THE FOOD OF THE AMERICAN CROW IN CENTRAL NEW YORK STATE.[1]

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IN many of the food studies of our American birds, the analyses have been based upon specimens collected at irregular intervals of the year, and without taking into account the type of country where they were obtained. In the following analysis of the food of the Crow (*Corvus brachyrhynchos brachyrhynchos*) an attempt was made to study the food habits of the bird from specimens which were collected in a restricted territory. As the Crow is omnivorous, its food will vary according to the locality, as well as to the abundance of available food present. Four hundred and sixty-five specimens were collected from five counties covering approximately a radius of fifty miles from Ithaca, New York. An effort was made to obtain data on the type of vegetation, or crops, at or near the locality where the birds were collected. An attempt was also made to collect, as far as possible, a representative number of birds for each month of the year, so as to get a typical picture of the monthly diet.

In each case, the analysis was based upon the percentage by bulk method as used by the Biological Survey (McAtee 1912[2]).

PLANT FOOD.

Vegetable material found in the stomachs formed the greatest bulk of the material, being represented as 61.53 per cent of the total. It was consumed by the Crow during every month of the year, but the greatest portion was taken during the winter months.

Buckwheat. By far, the largest proportion of plant food consisted of buckwheat. This does not figure prominently in previous studies, but in central New York it is widely cultivated and the birds always have a ready supply. It was found as 18.71 per cent

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[2] McAtee, W. L. 1912. Methods of Estimating the Contents of Bird Stomachs. The Auk, 29: 449–464.

of the yearly average and represented the largest percentage of vegetable material taken. Most of it was taken during the winter months, especially during February, March and April.

Corn, although claimed to be the favorite food of the Crow, was found as only 13.67 per cent of the yearly food, a quantity less than that of buckwheat. As with the latter, most of it was taken during the winter months. No corn was found, however, during August, but at the time when the "roasting-ear" stage becomes available an increase in its presence was noted. It is worthy of notice that during May, when the corn is sown in central New York, the amount present was only 1.10 per cent in thirty specimens collected during that month. The fact that so small a quantity was taken seems to show that the Crows in this area had not the proclivity for digging up the seeds of which it is so commonly accused.

Grains, other than buckwheat and corn, such as oats, wheat and barley were taken throughout the year. Oats were found largely present during the winter months, but April showed the largest amount, while during the warmer parts of the year the quantity was very small. At harvest time no increase was noted. It seems probable that this grain does not form a particularly favorite food of the Crow and is taken only when the choice of more desirable food is lacking, as in winter. Wheat was found only in isolated cases and represented but 4.25 per cent of the yearly food. Its presence was noted in nine months of the year, the winter months not being represented. It is believed that this grain does not form an important item of the bird's food and that it was picked up largely as waste grain. Barley was found only in one stomach, collected during February, forming 10 per cent of the stomach contents.

Cultivated Fruit. Cultivated cherries were found present in stomachs of birds collected during June, July and August, July being the month of greatest consumption, represented by 5.02 per cent. It was impossible to determine whether these cherries were taken from private orchards or whether they came from deserted ones, as deserted farm-lands are common in certain parts of the range studied. Seeds of raspberries were found in two stomachs collected during July, the maximum being 20 per cent for one

stomach. In this case, as well, it could not be determined whether these berries came from cultivated or wild plants. Grape seeds were also found during the winter months, but in this case they were probably taken along with other refuse, as they were always associated with garbage.

Wild fruit was present in nearly every month of the year. This item constituted 10.12 per cent of the yearly food. The maximum consumption took place during July and August where it was represented as 33.09 and 30.50 per cent respectively. The least amount taken occurred during January and May. Wild cherries (*Prunus serotina*) formed the greatest bulk of wild fruit. Other fruits were *Prunus virginianus, Vitis, Rhus typhina, R. toxicodendron, Cornus stolonifera* and *Solanum dulcamara.*

Wild seeds were less common and it is believed that Crows picked these up accidentally with items which were more preferred. The seeds found were those of *Polygonum, Rumex,* and *Lepidium.*

ANIMAL FOOD.

The animal food consisted of about one-fifth of the total food, or 19.35 per cent. Although less than the vegetable food, it exceeded the latter in its economic importance. While the largest amount of plant material was consumed during the winter months the animal food reached its highest proportions during May when it amounted to 77.44 per cent.

Insects formed the greatest bulk of this type and were consumed in nearly every month of the year. Most of this food was taken from May to October.

Coleoptera were found in the stomachs in almost every month. Carabidae were commonly taken and amounted to a yearly consumption of 2.22 per cent, with a maximum of 3.71 per cent during June. These beetles were represented by *Calosoma, Harpalus, Lebia grandis* and *Cicindela.* Elateridae and their larvae, the latter living wholly in the soil, were not as plentiful as expected. *Hemicrepidus* was found in but one stomach. The Scarabidae formed by far the largest amount of Coleoptera consumed, consisting of 6.37 per cent of the yearly average. The most important representatives of this family were specimens of *Phyllophaga* or May-beetles. Reference to the chart will show that the greatest

consumption of these beetles took place during May and that it coincided with the period of greatest abundance of adult beetles. Out of 30 birds collected during May, 27 stomachs contained adult beetles and 7 of these contained 100 per cent. Other Coleoptera were eaten but did not figure as prominently as the above families. The Crow seems to confine its attention mainly to the Scarabeidae.

Probably next in importance to the consumption of May-beetles is the destruction of grasshoppers. These insects formed the most prominent animal food during the fall. The form most commonly taken was *Melanoplus femur-rubrum*, a very common species in central New York, which may become injurious when too abundant. This grasshopper was present in stomachs of birds collected from July to October and the amount represented 11 per cent of the yearly insect diet. Reference to the chart will show that the greatest consumption coincides with the greatest abundance of mature individuals.

Of the remaining insect orders, Lepidoptera, Hemiptera, Diptera, and Hymenoptera were present, but of the latter three only traces. The Lepidoptera amounted to 4.99 per cent of the yearly food comprising mainly caterpillars and pupae. The greatest consumption of caterpillars was 3.81 per cent during July. Only one specimen of a bug was found belonging to the Pentatomidae. Of the Diptera, two maggots were taken during November, and a larva of *Eristalus* was also taken during the same month. Ants were found in a few instances. It is believed that the Crow picks these insects up accidentally since they are present in such isolated cases.

Other invertebrates were not found in any great quantities. Spiders were taken only rarely, being found in one stomach. Of the Myriopods, both Chilopoda and Diplopoda were present. The latter formed only 0.24 per cent of the yearly consumption while the greatest quantity was consumed during June (2.90 per cent). The Chilopoda formed 0.55 per cent and were present during May, July, November and December. Since these animals are always found either at the surface of the soil or directly beneath, it is believed that the Crows picked them up along with other miscellaneous items.

As the Crows examined in this study were collected on farm lands very little aquatic material was found. Snails were present in a few cases. Crayfish, however, were found during June and July.

Of the amphibia taken, frogs were found in but one stomach collected in June and comprised but 1.02 per cent. Since frogs are occasionally trodden upon, or injured, the Crow has no trouble in picking them up.

No direct evidence could be found in the stomach analysis that the Crows had taken any native birds, either the eggs or nestlings. In the determination of this material, it is not always possible to rely upon stomach analysis alone, as the tender flesh of the nestlings is very quickly digested, little of the egg-shell is eaten, and the yolk often becomes unidentifiable as such. Eggs themselves do not tell the whole story, as Crows will pick up, along with other food, eggs of poultry throughout the year. In one instance, a foot of a Pigeon was found, but it was not possible to say whether the Crow had killed the bird or had picked it up as carrion. In a stomach of a nestling, about two weeks old, feathers were found which comprised about one-third of the total contents.

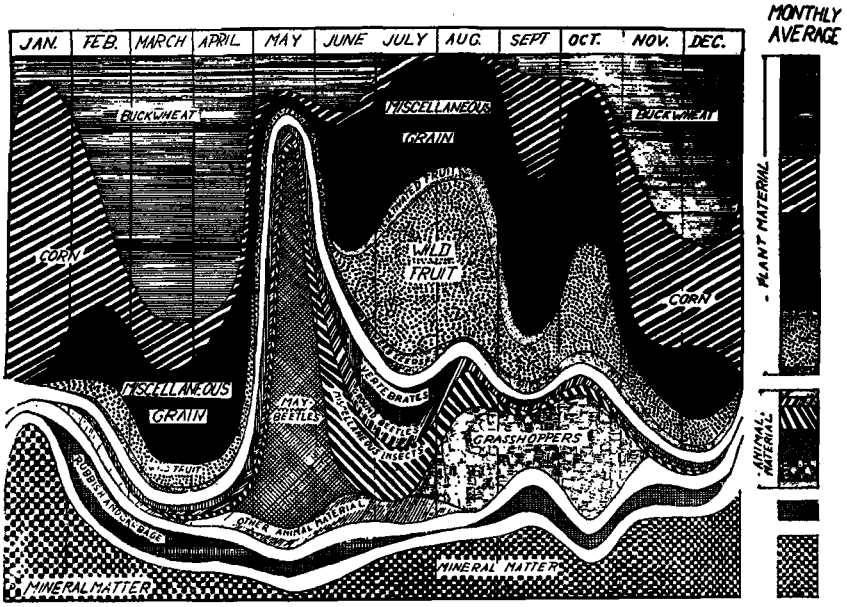
In the consumption of injurious mammals, the Crow can be considered beneficial. Remains of mammals comprised 1.34 per cent of the yearly food, and were present during nine months, the greatest amount taken in June and July. Most of the remains of mammals consisted of the bones of small rodents belonging to the genus *Microtus*. In one stomach collected during April there were four lower jaws of *Microtus*, together with a small number of other bones. One stomach collected in July contained 40 per cent of this food. Another stomach contained three lower jaws of the short-tailed shrew (*Blarina brevicauda*).

That the Crow is a scavenger is a well-known fact, yet it is often difficult to detect the fact from the analyses of stomachs.

Carrion may frequently be detected by the presence of other items in the stomach, such as carrion insects (*Silphidae*, *Staphylinidae*, *Calliphoridae* and *Scarphagidae*) which breed in decaying animal material. This index fails, however, during the winter months, when the Crow is most likely to eat carrion as these insects are hibernating at this time. Material found in this study which might be classed as carrion amounted to 1.08 per cent of the yearly

total average and was found most prevalent during the winter and spring months.

Much garbage is taken by the Crow, especially during those months when its more favored food is lacking. Under these circumstances the bird collects a variety of items. Seeds were partly classed under this category as they were found in stomachs of Crows collected during a time when these seeds were probably wastes from the dinner table. Thus seeds of pumpkins, apple,



orange, and grape were found from November to February. Together with garbage, but particularly during February, the shells of birds eggs were found which, in some cases, formed a considerable portion of the food. The yearly average for garbage consisted of 2.65 per cent and it was present in every month of the year. February showed the greatest amount taken, being represented by 11.23 per cent.

Mineral matter, which, of course, is not food, is added here because its elimination would change the proportion of the food taken. This item was taken so freely that the stomachs without

mineral matter were isolated cases. A certain amount of sand and gravel is essential in grinding up the various items of food taken, and quantities of pebbles and sand were consumed. The largest pebble taken was a little less than one-half inch in length.

CONCLUSIONS.

The fact that the Crows were taken from a restricted locality shows a great deal of variation with respect to the type and abundance of food taken as compared with the results of other similar studies on this bird where the range from which the material was obtained was much wider (Barrows and Schwarz 1895,[1] Kalmbach 1918[2]).

The most conspicuous point that arises in this study is the large amount of buckwheat present in the stomachs. Buckwheat is a crop much cultivated in this region, so that, when it is common, the Crow apparently prefers it to corn.

A final point is that the Crow will usually partake very freely of those items which are very abundant at a particular time. Thus, when May-beetles are very common, it will feed extensively upon them, and the same is true of grasshoppers and wild fruit.

With respect to a judgment as to the harmful qualities of the Crow, it can be said that there was no direct evidence based upon the analysis of these stomachs that the Crow had been harmful with respect to any of the items listed which are important as far as man is concerned. The bird is beneficial in the control of May-beetles, grasshoppers, and rodents, and neutral with respect to many insects and plants which were largely taken either as waste or which are of no particular economic interest to man.

Ithaca, N. Y.

[1] Barrows, W. B., and Schwarz, E. A. 1895. The Common Crow of the United States. U. S. Dept. Agric., Div. Orn. and Mam. Bull. No. 6.

[2] Kalmbach, E. R. 1918. The Crow and its Relation to Man. U. S. Dept. Agric. Bull. No. 621.