

Terns than the gastronomic, are also, included in the paper. Dr. Collinge's summary is:

"It seems clear that any shortage of inshore fishes at Blakeney Point can hardly be accounted for by the presence and preservation of Terns.

"If the absence of inshore fish were due to the Terns, then we should also have a scarcity of sand-eels, various crustacea, annelids, and marine molluscs, whose percentage far surpasses that of the food fishes eaten, but there are no such signs.

"We are, therefore, thoroughly convinced that the recent scarcity of flat fish at Blakeney Point is due to some other factor, and feel certain that if the whole of the Tern population of Blakeney Point were to migrate elsewhere, the result would not be marked by any increase in the fisheries.

"To those acquainted with fishery investigations, these migrations or diminutions are nothing new, and their cause or causes still remain unsolved, but of one thing we are quite certain, viz., that the feeding habits of Terns or any other sea-birds bear no relation to them."—W. L. M.

Economic Ornithology in Recent Entomological Publications.—

Information on the bird enemies of certain insects has appeared in various recent entomological publications which are briefly reviewed in the sub-joined paragraphs.

Grasshoppers.—These insects do great damage on range and dry farming lands. Among their natural enemies "American sparrow-hawks, crows, blackbirds, meadow larks, and Columbia sharp-tailed grouse (prairie chickens) are of some value on the cattle ranges of British Columbia. In many cases these birds, feeding on mice, beetles, and other forms of life, make grasshoppers only incidentally their diet. Nevertheless they are valuable allies when grasshoppers are in an outbreak form."¹

Japanese beetle (*Popillia japonica*).—This introduced beetle is a destructive pest of fruit, shade, and ornamental trees in New Jersey and Pennsylvania. Among the natural enemies of the insect, says C. H. Hadley in a paper on "The Japanese Beetle in Pennsylvania," "birds are without question of considerable importance. It has been found that a number of our commoner birds do feed upon this insect, notably the Purple Grackle or Crow-blackbird (*Quiscalus quiscula*), and the Starling (*Sturnus vulgaris*). Most of our other commoner species feed more or less upon this insect, and all are of considerable value in the aggregate."²

In another paper³ on this insect published by the Federal Department of Agriculture the same author in collaboration with Loren B. Smith, states that "Among the natural enemies of the Japanese Beetle which are native to the United States, the birds are apparently the most important." These authors quote fully (pp. 41-43) from reports on two investigations

¹ Treherne, R. C. and Buckell, E. R., The Grasshoppers of British Columbia. Bull. 39, Dominion of Canada Dept. Agr., Oct. 1924, p. 33.

² Bull. Penn. Dept. Agr., Vol. 7, No. 11, June 1924, p. 16.

³ Circ. 363, U. S. Dept. Agr., March 1926, p. 41.

by the Biological Survey which disclosed that at least 16 species of birds prey upon the pest. Messrs. Smith and Hadley note an interesting attempt to utilize a bird enemy of the Japanese Beetle in the following paragraph.

"Pheasants are known for their fondness for beetles of all kinds. A pair of English Pheasants (*Phasianus colchicus*) furnished by the New Jersey State Fish and Game Commission showed a great liking for both live and dried Japanese beetles. An attempt has been made to colonize these birds in the infested area, and to this end the New Jersey Legislature has passed a law prohibiting the killing of Pheasants in certain designated areas for a period of five years, and the Burlington County Game Protective League has distributed pairs in a number of places in the beetle-infested region."

Green June beetle.—In a paper entitled "Notes on the Behavior of *Cotinis nitida* L. and its Bird Enemies,"¹ Dr. F. H. Chittenden publishes observations on Starlings feeding on the larvae and Cardinals on the adults of this beetle. In addition to these birds, the reviewer gleans from various sources the names of 22 other species that are known to prey upon this lawn and fruit tree pest.

A somewhat speculative matter in Dr. Chittenden's paper is of sufficient interest to quote. "There is evidence of an unusual attraction of the green June beetle to the Cardinal and *vice versa*. When a bird alights among a lot of them where they congregate in bright sunlight and begins pecking at them, some fly directly at the bird as though in actual combat, giving the impression that the bird, because of its bright color, attracts the beetle. It was surmised at the time that the insect might mistake the bird for a flower. That this surmise may be correct is borne out by the observation of Dr. T. E. Snyder at Norfolk, Va., in July, 1925, that the beetles are strongly attracted to red varieties of Canna."

Striped cucumber beetle (*Diabrotica vittata*).—Messrs. J. S. Houser and W. V. Balduf state² that "the cucumber beetle occurs in practically all States of the Union, and everywhere its destructiveness has been keenly felt," but despite investigation and experimentation, "the injuries committed have continued little checked by the remedies evolved." A list of 15 species of birds known to prey upon the insect is given (p. 305) and the statement made that "it may be wondered how this insect is able to propagate itself and constitute so serious a pest in the face of its many enemies." To the list of bird enemies of *Diabrotica vittata* given by these authors may be added the Red-eyed and Philadelphia Vireos.

Cattle Grubs (*Hypoderma*)—"The cattle grubs are among the most widespread and injurious insects with which our livestock are beset," and while their life history is such that birds have few opportunities to feed upon them, yet the authors of an important bulletin about them are able

¹ Proc. Biol. Soc. Wash., Vol. 39, pp. 15-17, Feb. 1926.

² Bul. 388, Ohio Agr. Exp. Sta., Nov. 1925, p. 241.

to present some evidence that they do have bird enemies. They say¹ "Birds undoubtedly destroy many larvae as they drop to the ground after emerging from the backs of cattle. The pupae also are subject to attack, since they often remain exposed on the surface of the soil or only slightly covered. Several instances were observed in New York in which Robins (*Planesticus migratorius*) devoured larvae of *H. bovis* with avidity. . . . Henry Polson of Mountain View, Wyo., makes the following statement: 'Sometimes Magpies pick holes in the backs of the cattle, trying to get the grubs out, causing sores.'" The latter statement, while not given full credit by these authors, is corroborated by other observers. The Biological Survey has found larvae or pupae of flies of the family (Oestridae) to which the cattle grubs belong in stomachs of the Ring-necked Duck, Red-tailed Hawk, Great Horned Owl, and Crow.

Cankerworms (*Alsophila pometaria* and *Paleacrita vernata*).—These pests of fruit trees have made themselves very unfavorably known to our horticulturists since colonial times, and to this day sporadically develop destructive outbreaks. "One outstanding feature of cankerworm history is the recurrence of extremes of abundance and scarcity. In many cases the periods of extreme abundance have been suddenly terminated by an almost total disappearance of the worms, followed by a period of comparative freedom from attack." These phenomena are due to the great effectiveness of natural control among the factors of which birds are prominent. The authors of a federal bulletin summarizing information about cankerworms state that "Practically all of our common birds have been recorded at one time or another as cankerworm feeders," and that "Birds seem to be among the most important of the enemies of cankerworms."² Seventy-six species of birds are on the list of cankerworm predators according to information in the files of the Biological Survey.

Cabbage Worm (*Pieris rapae*).—In the latest Farmers' Bulletin on this well known pest, bird enemies are given due mention. The author, Dr. F. H. Chittenden writes:³ "Birds which are known to feed upon cabbage worms are the Chipping Sparrow, English Sparrow, and House Wren. It is certain, however, that other birds eat them, and in one case it was reported that during the winter the number of chrysalids (resting stage) of the cabbage butterfly were reduced more than 90 per cent by birds."—W. L. M.

The Ornithological Journals.

Bird-Lore. XXVIII, No. 2. March-April, 1926.

Feathered Fisherman. By W. H. Gratwick, Jr.—Kingfisher studies with photographs.

¹ Bishopp, F. C., Laake, E. W., Brundrett, H. M., and Wells, R. W. Bull. 1369, U. S. Dept. Agr., April 1926, p. 80.

² Porter, B. A., and Alden, C. H., Bull. 1238, U. S. Dept. Agr., Oct. 1924, pp. 29, 30.

³ Farmers' Bull. 1461, U. S. Dept. Agr., May 1926, p. 6.