Some Local Fish-eating Birds

BY HENRY W. FOWLER

THE water-birds of the Delaware Valley have always been of primary interest to me in my studies of natural history. Living near the Delaware River, and close to one of its smaller tributaries, my opportunities for study have been more advantageous than many other investigators. Added to this are many opportunities while studying fishes along the coast, or off the shores of our adjacent States. A number of the more important notes, made at odd moments, are here embodied as a slight contribution to science, and in the hope that they may stimulate further efforts in this direction by our ornithologists. Acknowledgment should be made to Messrs. David McCadden, D. E. Culver and Richard F. Miller, who have supplied me with notes, as well as material, used in these studies.

The information gathered is at best fragmentary, and refers largely to our commoner species of birds. The element of fish-eaters is doubtless larger than here outlined, though the list is characteristic for the fresh-water tidal regions about Philadelphia. Off the coast are hosts of water birds, feeding on marine life of one form or another. Such are gannets, shearwaters, various gulls and terns, smaller species of auks, murres, guillemots, jaegers, petrels, ducks, geese, skimmers, etc. No local information appears available, and many of the statements given in Wilson and Audubon will remain as purely conjectural about their vague "fish" diet, until detailed studies are made.

Three methods of observation are open to the study of the food of fish-eating birds. The first, and most important, is the examination of stomach contents, or such remains as are in the alimentary canal, of the freshly-killed bird. The second method is the observation of the living bird, feeding about waters where the fish-life has been previously examined. The last method is

the examination of nests, with their fragments of food, bones, etc. In the first case, it is often remarkable how well preserved some specimens found in the gullets of their captors may be. I have frequently secured very interesting or valuable specimens of fish in this way. Often the important bones are not completely dissolved, and usually the pharyngeal bones of cyprinoids remain intact. As these latter are the chief, and thus nearly certain clues, the identification of the fish is usually easy.

The most important conclusion which the writer may premise is that the evidence shows our fish-eating birds in a very favorable, if not altogether harmless, light. The fishes they devour are rarely, and in the case of the majority, of slight or no direct importance to man. Even among marine fishes very few of commercial value are taken by birds, and never in appreciable numbers. In fresh-water streams, the herons and kingfishers seldom do much damage, except occasionally taking a trout or bass. There is thus no legitimate reason whatever for the destruction of any of our fish-eating birds.

Horned Grebe (*Colymbus auritus*). An irregular, though sometimes abundant species along the tidal reaches of the Delaware River. I have examined the stomachs of several birds killed near Philadelphia, and in each case they contained the remains of small fishes. Some of these were identified as killifish (*Fundulus heteroclitus macrolepidotus* and *F. diaphanus*). Very likely other small fishes, as cyprinoids, catostomoids and centrarchids, may also be devoured, as they are frequently active in cold weather. The occurrence of several birds, or a solitary individual, about ponds near the river, may be explained by the great abundance of small fish which I have noted in such locations during all seasons of the year.

Dabchick (*Tachybaptus podiceps*). Our most abundant species, and migratory, in the Delaware River tidal regions. Its favorite haunts are about the breasts of dams, of water-falls, mill-ponds, quiet coves, and usually where the water is still. It is often confiding, even permitting a close approach, though quickly diving if alarmed. Like the other grebes, as it is a good swimmer and diver, it doubtless secures an ample supply of food from the vast schools of small fishes. I have not exam-

ined any stomachs, though I have caught numerous small fishes in the very locations from which the birds were driven on numerous occasions. Such fishes were largely small cyprinoids, etc. (*Abramis crysoleucas*, *Notropis bifrenatus*, *Notropis whipplii analostanus*, *Notropis cornutus*, *Notropis chalybaeus*, and *Erimyzon sucetta oblongus*). It is reasonably certain that most of these, as well as some others, are devoured.

Loon (*Gavia immer*). About our inland lakes solitary birds, or pairs, are usually seen. In rivers nearer the coast, small flocks often occur. The loon is mostly found in the Delaware River tidal regions in the spring and fall. Though a shy and wary bird, it is frequently reported by river fishermen as becoming entangled in their set-nets. It devours larger fishes than the grebes, and such as are more characteristic of open, deeper waters. Warren mentions that fall fish (*Semotilus bullaris*), suckers, carp (*Cyprinus carpio*) and the brook trout (*Salvelinus fontinalis*) are sometimes eaten by loons. In one he found a brook trout seven inches long. In fresh-waters, where loons were noted, I have found mostly cyprinoids (*Hybognathus nuchalis regius*, *Notropis hudsonius amarus* and *N. whipplii analostanus*), and in salt-water, white perch (*Morone americana*), silversides (*Menidia menidia notata*), mullets (*Mugil curema*) and pampanos (*Trachinotus carolinus*). All these fish very likely are devoured, though I have not made any examinations of stomachs.

Herring Gull (*Larus argentatus*). A common winter visitor along the New Jersey coast and the Delaware River tidal, and sometimes straggling inland in small numbers. This gull probably does not capture living fish, though it will occasionally nibble at dead fish, as alewives (*Pomolobus pseudoharengus*) floating about with the tides. They will also feed on offal and bits of sewage. Along the coast they sometimes devour dead killifish (*Fundulus heteroclitus macrolepidotus* when frozen in the salt ponds and then thawed out.

Laughing Gull (*Larus atricilla*). Found along our larger rivers during migrations. I reported this bird some years ago [1]

[1] CASSINIA, 1903, p. 46.

from the Delaware, feeding on dead alewives during the shad season. Like the herring gull they feed on floating offal, though they do not disturb living fish.

Common Tern (*Sterna hirundo*). Occurs in small numbers along our rivers and other inland waters, during migrations. Along the coast it feeds chiefly on small fish, as silversides (*Menidia menidia notata*), and crustaceans.[1] I have frequently seen this tern at Atlantic City, Great Bay and Ocean City, fly by with a bright silvery fish grasped in its bill, likely a silversides. In fresh water the tern doubtless secures cyprinoids (*Hybognathus nuchalis regius* and *Notropis hudsonius amarus*), and killifish (*Fundulus heteroclitus macrolepidotus* and *F. diaphanus*).

Double-crested Cormorant (*Phalacrocorax auritus*). Occurs along the coast, and in the Delaware River tidal during spring and fall. The cormorant is an adept fisher, and devours great quantities of the smaller fishes along our coast, such as anchovies (*Anchovia brownii, A. mitchilli*), silversides (*Menidia menidia notata*), young pampanos (*Trachinotus carolinus*), etc. The above list is from the schools of small fish I found about the pounds in Delaware Bay, and off the shores of New Jersey, Delaware, Maryland and Virginia. In such places cormorants were abundant. I only examined the stomachs of two birds, killed in Pennsylvania, and they were empty.

Common Merganser (*Mergus americanus*). Abundant in winter on our larger rivers, sometimes in large flocks. Though often killed and brought into the markets of Philadelphia, it is not highly valued, on account of its poor and often fishy flavor. This merganser often frequents reservoirs in cities, where it finds security and a food-supply in the fishes living in such places. These usually consist of carp (*Cyprinus carpio*), silver-fins (*Notropis whipplii analostanus*), spot-tails (*N. hudsonius amarus*), and sunfish (*Eupomotis gibbosus*). The variety of fish eaten is likely very great, as I have several gobies (*Gobiosoma bosci*) and a small sole (*Achirus fasciatus*) taken from an example secured at Chincoteague, Virginia, by Mr. I. N. De

[1] Rep. N. J. State Mus., 1911 (1912), p. 363.

Haven, about ten years ago. Dr. Mearns (Bull. Amer. Mus. Nat. Hist. N. Y., x, 1898, p. 322) says the sole is often found in the gullets of our Mergansers (*Mergus americanus* and *M. serrator*). Recently, the contents of two stomachs were given to me for examination by Mr. D. E. Culver. These birds were taken at the same locality in January, 1913. One contained two silversides (*Menidia menidia notata*), about $3\frac{1}{4}$ inches long, and a mullet (*Mugil cephalus*) $7\frac{1}{2}$ inches long, the last in the gullet. Apparently such prey is quite large. The other bird contained two partly-digested white perch (*Morone americana*), $6\frac{1}{4}$ and 4 inches in length respectively. This merganser is often fond of eels (*Anguilla chrisypa*), and one taken near Philadelphia was reported to have contained an eel ten inches long. The fishes usually devoured here are killies (*Fundulus heteroclitus macrolepidotus* and *F. diaphanus*), and roach (*Abramis crysoleucas*). These, and various shiners (*Notropis*), will often collect in shoals about the mouths of little estuaries after the ice breaks in the spring, and then the mergansers may be seen in small flocks, all on the lookout or chasing their prey.

Red-breasted Merganser (*Mergus serrator*). This occurs in similar situations as the last, and in flocks of various size. They feed on small fish, Mr. R. F. Miller having opened one killed at Bristol on November 5th, 1910, which contained nine unidentified "minnows." One example from the Delaware River which I examined contained remains of killifish (*Fundulus diaphanus*).

Black Duck (*Anas rubripes*). A most highly valued game-bird, and, while feeding largely on vegetable matter, it sometimes devours small fish. I have examined several stomachs from Sea Isle City and Cape May that contained large killifish (*Fundulus heteroclitus macrolepidotus*) entire.

Golden-eye (*Clangula clangula americana*). This duck is credited by Wilson as a fish-eater, as he mentions that it feeds on "small fry." Several examples in the Philadelphia markets which I examined had their stomachs crammed full of the small river-snail (*Goniobasis virginica*), so common in the Delaware.

Bittern (*Botaurus lentiginosus*). Usually occurs in migrations, lurking about swamps and marshes. I have found the stomach

contents of several to consist of killifish (*Fundulus diaphanus*) almost exclusively, and sometimes roach (*Abramis crysoleucas*).

Least Bittern (*Ixobrychus exilis*). A summer resident on the Delaware River marshes, and seldom noticed on account of its secretive habits. Six examples which I examined contained remains of small fishes and insects, and in one were three quite large killifish (*Fundulus diaphanus*).

Great Blue Heron (*Ardea herodias*). Frequent in spring and fall migrations, and occasionally occurs in winter. Wilson mentions[1] a specimen, the stomach of which "was entirely filled with small fish, among which were some small eels" (*Anguilla chrisypa*). This heron doubtless feeds on various of our cyprinoids and killifish, though I have no data. Audubon mentions[2] a bird he captured at Key West, which contained the undigested large head of a fish which lodged among the viscera, and thus rendered it sickly. Apparently these large herons swallow extraordinarily large fish, as I found a Great White Heron (*Ardea occidentalis*) on Sugar Loaf Key in Florida, which appeared greatly inconvenienced after swallowing a large sheepshead.[3]

Little Blue Heron (*Florida cærulea*). Occurs occasionally in late summer in the Delaware River valley, or about streams along the coast. In the white plumage it is usually confused with the Egret by sportsmen and others. Recently I had the opportunity of examining the contents of the stomachs of two of these birds, killed near Sea Isle City, on August 13, 1913. They were obtained by Mr. W. J. Fox, and both were in the white plumage. Both also contained killifish exclusively. In one example were 46 mummichogs (*Fundulus heteroclitus macrolepidotus*), of which several of the largest were $2\frac{1}{2}$ inches long, and 14 small pursy minnows (*Cyprinodon variegatus*). The other bird had 62 small mummichogs and one adult pursy minnow. These show it to be quite a voracious feeder.

Green Heron (*Butorides virescens*). Our most abundant and

[1] Amer. Ornith., iii, 1829, p. 63.

[2] Birds of America, vi, 1842, p. 127.

[3] Auk, xxiii, 1906, p. 397.

familiar heron. It is usually seen along our creek or river shores, moving stealthily over the mud in search of prey, or silently standing motionless on the lookout. Green Herons are very partial to small killies (*Fundulus heteroclitus macrolepidotus* and *F. diaphanus*) along our tidal regions. They also devour young roach (*Abramis crysoleucas*) and minnows (*Notropis whipplii analostanus* and *N. cornutus*). The birds are very agile in capturing young fishes, which they seize by suddenly darting the long sharp beak into the water. The victim is quickly gulped down, head first, with equal dexterity. Often the bird may appear to crouch, even if the head and neck are not completely folded on the shoulders. An examination of a number of stomachs shows that their food varies, consisting of insects, grubs, dragon-flies, etc. One bird was reported to have swallowed a dead bullhead (*Ameiurus nebulosus*), though this is likely exceptional, living prey being preferred.

Night Heron (*Nycticorax nycticorax nævius*). Next to the last, this is our most common heron. It is a summer resident, appearing generally distributed about our larger bodies of water. Examples I examined had fed on roach (*Abramis crysoleucas*), killifish (*Fundulus diaphanus*), and sunfish (*Eupomotis gibbosus*).

Greater Yellow-legs (*Totanus melanoleucus*). This occurs along our rivers sometimes, in the spring and fall. They often feed on small fish, as roach (*Abramis crysoleucas*), and other shiners. It is interesting to note Le Sueur in his remarks on the killifish (virtually *Fundulus heteroclitus macrolepidotus*), mentions it is preyed on by the Yellowlegs ("*Scolopax melanoleuca* and *S. flavipes*").[1]

Solitary Sandpiper (*Totanus solitarius*). A common visitor during the spring and fall migrations. Most examples I examined contained insects, though in one case a small killifish (*Fundulus diaphanus*).

Bald Eagle (*Haliætus leucocephalus*). In my experience an occasional resident. Its habit of stealing fish from the Fish Hawk is well known. I have seen it feeding on alewives (*Pomolobus pseudoharengus*) thrown out from the fisheries along the

[1] Journ. Acad. Nat. Sci. Phila., i, pt. 1, 1817, p. 131.

shores of the North East River, in Maryland. Haldeman mentions[1] that it dives for fish in the Susquehanna, when not able to rob the Fish Hawk. Audubon gives an interesting note of its fish-eating habits.[2] In the Perkiomen Creek he saw one secure a number of redfins (*Notropis cornutus*) by wading through the water and striking at the fish with its bill.

Turkey Vulture (*Cathartes aura septentrionalis*). This familiar bird frequently devours dead fish along our river shores. I have seen numbers eating dead alewives (*Pomolobus pseudoharengus*) along the shores of the Bohemia River, in Maryland.

Fish Hawk (*Pandion haliætus carolinensis*). Found in our region, except during the cold weather, the Fish Hawk is our most formidable fish-eater.

Wilson gives[3] the following interesting notes:

"A shad was taken from a Fish Hawk near Great Egg Harbor, on which he had begun to regale himself, and had already eaten a considerable portion of it, the remainder weighed six pounds. Another Fish Hawk was passing Mr. Beasley's, at the same place, with a large flounder in his grasp, which struggled and shook him so, that he dropped it on the shore. The flounder was picked up, and served the whole family for dinner. * * * The hawk, however, in his fishing pursuits, sometimes mistakes his mark, or overrates his strength, by striking fish too large and powerful for him to manage, by whom he is suddenly dragged under; and though he sometimes succeeds in extricating himself, after being taken three or four times down, yet oftener both parties perish. The bodies of sturgeon and several other large fish, with that of the Fish Hawk fast grappled in them, have at different times been found dead on the shore cast up by the waves."

Ekström also mentions[4] that in the back of a large pike (*Esox lucius*) he found the skeleton of an Osprey, which had been drawn below the water and drowned. Similar stories of other European birds, as Sea Eagles, have also been told.

[1] Proc. Acad. Nat. Sci. Phila., 1863, p. 2.

[2] Birds of America, i, 1840, p. 58.

[3] Amer. Ornith., i, 1828, p. 74.

[4] Vet.-Akad. Handligar, 1831, p. 79.

Audubon figures[1] the Fish Hawk grasping a weakfish (*Cynoscion regalis*).

I have frequently seen Fish Hawks capture alewives (*Pomolobus pseudoharengus*), menhaden (*Brevoortia tyrannus*), roach (*Abramis crysoleucas*), and carp (*Cyprinus carpio*), along the Delaware River. Once at Cape May, New Jersey, I saw a Fish Hawk fly over with a large writhing eel in its talons, which shortly forced it to alight in a near-by field. At the off-shore pounds, off Rehoboth in Delaware, and Ocean City in Maryland, numbers of Fish Hawks resort. They sit on the posts supporting the nets, and, as they desire, fly down and lift out a fish. The species I have seen them secure in this fashion are sea-robins (*Prionotus evolans strigatus*), croakers (*Micropogan undulatus*), weak-fish (*Cynoscion regalis*), flounders (*Paralichthys dentatus*), and alewives. Doubtless from the multitudes of fish entrapped they also secure many others.

Kingfisher (*Ceryle alcyon*). The Kingfisher appears to bear the same ecological relation to our smaller bodies of water that the Fish Hawk does to the larger. Often it is resident in the Delaware River valley.

The food of the Kingfisher appears to consist entirely of small fishes, of which he takes a continual and heavy toll. Mr. Richard F. Miller says that along the Wissinoming Creek, in Philadelphia, he flushed a Kingfisher from a favorite perch. This was on February 10th 1902, and as snow covered the ground, a dead minnow (*Fundulus diaphanus?*), and several disgorged balls of fish-scales and bones, probably of minnows, and large as small grapes, were found underneath the perch.

On May 8th, 1913, Mr. Miller sent me a lot of fragments of food belonging to a nest dug out of a burrow in a bank, about eight feet in elevation. This was located along the Pennypack Creek near Vereeville, in Philadelphia, and contained seven fresh eggs. The enlarged end of the nest was seventeen inches deep, the tunnel fifty inches deep and four inches wide at the aperture. The fragments consisted of crawfishes (*Cambarus bartonii*), roach (*Abramis crysoleucas*), redfins (*Notropis cornutus*) and suckers (*Catostomus commersonii*).

[1] Birds of America, i, 1840, Pl. 15.

I have frequently seen the Kingfisher dive into the water and capture a roach (*Abramis crysoleucas*), which in many places seems to be its chief food. This is doubtless the case, as the roach is one of the most common and easily secured of all our small fishes. Other minnows it takes are fat-heads (*Pimephales notatus*), spawn-eaters (*Notropis hudsonius amarus*), bridled minnows (*N. bifrenatus*), silver-fins (*N. whipplii analostanus*), besides those already referred to. Its menu is likely still greater, as most all of our small cyprinoids are devoured.

Crow (*Corvus brachyrhynchos*). A familiar resident, and especially abundant along our rivers in cold weather. Though the examples I examined usually contained vegetable matter, occasionally remains of small fish were noted, evidently roach (*Abramis crysoleucas*), and killifish (*Fundulus heteroclitus macrolepidotus*).

Purple Grackle (*Quiscalus quiscula*). Occurs in the summer months scattered along our streams, where it will sometimes devour young minnows, left by the tides or otherwise accessible. I have seen them take young roach (*Abramis crysoleucas*), when less than two inches in length, along the shores of the Delaware. Mr. Joseph Wilcox has reported the habit of grackles feeding on fish many years ago. [1]

In concluding it may be interesting to note that the larger and more powerful predatory fishes are able to capture and overcome birds which may frequent the shores, swim on the water, wade through it, or dive below its surface. Large pike (*Esox lucius*) and eels (*Anguilla anguilla*) are known to capture water birds in Europe. Regan [2] mentions, "not many years ago a large eel was captured in a pond near Sherborne by a laborer, who noticed a swan in difficulties and went to see what was the matter; the bird had put its head under water and this had been seized by the eel, who would not let go until it was in the grasp of the man who landed it." The most famous of bird-eating fishes is the angler (*Lophius piscatorius*), also called goose-fish, as some "have been known to swallow live geese." Storer

[1] Proc. Acad. Nat. Sci. Phila., 1877, p. 38.

[2] British Freshwater Fishes, 1911, p. 156.

mentions, on the authority of two quite reliable Cape Cod fishermen, that "when opened, entire sea-fowl such as large gulls, are frequently found in their stomachs, which they supposed them to catch in the night, when they are floating upon the surface of the water." He also notes he was "informed by Captain Leonard West, of Chilmark, that he had known a goose-fish to be taken having in its stomach six coots in a fresh condition. These he considered to have been swallowed when they had been diving to the bottom in search of food." According to Brown-Goode, a fisherman informed him "he once saw a struggle in the water, and found that a goose-fish had swallowed the head and neck of a large loon, which had pulled it to the surface and was trying to escape. There is authentic record of seven wild ducks having been taken from the stomach of one of them. Slyly approaching from below, they seize birds as they float upon the surface."[1] Bigelow recently mentions[2] two goose-fish taken in North Carolina, which contained ducks in good preservation. One had a Lesser Scaup and the other a Red-breasted Merganser.

[1] Gill, Smiths. Misc. Coll., xlvii, 1905, pp. 507–508.

[2] Forest and Stream, lxxx, February 8th, 1913, p. 173.