(*Phoradendron*) of mistletoes things are quite different as the seeds are seldom distributed from tree to tree (except by gravity) by any agencies besides birds and other animals. These mistletoes are the most injurious also as they are known to kill many trees. The birds that are important disseminators of Phoradendron in Texas are, according to Professor H. H. York,[1] Mockingbirds, Sparrows, and Cardinals, and according to Dr. W. L. Bray,[2] Mockingbirds, Cedarbird and Robins.

Dr. Bray says: "It is the conclusion of most observers that the Mockingbird is the chief distributor of mistletoe seed, but perhaps the cedar birds actually distribute more, for in March and April these birds appear in flocks of hundreds in search of berry mast — especially hackberries — and during the brief visits of a few days or a week or two all the berry-laden trees are visited repeatedly until the berries are gone. During these flights, mistletoe berries are also eaten, though probably not much noticed until the hackberry crop is exhausted. Robins also are reported to be common distributors of mistletoe seed. In the vicinity of Austin large flocks of robins spend the winter, or part of it, in the cedar brakes, where they feed largely on cedar mast; but at times they appear in numbers about farmyards and in towns, feeding upon hackberries, and during these visits also upon mistletoe berries."

The birds which the Biological Survey has found to feed upon Phoradendron berries and which therefore distribute the seeds are the California Jay, Cedarbird, Phainopepla, California Thrasher, Hermit Thrush, Robin, Bluebird, and Western Bluebird.

While the problem of controlling mistletoes is a serious one in some localities, it is not likely that aggressive action against birds will ever be undertaken as a partial solution. The destruction of birds locally would be like dipping water from the ocean; others would come in to take their places and nothing would be gained. On any other scale combating mistletoe by killing birds is unthinkable. Like most pests mistletoe is best controlled by direct attack. Anyone interested in the European experience relating to birds as distributors of mistletoe will find it summarized by C. von Tubeuf in the article indicated by the appended reference.[3]— W. L. M.

Further Data on the Spread of the Chestnut-blight Fungus.— In previous communications to 'The Auk,'[4] the writer has called attention to a publication on birds as carriers of the chestnut-blight fungus and to another which showed the great importance of the wind in distributing

[1] Bull. 120, Univ. Texas, March 15, 1909, p. 7.

[2] Bull. 166, U. S. Bureau of Plant Industry, Feb. 2, 1910, pp. 11–12.

[3] Naturwiss. Zeitschr. f. Forst. u. Land wirtschaft. 6, H 1, 1908, pp. 47–68.

[4] 32. No. 1, Jan. 1915, p. 119 and No. 3, July, 1915, p. 378.

[5] Studhalter, R. A. and Ruggles, A. G., Insects as Carriers of the Chestnut-blight fungus, Bull., 12, Pennsylvania. Dept. of Forestry, April, 1915, 33 pp., 24 figs.

spores of this serious tree pest. A third paper [5] on this general subject has also been published, and it establishes the fact that insects are important carriers of the blight. "In proportion to size" say the authors, "insects may carry a greater number of spores of the blight fungus than birds. We are led to the conclusion that some insects .... are important agents in the local dissemination of this disease."

These findings make it certain that no large part of the responsibility for spreading chestnut blight can be placed upon birds, for it is evident that bird vectors are far from indispensable to a pest that has at its service, innumerable insects, and the ubiquitous wind.— W. L. M.

Economic Ornithology in Recent Entomological Publications.— The army worm (*Cirphis unipuncta*) is one of those pests of agriculture which appear in large numbers, now here, now there, but which in spite of the sporadic nature of their outbreaks wreak the most serious damage. Never has an infestation of army worms been studied without yielding evidence of the importance of bird enemies of the pest. Mr. H. H. Knight, of Cornell University, who investigated the army worm during the 1914 outbreak in New York, gives the following commendation [1] of the birds: "Certain species of birds were very numerous in fields infested with army-worms. One large hay field, situated on low ground and in the proximity of timber, was frequented daily by a large flock of crows. The crows destroyed the worms so fast that the field never became brown as was the case in all other infested meadows. Flocks of cowbirds and grackles were doing good work in some fields. The meadow lark and the robin were also observed eating the larvae."

In a Farmers' Bulletin [2] giving a general discussion of the army worm, Mr. W. R. Walton, remarks that: "Most fortunately for the farmer, the army worm has many natural enemies among the native insects, reptiles, birds, and mammals ..... According to the records of the United States Biological Survey, more than 40 species of native wild birds are known to eat the army worm in its various stages. Among the most important of these are the following: Crow Blackbird or Grackle, Yellow-headed Blackbird, Chipping Sparrow, Bluebird, Prairie Hen, and European Starling. Domestic Fowls of all kinds will greedily devour the caterpillars and pupæ if allowed to roam over infested fields. Skunks and toads also undoubtedly eat thousands of the army worms, both caterpillars and pupæ. These birds and other animals should therefore be encouraged and protected by the farmer by all possible means."

Damage by the clover leaf-hopper, due to the small size of the pest which is overlooked, is usually attributed to soil or climatic deficiencies. It is really considerable, however, and it is fortunate that natural enemies

[1] The army-worm in New York in 1914, Bull. 376, Cornell Univ. Agr. Exp. Sta., May, 1916, p. 763.

[2] No. 731, U. S. Dept. Agr., May 23, 1916, pp. 9–10.