

stomach was probably filled several times daily, the estimate made by Mr. Bailey seems a very conservative one. He now regards the chickadee as the best friend the farmer has, for the reason that it is with him all the year, and there is no bird that can compare with it in destroying the female moths and their eggs. It was noticed that the birds made no attempt to catch the male moths. This, however, cannot be considered as a fault, for the birds accomplish far more by destroying the females than they would by killing males.

The following notes from the preliminary examinations of the contents of the alimentary canal of chickadees made by Mr. Kirkland are of interest in this connection :

"Bird brought in by Mr. Bailey, March 16, 1895: Gullet empty. Gizzard contained 270 canker-worm eggs (*Anisopteryx pomataria*), forty-six case-bearers (microlepidoptera), six cocoons, Fig. 30d, of a small tineid (near *Aspidisca*). These three kinds of food in bulk composed eighty per cent. of the gizzard contents, the remainder being dark material which I was unable to determine under a hand lens. I think it very probable that part of this was bits of bark or particles of bark dust taken in with the eggs or cocoons. The intestine contained a large quantity of meat, seventy-five per cent., and 103 canker-worm eggs, ten per cent., the remainder, fifteen per cent., being material which I could not identify. It was not meat. This gives us as totals, 373 canker-worm eggs and fifty-one microlepidoptera.

"Specimens of so called 'scales' on apple twigs brought in by Mr. Bailey, March 12, 1895. These are not bark lice, but the cocoons of a microlepidopteron, probably a tineid. Length 1-12 to 1-8 inch: width, 1-12 to 1-10 inch; elliptical, dark brown or reddish brown. They are closely spun, the upper surface apparently being of leaf epidermis, while underneath is a small well-formed cocoon which contains a minute green larva which evidently hibernates as such, probably pupating in the spring. The larva undoubtedly feeds on the leaves of the apple-tree, as these cocoons were taken from the small twigs at the extreme end of a large branch. Some of these cocoons are empty and have a minute hole at one end, which probably served for the egress of some small parasite. These cocoons are eaten by the chickadee, and have been found in the gizzard of the birds."

The case-bearers and the tineids or leaf miners are injurious to the foliage of the apple-trees.

It was noticed by Mr. Bailey, who watched the birds closely for several days, that they were eating quantities of both of these insects. It would have been impossible for any one to determine the species of the leaf miners as found in the birds' stomachs, for little remained but small fragments of the shell of the creature. Mr. Bailey noticed that the birds were taking objects from the twigs, some of which they ate; others they rejected and dropped upon the snow. Some of those dropped he picked up and examined, finding them to be parasitized. The birds undoubtedly ate only those which were alive.

It was evident from a careful examination of the eggs found in the stomachs of the chickadees that they were either broken by the bill in such a way that the contents were exposed to the action of the gastric juice or the gastric fluid destroyed a portion of the shell. Occasionally a few eggs which appeared to be whole were found in the intestines.

A great quantity of animal food is required to sustain life and provide animal heat sufficient to enable these little birds to resist the inclemency of our severe winters. In proof of this it may be stated that during favorable weather the birds visited the meat and ate largely of it three times each hour with fair regularity. During each interval they were occupied in destroying eggs and other hibernating insect forms which were always present and numerous in the stomachs examined. This feeding appeared to be almost continuous except in severe storms when the birds sought shelter or when they were laboring under excitement caused by fear, as in the case of a visit from a hawk, cat or shrike. Whenever a cat appeared they immediately hid behind the branches and remained quiet until the intruder had passed. The appearance of other enemies or the firing of a gun would produce much the same effect.