

important place in his life. These wishes were carried out by a small group of intimate friends.

His life has left a lasting imprint in the field of wildlife conservation. His many friends will greatly miss the kindly personality of the genial "A. K." He truly lived a complete life.

*U. S. Fish and Wildlife Service, Patuxent Research Refuge,  
Laurel, Maryland, November 9, 1950.*

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THE FOOD OF NESTLING BRONZED GRACKLES,  
*QUISCALUS QUISCULA VERSICOLOR*, IN  
CENTRAL NEW YORK

BY W. J. HAMILTON, JR.

THE food of the Bronzed Grackle has been studied by several investigators. Beal (U. S. Dept. Agric. Bull. 13: 60, 1900) reported on 2346 specimens from all parts of this bird's range. Of the specimens examined, 456 (19.1 per cent) were nestlings. Beal's study indicated that the food of young grackles often differed materially from that of the adults. The food of the entire year, taking into account all 2346 stomachs, adult and young, was made up of 30.3 per cent animal and 69.7 per cent vegetable matter. Of the total examined by Beal, 28 specimens taken in May and June are reported from New York, but there is no indication if any of these were nestlings. Warren ('Birds of Pennsylvania,' pp. 221-222, 1890) stated that the diet of the young birds, while under parental care, is almost exclusively insects, consisting mainly of caterpillars and grubs. This large blackbird, with its formidable bill, has been praised and cursed alike by those who farm the land. Few exact data on the food of this common and widespread species have been recorded. This report is a minor attempt to provide data on the dietary of the nestlings in a restricted locality.

To determine the dietary of nestling Bronzed Grackles in the Ithaca, New York region, collections of young in the nest were made in May and June of 1947, 1948, and 1949. A few nestlings were collected in May, 1926, and analyses made of their food at that time. These analyses do not differ materially from the observations recorded in later years. One hundred and thirty young birds have been examined. The droppings of nestlings at various ages were likewise collected. Feces can be collected merely by handling the young or stroking their abdomens. Droppings deposited in this manner were

placed in small match boxes while at the nest site and examined within a few hours after collecting.

The Bronzed Grackle is an adaptable bird in central New York, nesting in a variety of situations in the same locality. These birds occasionally build their nests in dead cat-tail stalks in the same habitat chosen by Red-winged Blackbirds, *Agelaius p. phoeniceus*. They also build 30 or more feet high in a grape tangle or willow a few rods from the swamp border. On higher ground Norway spruce are favored, the birds resorting to the same sites in farmyards and cemeteries year after year. One particularly good collecting area was a thick stand of red pine bordering a cemetery. In this site, ten nests were observed in an area of half an acre. At the foot of Cayuga Lake at Ithaca, New York, a stand of 20 Norway spruce, covering an area of 1630 square feet, contained seven grackle nests in 1947 and six nests each in 1948 and 1949. In these same spruces Mourning Doves, *Zenaidura macroura carolinensis*, and Green Herons, *Butorides v. virescens*, nested, often within a few feet of the nesting site of the grackles.

Many of the nests were situated close to the inlet of Cayuga Lake. Most of the nests from which nestlings were observed were near ponds, lakes or other watercourses. Observation indicated that the adults often flew a half-mile to secure food for the nestlings, although the same food might have been obtained within a few feet of the nest. When alewives, *Pomolobus pseudoharengus*, were dying in great numbers and their bodies being washed to the shore within a few feet of one nest, the birds were observed to fly a third of a mile to collect these dead fish which were fed to the young. In a grove of red pines in which the birds nested, the adults also flew an airline distance of a third of a mile to the ponds at the Cornell Fish Hatchery, where tadpoles of *Rana clamitans* were captured and fed to the nestlings. When one considers the various food items that the nestlings are known to eat, and considers the proximity of these items to the nest, observation suggests that some predilection may be exercised by the adults. On the other hand, the ease of capture may indicate a farther flight for food than might appear necessary. Adults flew nearly a third of a mile to collect red-backed salamanders, *Plethodon cinereus*, which were fed the young, although a sizable acreage of lawn, harboring earthworms and an abundance of insects, was within a few feet of the nesting site.

Presumably, availability of food items plays a major rôle in the dietary of young grackles. The data suggest, however, that the ease of capture of certain large items may induce longer trips from the nesting site. Contrariwise, the adults pass over feeding grounds that

presumably provide adequate food for the young. The birds' purpose in flying relatively long distances for food items, many of which are close at hand, is not known.

Usually similar food was fed a complement of nestlings at one time. Repeated observations of individual broods indicated the same kind of food. This fact was further substantiated through analyses of droppings from the nestlings.

Animal remains were found in every nestling, the bulk comprising 89.1 per cent of the total volume. Plant material was taken from 26.1 per cent of the stomachs, constituting 6.4 per cent of the volume. The remaining matter was inorganic, consisting of small grit, gravel, and other mineral fragments. Sizable fragments of cinders from a nearby railroad bed, large pebbles, and miscellaneous grit indicate that this species feeds its young material that may aid in digestion.

Sex of the young was positively determined on 92 individuals. Of these, 49 were males, 43 females.

#### DISCUSSION

*Insects.*—Insects are the predominant food of nestlings. Beetles appear to be of greatest importance, constituting, in frequency, 42.5 per cent of all insects eaten. Adult June beetles, *Lachnosterna*, were fed the larger nestlings in some numbers. In May, 1949, a greater number were fed to the nestlings; this correlated with the increase in numbers of this scarabid in that year. Fewer were taken in 1948, a year of lesser abundance for *Lachnosterna* in the area studied. Carabids, elaterid larvae, and fragmentary remnants of small unidentified scarabids comprised the remaining beetles. Lepidopterous larvae totaled 40.3 per cent of the bulk and occurred in 52.4 per cent of the

TABLE 1  
FOOD OF 130 NESTLING BRONZED GRACKLES IN THE ITHACA, NEW YORK  
REGION, MAY AND JUNE, 1947-1949

<i>Food</i>	<i>Per cent occurrence</i>	<i>Per cent by bulk</i>
Insects	84.6	48.2
Earthworms	18.5	10.9
Amphibians	10.8	8.3
Fish	70.8	6.6
Spiders	24.6	5.4
Green grass	9.2	3.2
Millipedes	6.1	0.8
Grain	4.6	1.4
Sowbugs	4.6	3.4
Fruit	4.6	1.8
Mammals	1.5	0.3
Molluscs	2.3	5.2
Grit	17.0	4.3

nestlings which had been fed insects. Of these, a relatively small percentage were determined as cutworms. Hemiptera were present in 16.7 per cent of the young which had been fed insects. These bugs consisted principally of pentatomids. The head capsule, in some numbers, remained after the other parts had been digested. Possibly the adults seek out these small hemipterans. At any rate the head capsules occurred repeatedly in the stomachs of nestlings in successive years. A few ants, *Lasius niger* and *Formica* sp., a single Mecoptera, *Panorpa* sp., and the remains of a grasshopper, *Melanoplus* sp., constituted the remaining insects. The grasshopper was undoubtedly a dead specimen, gleaned from the tussocks of dead grass which partially conceal these orthopterans during the colder months.

*Earthworms*.—Evidence that the worm is killed, broken into pieces, and then fed the young was indicated by the fragments removed from the throat of nestlings a few seconds after being fed. Digestion is absolute, no indication was found of this item in the droppings. A careful search for the setae produced negative results.

*Amphibians*.—The relatively high percentage of salamanders and tadpoles does not suggest availability so much as the possible ease of capture. Grackles nested within a few feet of a stream in which tadpoles of *Rana clamitans* occurred. These tadpoles were frequently seen in water shallow enough to provide easy feeding for the grackles. The adults flew to a gorge a third of a mile distant to take salamanders,

TABLE 2  
FOOD OF 26 NESTLING BRONZED GRACKLES (RECENTLY HATCHED TO THREE DAYS OLD) COLLECTED AT ITHACA, NEW YORK, MAY-JUNE, 1947-1949

<i>Food</i>	<i>Per cent frequency</i>	<i>Per cent bulk</i>
Insects	88.5	52.3
Spiders	65.4	15.7
Earthworms	26.9	11.6
Sowbugs	15.4	8.2
Fish	15.4	3.7
Molluscs	11.5	3.8
Grass	7.7	2.2
Grain	7.7	0.8
Fruit	3.8	0.7
Grit	3.8	0.9

*Plethodon cinereus* and *Desmognathus fuscus*, to feed their nestling young. One well feathered nestling had been fed three *Plethodon cinereus*. On May 13, 1948, and May 15, 1949, nestlings in the same colony (Norway spruce at the foot of Cayuga Lake) had been fed red-backed salamanders. Presumably some birds become conditioned to favored feeding grounds. The parent birds may learn the method of capture and take certain food in areas which are accessible and pro-

vide easy capture of the particular item. Tadpoles of *Rana clamitans* were the only anurans fed to the nestlings which I examined.

*Fish.*—A considerable number of nests under observation were close to Cayuga Lake and its inlet. At the time of this study, alewives, *Pomolobus pseudoharengus*, were dying in great numbers. These fish were washed to the shore, often in considerable numbers. Adult birds were frequently observed feeding on the smaller fish or tearing up the partly decomposed bodies of the larger individuals. Within a few feet of one grackle nest, the dying fish were extremely abundant. Rather than take this easily available food, the adults flew along the lake shore for nearly half a mile to secure the same beached food which was fed the nestlings. A single pharyngeal arch of a cyprinid was recovered from the gizzard of a large nestling.

*Spiders.*—Spiders were most frequently fed to the smaller nestlings, newly hatched to approximately four days of age. The following genera were identified: *Tibellus*, *Mimetus*, *Tetragnatha*, and *Pardosa*. Often a dozen or more small spiders were found in a single gizzard. Newly hatched Crows, *Corvus b. brachyrhynchos*, which I have examined often contain a relatively large number of small spiders.

*Green Grass.*—The presence of considerable amounts of green grass in the gizzards of several nestlings suggests that this item is not adventitious. Occurring in nine per cent of the nestlings, its presence suggests that adult birds deliberately feed the nestlings fragments of grasses and other green succulents.

*Other Food.*—The remaining items were represented in small quantity. Millipedes, *Julus* sp., were fed the young sparingly. Some waste grain, a few seeds of fruit, including a *Rubus* seed from the past season, sowbugs (Oniscidae), and molluscs were recovered from a few gizzards. The snails include *Anguispira alternata* and *Cochlicopa lubrica*. One nestling, estimated as being six days of age, had been fed part of a newborn field mouse, *Microtus pennsylvanicus*. Another large fledgling contained fragments of a small sorcid, probably *Sorex cinereus*.

*Cornell University, Ithaca, New York, October 3, 1950.*