

about a month before destroying the nests of the second brood, thus enabling the parasites to escape. The increased parasitism of the fly in the second brood, together with a natural loss of the adult flies during the long hibernation, should tend toward keeping the number of *Protocalliphora* down to what would be considered normal conditions.

In 1924 I obtained from Mr. J. S. Pfeil two maggots taken from swellings on the neck of a sparrow found near Middleboro, Massachusetts. The larvæ pupated August 3rd, and the adults (male and female) emerged August 12th. This was recorded in 1925 as *Protocalliphora hirudo* var. *cuprea* Shann. and Dobs. (It was described in 1924 from Seattle, Washington, from the nest of a Western Robin.) This constitutes the only Eastern record for the species and is of special interest, showing that there is also in this section of the country a *Protocalliphora* with habits very different from those described. The larva of this species must enter the bird when the larva is very young, the irritation of the maggot causing a swelling in which pus forms, on which the maggot feeds, similar to the larvæ of subcutaneous bots such as the ox-warble. If anyone should find a bird with swellings on the neck as in the case of the sparrow above described, I should like very much to obtain the specimen.

I am planning to continue my study of these flies during the coming season and hope for the continued co-operation of those interested. It is desirable that the entire nests should be sent as soon as the nestlings leave, both of the first and second broods, so that I may be able again to check up the relative amount of parasitism.

Boston Society of Natural History.

MIGRATION STUDIES OF JUNCO AND CHIPPING SPARROW GROUPS

BY C. L. WHITTLE

THE summer and fall seasons just passed (1928) have afforded some details of the habits of Juncos (*Junco h. hyemalis*) and Chipping Sparrows (*Spizella p. passerina*) during migration, or preliminary to migration, of considerable interest. The observations were possible in part at least owing to the fact that here in Peterboro, New Hampshire, we have maintained two banding stations which were also, of course, places

where plenty of food was supplied to the birds. These stations are three miles apart, Mrs. Whittle's lying to the south of the writer's station, in a north and south line and within two hundred and fifty feet of the same elevation. Juncos nest sparingly within three miles of the stations, although they are not known to nest in the immediate vicinity of either station. Chipping Sparrows, however, do so abundantly.

My banding station was started during the spring of 1928. As fall and winter approached the problem of baiting birds expected to winter with me was a matter of great interest. It was believed that it would easily be possible to have Juncos and Tree Sparrows do this, as I knew the latter species wintered each year in Hillsboro, New Hampshire, eighteen miles north of Peterboro, and that Juncos wintered sparingly at least at two feeding stations within three miles of mine to the south, although inquiry failed to discover that others feeding winter birds in Peterboro or vicinity had Juncos as wintering birds. It appeared probable that at the latitude and longitude of Peterboro this species was wintering very sparingly near the northern limit of its winter range.

Having this setting in mind, it is profitable to note the behavior of Juncos during their southward migration, from October 6th, the apparent date the migration of this species began here, to November 20th, the latest date any Juncos were observed during the fall.

The Juncos made their first appearance on October 6th in a single small group of about six to eight individuals which spent several days in an old, weedy garden. On the 8th a flock of six to eight more appeared near Mrs. Whittle's banding station. On the 11th of October little groups of Juncos began to appear along the roadside between our two banding stations and continued to be plentiful up to October 20th, when a day afield showed a scarcity of this species, and from this date to November 2d Juncos were less plentiful than earlier. The distribution of the Juncos when most abundant was in small flocks up to perhaps twenty birds scattered quite generally over the open country. Some of the early groups remained several days, but as October wore on, the number of flocks increased and haste in continuing their migration became evident: abundant groups widely distributed present on one day departed over night almost entirely, and in November, as the groups decreased in number, this characteristic was increasingly pronounced, although it was occasionally possible to keep a few birds feeding at stations for several days. About the 4th of November, at a time in the month when Juncos were

comparatively few, seven birds suddenly appeared at my station during the closing hour of daylight and fed on canary seed. At this time a large group was also feeding at Mrs. Whittle's station. The following morning, however, not a Junco was present at either station, and at my station none were seen until November 9th, when five to nine Juncos appeared at the feeding-shelf and apparently became fixtures. At this time in the month, November 9th, Juncos generally had become scarce, but a few still fed at Mrs. Whittle's station. It was my hope and expectation that the little group at my station, which also contained one Tree Sparrow, two Song Sparrows, and one Savannah Sparrow, seemingly having become well anchored, would pass the winter with me. A like condition existed at the other station, but on the night following, the 20th, every Junco disappeared from both stations, and none has been seen by us in Peterboro or vicinity since that date. The Song, Tree and Savannah Sparrows dropped out of the Junco group on the 12th or 13th. The occasion for the Juncos going was not because the temperature had suddenly dropped, or because of warm weather. All the eleven days they were here the weather was seasonable as to temperature (about 30° average), although the two days prior to the birds' departure were generally rainy or foggy.

The portions of the above observations that I wish to emphasize are three in number: (1) the fact that the birds seemed to appear in small groups and to move along in small groups; (2) the fact that as the season of migration advanced to its maximum the movement became more hurried and then slowed up; and (3) the fact that the latest-arriving groups would tarry even for eleven days, but no attractions of food and shelter influenced such groups to remain for the winter. The meanings of these emphasized features of the migration in part are manifestly a matter of speculation, but a few words of comment seem justified.

That Juncos while migrating southward travel in small groups is believed, since they occur in small groups very early in the morning during this period.¹ That they reach their winter quarters, in some instances at least, also in small groups has been shown by experiences at my former station in Cohasset, Massachusetts, and at L. B. Fletcher's station in the same village.¹

¹See *The Auk*, Vol. XLIII, No. 4, October, 1926, and *The Auk*, Vol. XLI, No. 2, April, 1924, pp. 329, 330.

Concerning the earliest seen groups of Juncos, there is a possibility that they represent a relatively nearby gathering of rather locally nesting birds, a neighborhood group. Wendell P. Smith reports (see *Bulletin* for October, 1928, p. 137) that there were seven nesting pairs of Juncos in an area of 118 acres near Wells River, Vermont, in 1928, and he writes me that "during late August and early September there were small flocks of Juncos about which were evidently family groups consisting of two adults and several young." The amalgamation of such family groups as these later in the season may be reasonably expected to take place. See the history of a neighborhood group of Chipping Sparrows described below illustrating such a process.

We possess little or no information as to the geographical positions occupied by a species on its wintering grounds in terms of the distribution of such birds on their nesting-grounds; that is, we do not know, for example, if law and order determine the distribution, such as would be the case if Juncos nesting at the northern limit of their summer range wintered in the northern limit of their winter range, and the birds nesting in the southern part of the species' summer-range occupied the southern part of their winter range. It is possible that the behavior of the migrating Juncos recorded above may in part be governed by the mileage of the remaining distance a normal, ordered wintering requires of them, in which case we may infer that the hurrying birds wintered far to the south of Peterboro, and that the last two groups, one at Mrs. Whittle's and one at my station, were willing to tarry so late because their winter objectives were relatively near by. The problem referred to is one of great difficulty, but if it ever shall be solved, bird-banders must furnish the data, data which are slowly being gathered. Every recovery of a migrating bird captured on its wintering-ground wearing a band placed on its tarsus at nesting-time is a record of prime importance in helping to solve the riddle.

At my station in Peterboro the summer and fall of 1928 afforded an exceptional opportunity to observe Chipping Sparrows at close range every day from their first appearance in the spring up to the time they left in migration with their young. Three pairs nested so near my house that they visited my bounty of canary-seed often several times a day. When the first broods were old enough, they followed their parents to the station, and when the second broods were ready, they too followed their parents to the station. During the period of molt, the old birds and young continued their visits in little

groups, doubtless family ones. In early September it was apparent that the families had united into one neighborhood group, or clan, now numbering twenty-three birds, and this group, when well over the molt, began to range about and was often seen at a distance of from two to four hundred feet from the station, but the birds would flood into my feeding-places every day and often several times daily. In order to band them I led them to my window-shelf, which has a small trap operated from inside the house and later nineteen of them were banded. By October 1st the group showed great restlessness, ranging farther away, only a few coming to the station, and by the 5th they disappeared for the season, probably constituting a migratory unit. This is a late date for the occurrence of Chipping Sparrows in Peterboro as far as my experience goes. Possibly the extraordinary high temperature prevailing in October had a tendency to retard their departure.

In *The Auk* for 1926, p. 499, I have described a similar neighborhood group of this species occurring at Mrs. Whittle's station. The behavior of this group was strongly contrasted with the one above described, the birds as a whole not visiting her station, though they fed only a few hundred feet away for a considerable period. The group contained only three or four of the banded birds which had nested close by and which had been coming to the station during the nesting-season, and this small number, coming intermittently, was insufficient to determine the movements of the group as a whole.