

prodigious numbers in the shallow waters, especially in warm climates, such a stench would arise from the excess which would necessarily be washed up on the shores, that all human existence about the bays would be out of the question. Nature admirably provides a check to an over-supply, as well as a protection to those weak in numbers, and, if mankind interferes too much with the harmony, retribution will surely follow. Many of our birds are fast going the way of the bison, never to return. If men were not held in check by public opinion and the necessary laws, our land would soon be as barren of all animal life as are the plains of bison. In our greed, destructiveness, and lack of thought for our future comfort and happiness, we are not so very far in advance of the South-Sea islander, who plants his cocoanut, and has not the patience to let it grow, and yield a thousand-fold, but soon digs it up and eats it, fearing lest he lose it altogether, and then wonders why other islands are more favored than his own. GEO. B. SENNETT.

THE RELATION OF BIRDS TO AGRICULTURE.

THE utility of the so-called insectivorous birds — by which are commonly meant species which feed almost exclusively upon insects, like wood-peckers, fly-catchers, swallows, vireos, warblers, and, in less degree, the thrushes — has never been seriously questioned. The extent, however, to which other species subsist upon an insect-diet is not generally known or even suspected. Recent investigations respecting the food-habits of many of our birds show some surprising results, highly favorable to the species investigated. It has been found, for example, that all birds are to a large degree insectivorous, including hawks and owls, and even plovers and sandpipers. Professor Aughey, in his report on the food of the birds of Nebraska, published in one of the reports of the U. S. entomological commission, calls special attention to the importance of not only these birds, but the different species of the grouse family, as a check upon the grasshopper-scurge.

The great importance of the smaller birds in general, including the song-birds, as a check upon the undue increase of insect-life, and consequently the desirability of their strenuous protection, being well-nigh universally conceded, attention will be briefly called to certain species hitherto more or less generally under ban as injurious to agriculture, and whose destruction is considered praiseworthy. Foremost in this category are hawks, owls, crows, and jays. The robin, the brown-thrasher, the catbird, the chewink, and the various

kinds of blackbirds, are also excluded from protection under the bird-laws of most of the states. Crows are accused, with some justice, of depredations upon the young corn, and of now and then robbing a stray hen's nest, or of gobbling up a young chicken. These last enumerated misdemeanors are exceptional, too rare even to require formal notice. The depredations upon the young corn are easily guarded against, as a small quantity of grain thrown upon the ground is greatly preferred by the crows to the few kernels they can acquire by pulling that which has been planted. Many farmers, indeed, consider it much more to their interest to feed the crows for a few days than to destroy them, recognizing the fact that at all other times they are among their best allies; their food consisting largely of grasshoppers, cut-worms, and other noxious insects. Why the jays have been tabooed is hard to explain, their pilferings being at most of a trivial character, while, as destroyers of noxious insects, no birds, it may be safely said, are more important. The other species named above (aside from the hawks and owls) are well known to levy tribute on the small fruits of the garden, the robin particularly, to a somewhat serious extent; while the catbird, brown-thrasher, and chewink not unfrequently pull the corn planted near the thickets they inhabit. Otherwise these species are among the most useful of our birds, whose services are to such an extent recognized, that opinion is divided — even among those who suffer most from their depredations — on the subject of whether or not they are, during the short period of the fruit-season, to be treated as outlaws. In certain portions of the country, particularly in the south, the depredations of the blackbirds upon the grain and rice-fields are of serious character; but throughout at least three-fourths of the states there is certainly no good reason for destroying these otherwise useful birds.

Hawks and owls, from time immemorial, have been treated as foes, and legitimate targets for the rifle or shot-gun on all occasions; their destruction having been not unfrequently encouraged by the offer of bounties from the public treasury for their heads. Of late, frequent protests have been raised against this indiscriminate slaughter. These protests come mainly from ornithologists who have studied their food-habits, and become convinced that their destruction is not only unnecessary, but unwise. A number of published protests might be here cited, did space permit, based on actual knowledge of the facts in the case, and giving statistics of the contents of stomachs of many examples of different species of birds of prey. Only a few of the statistics at hand can

be here presented. Mr. B. H. Warren, a well-known ornithologist, in a paper entitled 'What hawks eat,' published in a recent report of the Pennsylvania board of agriculture, states, respecting the red-tailed hawk (*Buteo borealis*), — the 'hen-hawk' *par excellence* of eastern North America, — that an examination of the stomachs of one hundred and one examples of this species "revealed in eighty-one chiefly mice and small quadrupeds, also some small birds; nine, chickens; three, quail; two, rabbits; one, a part of a skunk; one, a red squirrel; one, a gray squirrel; three, snakes." In the stomachs of thirty-four red-shouldered hawks (*B. lineatus*) examined were found, in twenty-three, mice, small quadrupeds, grasshoppers, and coleopterous insects; in nine, frogs and insects; in the remaining two, small birds, hair, and orthopterous insects. Of twelve broad-winged hawks (*B. latissimus*), four contained mice; three, small birds; four, frogs; one, crayfish and insects. The contents of the stomachs of twenty-nine sparrow-hawks (*Falco sparverius*) was, in fifteen cases, principally mice with traces of various insects; in six, grasshoppers; in two, coleoptera and grasshoppers; two, meadow-larks; four, sparrows. Nine rough-legged hawks (*Archibuteo lagopus sancti-johannis*) examined had all fed exclusively upon field-mice. Of eleven marsh-hawks (*Circus hudsonius*), the stomachs of five contained mice; of two, small birds; of three, frogs; the other, grasshoppers and rabbit's hair.

The hawks of the genus *Accipiter*, on the other hand, present a bad record; fourteen out of twenty-four Cooper's hawks (*A. cooperi*) being found to contain chickens, seven others, birds, and three, only mice and insects. Of sharp-shinned hawks (*A. velox*), four out of fifteen contained chickens; nine, small birds; one, mice; and one, insects. On the other hand, it is known that several other species of the hawk family feed almost exclusively upon insects, mice, snakes, and frogs.

Careful examination of the contents of stomachs of owls, of which the results have been published, show that field-mice constitute their principal food, and that grasshoppers and other insects enter largely into the diet of all the smaller species. The larger species add to their usual fare of mice and the smaller mammals, many grouse and rabbits.

In short, enough is known of the regimen of our rapacious birds to show that they are only exceptionally harmful to the farmer; their infrequent raids — mostly by a few species — on the poultry being much more than offset by their destruction of mice, grasshoppers, and other injurious insects.

In this connection, reference may be appropri-

ately made to the letters from farmers and fruit-growers, as well as bird-lovers, from various parts of the country, addressed to the committee of the American ornithologists' union on bird-protection, detailing the vast injury they recognize as resulting to agriculture from the present wholesale slaughter of birds. An extract from a letter from a farmer in Dexter, Mich., will indicate the general purport of these communications. "The destruction of birds has been and is carried on here to such an extent that it is hardly possible to raise any kind of fruit; even the grapes, as well as the apples, being too wormy for use or sale. Boys, and even sires of families, but not men, go out and shoot swallows, robins, larks, etc. It makes no difference if they are nesting; and many a nest of young birds have starved on account of their parents being shot. And the small boy with his sling-shot destroys many — and all for the desire to murder. . . . There is a law to prohibit all this; but those who could enforce it take no interest in the matter. Not a single person saves the skins for gain: the birds are thrown away, or left where they fall. I have protested against the cruelty, but to no purpose, except in a few instances. The game and bird laws should be enforced by men appointed for the purpose, who should receive a salary, so that they may make it a business."

BIRD-LAWS.

MOST of the states and territories have on their statute-books laws for the protection of game and fish, regulating the season of hunting and fishing, and providing penalties for the taking of game or fish during certain portions of each year, or, in particular cases, for a series of years. These laws are intended, in most cases, to give protection to 'useful' birds, in addition to the game-birds, and their nests and eggs, at all seasons. In general, these laws are crude and unsatisfactory so far as they relate to supposed useful birds, and also in relation to many others which are either protected merely during certain months, or not at all, as is the case with many of the marsh and shore inhabiting species, such as the herons, terns, gulls, etc. Most of the laws exclude from protection all hawks and owls, crows, jays, and black-birds, and, in some cases, robins and other kinds of song-birds, woodpeckers, etc. A few of the laws make provision for collecting birds and their eggs for scientific purposes, often in a lax way, but occasionally, as in Maine, with considerable stringency; while the new bird-law of New Jersey prohibits the destruction of song-birds, their nests or eggs, for any purpose whatever. Defective as