I also made an attempt to find out just where the great flight seen off Duxbury bar crossed Cape Cod. Dr. Coffin is sure that none of the flocks which he saw on November 28 were Brant, as from his vantage point he had been watching Brant for weeks, and was armed besides with powerful glasses.

Some enquiries were made for me at various points east of Plymouth, from Manomet to West Barnstable, but at no place was more than about 1000 geese noted in any one day. West Barnstable pond gunners reported more geese than for many years, and large numbers were seen at Manomet Point and Great South Pond, Plymouth. The same story was obtained as to an unusual flight during the last of November and early December at Great Herring Pond, Plymouth, Mashpee Lake, Mashpee, and Mystic Lake, Barnstable. Hence it seems certain that more geese crossed east of Buzzard's Bay than is usually the case. It also appears that the great Plymouth flight of November 28 must have dispersed somewhat as it reached land, because no other points, as far as I have been able to learn, witnessed such a concentrated migration.

A STUDY OF THE NESTING OF THE CEDAR WAXWING.

BY ARETAS A. SAUNDERS.

PROBABLY all our accounts of the life history of the Cedar Waxwing (*Bombycilla cedrorum*) mention the flocking habits of this species. Most of them also include the statement that during the nesting season this habit ceases and the birds separate in pairs. In my own experience, however, the flocking habit often continues throughout the nesting season, the nests being placed, if not in actual colonies, at least in close proximity to each other, and the nesting birds often congregating in small flocks. One of my earliest bird-nesting memories is that of finding a number of Waxwing nests in the same apple orchard. In August, 1906, however, I found the best illustration of this habit I have seen, when I dis-

covered ten nests of the Cedar Waxwing in a small tract of about five acres. These nests, with one other about half a mile distant, were well located to watch, and I had plenty of spare time so that in the next few weeks I made many notes on the nesting habits of this species, which form the basis for this paper.

The nests were located at Woody Crest, a small shore resort of West Haven, Conn. The tract of ground was flat, somewhat swampy and covered with a second growth of red maple and chestnut sprouts about ten or twelve feet in height. In addition to the Waxwing's nests, I found on the tract three nests of the Goldfinch and two of the Indigo Bunting. Besides these I found many empty nests which showed that Robins, Catbirds, Brown Thrashers, Red-eyed and White-eyed Vireos, Yellow-breasted Chats, and Maryland Yellowthroats had nested there earlier in the season. The Waxwing nests were placed in red maples from five to ten feet above the ground. This is much lower than the species usually nests, probably because of the lowness of the bushes themselves. It was noticeable that each nest was placed as high as the bush, in which it was located, permitted. The nest located half a mile away, was in much higher cover and was fully twenty feet above the ground.

The composition of the nests was quite variable, but this variation seemed to be due more to the location of the nests than to the individual tastes of the birds. Thus two nests that were placed in bushes close to a large patch of sphagnum moss, were largely composed of that material, while other nests, not twenty feet away, but not easily accessible to the moss, had none whatever in them. The average nest was composed of grass and strips of bark with a lining of fine grass and plant fiber. Other materials used were roots, leaves, ferns, weed stalks, twigs, chestnut blossoms, and string. All these materials, except perhaps the string, could be obtained close to the nests. This bird appears to have a strong liking for string. In late June, 1907, I watched a pair of Waxwings pulling string from an old Oriole's nest, which they carried to a maple about fifty feet away where they were building their nest. This is the only opportunity I have had to watch nest-building by this species. In this case both birds took part in the building, but one bird, presumably the female, was much more active than the other.

All of the nests found in the thicket were discovered between August 20 and September 14, and all contained either eggs or young. The number of eggs or young was three in four cases and four in four others. In the other three nests it was not determined. Four nests were found before the complete sets were laid. Two of these were deserted, apparently because of my intrusion, and these two were the only nests of the eleven that failed to successfully rear a brood of young. A curious incident happened in one of these nests. When I found it, it contained a single egg which was partially imbedded into the bottom of the nest. The next day the nest was empty and I supposed the egg had been taken by some animal or bird, though I could not find a hollow place in the bottom, where the egg had been imbedded. Nothing further happened to the nest and about a week later I took it down and examined it. I was surprised to find the one egg sealed into the bottom. Apparently the bird had sealed up its egg and then deserted the nest.

The two undeserted nests which had contained incomplete sets of eggs were carefully watched. In both cases the remaining eggs were laid daily and the period between the laying of the last egg and the hatching of the young was twelve days. I watched incubating birds for some time and so far as I could tell, only the female performs this duty.

After the young hatch the female broods closely for several days until they become partially feathered and the eyes begin to open. During this time she seldom leaves the nest and never for more than an hour at a time. After this she broods but little in the daytime but continues to brood at night until the young are about twelve days old. I believe the male does not brood at all.

Both birds feed the young, but during the first few days when the female is brooding the male does most of it. When he comes to feed the young, the female leaves the nest for a few minutes, but returns as soon as he has gone. In all cases these birds are very slow and deliberate in their movements about the nest. They take a long time to approach the nest, feed the young, and leave again, during most of which they stand perfectly still between movements, with the neck stretched, the bill pointed upward and the crest lying flat on the back of the neck. I watched the nests

seated on the ground some ten or fifteen feet away. The slow movements may have been because of my presence, but I doubt it, for the birds did not show anxiety or uneasiness in any other way and in fact, I believe did not notice me at all, except when I was actually examining the nest and its contents. In approaching the nests, the birds would fly into the bush from whatever side they happened to come, sit on the lower limbs for a time, then approach the nest by short upward flights. After a long wait sitting on the nest rim, they would feed the young by the usual method of regurgitation, and then take another long wait before flying away. Each bird always left the nest in a certain direction. The birds were so regular in this that after a little observation at a given nest, I could distinguish the sexes by the direction in which they left the nest. At one nest the male bird always left flying straight toward where I sat and usually passed three or four feet over my head, not paying the slightest attention to me.

The birds feed the young only at long intervals, rarely as short as fifteen minutes and usually of from three quarters of an hour to an hour or more. Feeding, in every case that I watched, was by the method of regurgitation common to this species, which has been so well described by other observers. I believe, however, that the young are occasionally fed directly by food from the bill which has not been first swallowed by the parent. Once, as I approached a nest, I saw a Waxwing near it with a spider in its bill, which it was evidently about to feed the young. I saw it too late to stop myself, however, and frightened the bird off by my close approach. I believe that the method of feeding from the throat is not true regurgitation but is merely a convenient method of carrying more food at a time than could be taken in the bill, and accounts, in part at least, for the long intervals between feeding. The food, which in my observations was principally wild cherries, was never mashed or digested in any way, but was fed to the young whole, stones and all.

The parent birds from the different nests made trips for food in small flocks, usually of four or five. The cherry trees where most of the food was obtained grew along the shore about a quarter of a mile from the nests. The small flocks usually gathered in the tops of a few dead stubs that stood above the thicket, and left these

in a body for the cherry trees, returned in the same manner when the food was obtained and then scattered slowly to their respective nests.

The birds were rather irregular about cleaning their nests and individuals differed considerably in this respect. Small undigested parts of the food of the young, such as the cherry stones, often remained in the bottom of the nests, and it was by examining the nests after the young had left that I obtained the most information concerning the nature of the food. Stones of the wild cherry (*Prunus serotina*) were most abundant. With them were usually a few seeds of the pokeberry (*Phytolacca decandra*) and the chokeberry (*Pyrus arbutifolia*), wing cases of beetles, small snail shells, and pebbles. The latter two were evidently obtained along the shore and were always smaller than the cherry stones. The snail shells had the appearance of the sun-bleached empty ones found above high-water mark, rather than those of live snails. Both shells and pebbles had evidently passed through the systems of the young, but why the birds should feed empty shells and pebbles to the young is rather a mystery and I would not have mentioned my suspicion that this is so, were it not strengthened by other observations. Twice I saw a Waxwing on the shore above high-water mark near the cherry trees. In both cases the tide was too high for it to obtain live snails, but each time I frightened the bird away before I could see what it was doing.

I kept careful watch of the growth and development of the young Waxwings. In only three of the nests did I ascertain the exact date of hatching, but I was able to get the age of the other broods approximately by comparison of their development with that of the broods whose age I knew. These three broods left the nest, one in fourteen, one in sixteen and one in eighteen days. The other broods all left when they were approximately sixteen or seventeen days old. The young when born are perfectly naked, without the natal down found in most young birds. The first few days they grow in size only. By the fourth day a row of small black pimples shows along the middle of the back where the first feathers are starting through. In six days the feathers of the back and the wing quills come through and pimples begin to show on the breast. By seven or eight days the eyes begin to open and more

pimples appear on top of the head. In eight or nine days the head and breast feathers appear, the feathers of the back begin to break their sheaths and pimples appear on the throat. By ten to twelve days the throat and tail feathers appear, the wing quills and head feathers break their sheaths, and the creamy white streak above the eye, a mark of the young bird only, begins to show plainly. By twelve to fourteen days the eyes are wide open and all the feathers are unsheathed or unsheathing except those forming the black patch on the forehead and about the eyes. These feathers are last of all to appear and do not break the sheaths till about the fifteenth day or later, sometimes after the young have left the nest. This fact appears to have led some writers to state that young Waxwings do not have this black mark. By fourteen to eighteen days the young are fully fledged and leave the nest shortly, being able to fly a little as soon as they leave. For a few days after leaving they may usually be found in the vicinity of the nest, the whole brood perched together in a row, with necks stretched and bills pointing up in the air in the same manner as the adults.

The difference in the development of the different broods was evidently due to a difference in frequency of feeding by the parents. The brood leaving the nest in fourteen days was fed often for this species, every fifteen minutes, at least during part of the day. The brood leaving in eighteen days was fed on an average of about once an hour. The last brood left the nest on September 20.

Late in November, after the leaves had fallen, I visited the thicket again to see how many Waxwing nests in all were there. I found seven more nests evidently of this species, making a total of seventeen. These other nests were some distance from the ones I studied and much more scattered. All of the seventeen, however, could be included within a radius of 150 yards.

The next year I was away from this vicinity most of the summer but returned in September. On September 21 I visited the thicket again to see if the Waxwings had been there that summer. After a long search I found two nests, both empty, but one with a parent bird and brood of four young sitting in the bush above it. This was just one day more than a year since the last brood of the year before had left the nest. The birds were there but not in the same numbers as the previous year. Evidently Waxwings do not

necessarily return to the same locality in which they have nested before.

It is evident that the presence or absence of Waxwings in a given locality is due to the abundance or lack of a supply of the berry or fruit that forms the major part of their food. A later experience in the vicinity of Bozeman, Montana, confirms this. During the summer of 1908 there were no Waxwings that I observed in the vicinity of Bozeman. The next year, however, they appeared in June and were abundant throughout the summer. During this time I found two Waxwing nests in shade trees along the streets of Bozeman and could doubtless have found many if I had had time for search. In this region the service berry (*Amelanchier alnifolia*) forms the principal article of food. This berry was very abundant about Bozeman in 1909 and correspondingly scarce in 1908. During the summer of 1910, in a few short visits to Bozeman, I again found Waxwings quite common and service berries fairly abundant.

NOTES ON THE MIGRATION OF THE SAW-WHET OWL.

BY P. A. TAVERNER AND B. H. SWALES.

FROM all written accounts it appears that the Acadian, or Saw-whet, Owl (*Cryptoglaux acadia acadia*) is generally regarded as a resident wherever found or that, if it migrates at all, it is but slightly and the movement is limited to the northern and southern extremes of its range. This view is reflected by the citations from the following authors.

Wilson. "This species is a general and constant inhabitant of the Middle and Northern States." [1]

A. K. Fisher. "The species is not migratory but is more or less of an irregular wanderer in its search for food during the fall and winter." [2]

[1] Wilson. American Ornithology. Brewer ed., 1840, 310.

[2] Fisher. Hawks and Owls of the United States in Their Relation to Agriculture, 1893, 161.