baird says:² "Birds were among the chief factors in controlling this insect and the following species were noted: Song Sparrow, Chipping Sparrow, unidentified sparrow, Mourning Warbler, American Goldfinch. On May 18th in the woods at Fredericton large numbers of birds were seen feeding on the larvae; Song Sparrows and Chipping Sparrows were the most abundant. A large species of sparrow, which was not identified, was also present, and a few Mourning Warblers. These birds were all feeding very eagerly upon the case bearers and the snap of their bills was very noticeable on all sides as they hopped from branch to branch picking off the larvae. One Song Sparrow was seen with its beak packed with case bearers but all the others appeared to swallow them as they picked them from the trees. On May 20th, in the same place, birds were again noted feeding voraciously on the larvae, Chipping Sparrows being the most abundant species. In this particular area a very large percentage of the larvae had been eaten and on trees where there were from 2 to 5 or more case bearers in each leaf whorl on May 10th, one could not find more than one case bearer in every 2 to 5 leaf whorls on the 18th. Birds were also seen feeding on the larvae at Chipman but not to the same extent and it is doubtful whether the birds were so abundant in most of the larger larch swamps; they were noticeably much more abundant around the edges of clearings and old pastures. The percentage taken in these places probably amounted to 75 per cent at least but in general about 25 per cent would probably be nearer the average."

Spruce budworm (*Tortrix fumiferana*).—Outbreaks of the spruce budworm of increasing frequency and seriousness culminated in one in which practically all fir of commercial size in New Brunswick was killed and red spruce seriously damaged. Dr. J. D. Tothill who carefully studied the progress of the latest infestation observed³ that "Even in the most heavily infested parts of New Brunswick it soon became evident that there were natural checks operating against the budworm that sooner or later would bring it under control." At Fredericton in 1918 about 20 of the average laying of 150 eggs were eaten by birds. Together the various natural checks cut the numerical abundance in half. "In succeeding years, as

¹ Proc. Acadian Ent. Soc. 8, (1922) 1923, p. 162.

² l. c. pp. 169-170.

³ Op. cit. pp. 174-176.

the food pressure increased and the insects decreased, the birds and insect parasites became more important. The birds observed feeding on the larvae were: The White-throated Sparrow, the Song Sparrow, the Junco, the Robin, the Black and White Warbler, and several undetermined species of Warblers. . . . The outstanding fact concerning these natural checks is that at all places, such as Fredericton, where the favored food plant was present in abnormally large quantities, the natural checks were wholly incapable of suppressing the insect until it became practically starved out of existence.

"In marked contrast to the Fredericton conditions were those in Madawaska County and at Lillooet in British Columbia, where the favored food plants—balsam fir and Douglas fir, respectively—existed in smaller and more natural quantities." At Lillooet it was found that of the eggs and pupae resulting from an average clutch of 150, fifty-eight were consumed by birds. "In this case," says Dr. Tothill, "the natural checks brought about a reduction of the insect before any trees were killed and in the following year the outbreak subsided entirely, due to continued activity of the birds against the smaller number of larvae. Juncos were by far the most abundant of the birds, but others were,—Mountain Chickadee, Western Tree Sparrow, Western Robin, Western Tanager, Hermit Thrush, Western Evening Grosbeak, Bush-Tit, Pygmy Nuthatch, Red-breasted Nuthatch, Black Phoebe, and Brewer Sparrow."

Ornithologists should certainly appreciate the definite and interesting results Dr. Tothill and his associates are publishing on the part birds play in the natural control of insect pests.—W. L. M.

The Ornithological Journals.

Bird-Lore. XXVI, No. 3. May-June, 1924.

Feathered Friends about my Door. By Mrs. Glen Eaton-Hodson.—On May 29, thirty-three species could be heard from the writer's door at Anoka, Minn.

Hiking with a Pitch-Pipe. By W. B. Olds.—An admirable lesson in analyzing and comparing bird songs.

History of Four Young Birds. By Rose L. Cannon, and others.—Crow, Rosebreast, Cedarbird and Robin.

Our Winter Guest. By Mary C. Rhoads.—A Carolina Wren occupying a green-house as sleeping quarters.

The educational leaflet treats of the Starling and is by E. H. Forbush with a colored plate by Brooks. There are a number of excellent half-tones illustrating various birds scattered through the number.

Bird-Lore. XXVI, No. 4. July-August, 1924.

Birds and Man. By F. M. Chapman.—An address before the National Conference on Recreation at Washington, D. C., May 22, 1924. It would