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FOOD HABITS OF RED-TAILED HAWK, COOPER HAWK, AND SPARROW HAWK.

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Much has been done, during the past few years, in determining the food habits of the various species of birds by means of stomach examinations. With a sufficient number of specimens, this method should give accurate information. Because of the time and patience required, and the difficulties to be overcome, little has been done by means of personal observation of the individuals in the field. During the past few years, it has been a matter of considerable interest to me, to follow up the reports of labratory examinations of stomachs by personal observation, especially of the birds of prey.

Of the red-tailed hawk, Dr. A. K. Fisher in his bulletin entitled "Hawks and Owls from the Standpoint of the Farmer," says: "There is no denying that both it and the red shouldered hawk, also known as 'hen hawk,' do occasionally eat poultry, but the quantity is so small in comparison with the vast numbers of destructive rodents consumed, that it is hardly worth mentioning. While fully 66 per cent of the red-tail's food consists of injurious mammals, not more than 7 per cent consists of poultry. * * * * Abundant proof is at hand to show that the red-tail greatly prefers the smaller mammals, reptiles and batrachians, taking little else when these can be obtained in sufficient numbers."

From March to June, 1910, I shadowed a family of red-tailed hawks in an effort to satisfy myself whether the continued observation of the same individual would show results similar to the stomach examinations of numerous specimens. Of course in considering the value of this kind of observation, it should be borne in mind that birds of prey have individual peculiarities, and that the particular family under observation might depart from the general rule of the species in selecting food. It has not been possible, as yet, for me to continue the work by observing other families of the same species in similar manner. It would seem that this could be done with profit should opportunity offer.

Until the parent birds began to bring food for the young, I had no means of ascertaining upon what they were feeding, excepting for a chance occasion. As soon as the young demanded attention, I found it possible to get fairly satisfactory information by hiding myself at a short distance from the nest. As the nest was fifty feet above ground and because of the extremely shy disposition of the birds, I found it necessary to remain carefully concealed, it was sometimes impossible to determine accurately the nature of the food. When a small mammal was brought in, I could not tell whether it was a mouse or a vole; but seldom had any doubt as to whether the food was a bird or mammal. Apparently, the pocket gopher was brought in more often than any other single item of food. This was a surprise to me, because I had thought the underground habits of this animal protected it from birds of prey. The state of Iowa pays out annually thousands of dollars in bounties for the

destruction of the pocket gopher. If this family of hawks is a fair example, I think it safe to estimate the number of pocket gophers caught by a family of red-tailed hawks during a summer at one hundred. Aside from pocket gophers the food consisted of prairie grey squirrels, striped ground squirrels, rats and field mice. During the entire time that the birds were under observation, they were only observed to have two small chickens about the size of quail. In making my first report of this observation, (Forest and Stream, Vol. 74, No. 25), before the work was quite concluded, I reported only one chicken. The second was observed after the article was written. As an example of the bill of fare, they were seen to have three pocket gophers, a prairie grey squirrel and two field mice in one day. On no occasion did I see any evidence of reptiles or batrachian.

Of Cooper hawk, Fisher says: "Cooper hawk is preeminently a chicken hawk, and is by far the most destructive species we have to contend with. * * * * It is especially fond of domesticated doves. * * * * The aboreal and ground squirrels appear to be the mammals most frequently taken by Cooper hawk."

I found it even more difficult to ascertain the nature of the food taken by this family, than the red-tails, but my observation is almost exactly in line with Dr. Fisher's conclusions from the stomach examinations. During the first weeks of observation I found no evidence of any food excepting poultry, pigeons and birds. Seldom did more than two days elapse between chickens, and frequently, chickens were taken for several days in succession. When the hay was cut about the middle of July, a change was at once apparent in the food brought to the nest. A large part of the food now consisted of ground squirrels (spermophiles), though they still continued to revert to chicken quite frequently. No trace of tree squirrels or other mammals was found.

Referring again to Fisher, concerning the Sparrow hawk, he says: "It is the only one of the true falcons which can be placed in the mainly beneficial class. At times it attacks birds and young chickens, but these irregularities are so infrequent that they are more than outweighed by its good services by destroying insects and mice. Grasshoppers, crickets, and other insects form the principle food during the warm months, while mice predominate during the rest of the year."

The Sparrow hawk, being more confident, was easy to observe; in fact, a pair very obligingly took up their abode in a box erected in the front yard and reared their family there. The birds would permit me to approach within a short distance, and I could see the mice they carried about, long before the young appeared in the nest. The nest was examined frequently for fragments in order to get as full information as possible. While grasshoppers and crickets formed a considerable portion of the food, mice apparently predominated during the entire time. A few striped ground squirrels were taken and an occasional small bird. The feet of the birds were sent to Washington for identification and were found to be for the most part English sparrows, though a few black throated buntings and song sparrows were included. Though the hens with their flocks of young chicks were unconfined, never did I know of them taking one, though I think I would have known had they done so, as we kept careful

count. On one occasion, I saw one of the hawks make an attempt to capture a chick, but she failed to secure it.

A pair of blue jays had their nest in a tree near to that occupied by the Sparrow hawks, but were undisturbed. The hawks and jays were observed to make common cause against a crow that alighted in a nearby tree. I could not see that any of the birds nesting in the grove were disturbed in the least, all the food being taken from the fields near by.