separate. Sometimes the Flickers give up easily, or again they will persevere for several days, but always the result is the same.

There are two natural cavities in one of these trees, but the Starlings prefer the nice new holes of the Flickers. One year Starlings nested in one of these natural cavities (often tenanted by a Screech Owl), occupied another year by a pair of red squirrels. During tenancy by the latter, the Flickers nested in the second cavity, which is too low to interest Starlings, anyway. The squirrels did not fancy such near neighbors, entered the nest, killed the male Flicker and dumped him out of the hole. The female had a new mate within two days, but before long the eggs were deserted.

Last year the Starlings did not molest the Flickers until the eggs were laid. I was reading in the living room when a Starling alighted on a pine branch nearby and dropped something white. Investigation disclosed that the bird was removing Flicker eggs, one at a time, and dropping them to the ground. I shot the Starling before all the eggs had been destroyed, but within a few days the stub blew down, breaking cleanly at the nesting cavity, and nothing more was seen of the Flickers.

These occurrences, however, do not show the Starling in its most diabolical rôle. The Downy Woodpeckers nest high in the most frequently tenanted of these two trees. They are quiet and exemplary neighbors, and the holes are so small that I am not certain that a Starling could even wedge its head into one. Nevertheless it is doubtful whether the downies have been permitted to rear a brood in the three years concerned. They are ignored by the Starlings until the young of the former are of respectable size. Then we are made aware, by an increasing tempo of outcries early in the morning, that the downies are greatly perturbed. The Starlings are close to the nests, hopping from twig to twig and peering in the hole. This continues, with increasing aggressiveness, for several mornings, but I have witnessed the climax only once. A Starling with something in its beak approached the hole and appeared to dangle it temptingly at the entrance for a moment, before giving a single mighty jab. This was repeated several times. Evidently it was trying to entice, with bait, a young downy within reach of a crippling blow by its beak.

The elimination of Downy Woodpeckers from the vicinity of Starling nests can be of no possible benefit to the latter. But the Starling is an aggressive and singularly successful type. In the latter rôle it is doubtless impatient of near neighbors of all sorts. The trait will prove to be hard on some of our native birds, and may likely prove critical for some of our woodpeckers.—A. BRAZIER HOWELL, *Department of Anatomy, Johns Hopkins University, Baltimore, Maryland.*

Nesting of the Eastern Bluebird.—For the past ten years, Bluebirds (*Sialia sialis*) have been attracted to boxes expressly placed for them about my home at Ithaca, New York. These boxes were so designed that the top could be removed easily, thus facilitating a study of nest construction, eggs and development of the young. Since few attempts have been made to record the domestic activities of this species, and published observations are notable only for their paucity, it appears justifiable to record my notes.

Bluebirds usually arrive in central and western New York during late February or the first week of March. It seems likely that these are birds which are to pass the breeding months farther north, for, following their arrival and early departure,

usually a week, more often two weeks, will pass before resident birds become abundant about their nesting haunts.

Nest Building.—Once the resident birds have arrived, little time is lost in selecting a nesting site. If a box or tree cavity meets with their approval, preliminary nesting activity commences at once, as if to establish ownership. During the spring of 1931, a pair of Bluebirds arrived in my yard on March 27. I first saw them inspecting a bird box at 6 a. m. At 6:30 a. m., both were carrying in straws and grasses. The weather remained cold, freezing temperatures prevailing daily, and no further work other than this initial structure was attempted until April 3. Two pairs of birds commenced nest building on April 7, 1929; in 1932 a pair started building activities on April 16. Usually cold or otherwise inclement weather interrupts these building operations. I have noticed that the male is generally the more industrious worker during the incipient stages of nest construction; the female is usually entrusted with the lining and final completion of the structure. Nest building may occupy three weeks, but the entire structure can be completed in five days or possibly less.

During nest building, the male courts the female daily. Courtship consists of wing-quivering not unlike that exhibited by young birds begging for food. The humerus is held close to the body, and the primaries are rapidly waved, occasionally almost at right angles to the body. The familiar warble accompanies this act.

Incubation.—As soon as the nest is completed, the eggs are laid, one daily until the complement of four to six is complete. I have observed that the eggs are usually laid about 8 a. m. This has been so in fourteen records where the nest chamber could readily be observed. No reason for this is apparent. Usually the bird does not commence to incubate immediately the clutch is complete, but a dozen hours or so elapse before incubation normally starts.

The loss in weight of the eggs occasioned by the evaporation of gases from within the shell during incubation is not great. Five sets of eggs were weighed daily from the commencement of incubation until the developing young were ready to pip the shell. The newly laid egg varies between 2.55 grams and 3.22 grams. The average weight of 24 eggs was 2.91 grams. At the close of incubation, just prior to pipping, the eggs have lost from 11.8 to 13.4 per cent of their original weight. The average weight-loss of 24 eggs during incubation was 12.62 per cent. The loss is a gradual one from the inception of the incubating period until its termination.

Burns [Wilson Bull., 27 (1): 286, 1915] lists the period of incubation as twelve days, both sexes participating. I have carefully watched a dozen pairs and have never observed any evidence of the male relieving the female. He is very solicitous of her welfare, and constantly brings her food or sings from a nearby perch, but no other family duties engage him until the young appear. In only one instance has the incubation been twelve days. I have eleven records of thirteen days, one of fourteen days, and another of seventeen days. This last record, of an exceptionally long period of incubation, may be attributed to *Polistes* wasps which had constructed a nest on the ceiling of the box and apparently irritated the bird in some manner. In addition, unseasonably cold weather prevailed during this incubation period, and the female appeared to spend uncommonly long intervals away from her eggs. Daily removal of the eggs for a few minutes from the nest box to weigh them apparently had little effect on the incubation period, for those sets which were not weighed required a similar period for hatching.

On April 24, 1929, two Cowbird eggs were deposited in a Bluebird's nest which had just been completed. Both were curiously marked, pencilled on the larger end like the egg of a Red-wing. The female Bluebird promptly covered these with a new lining.

The eggs, even though in an advanced stage of incubation, can withstand desertion for many hours. At 11 a. m. on May 11, 1938, a cat caught a female Bluebird which had left her incubating duties momentarily to feed on the ground. This occurred on the ninth day of incubation. At 5 p. m. the eggs were cold. The following day was unseasonably cold, with temperatures of 34° to 40° F. prevailing. Although several people kept watch throughout the day there was no sign of the male about. At noon of the following day (May 13) the male appeared with another mate, a much paler bird than his previous consort. This female immediately took over incubating duties. In spite of chilling temperatures and an interruption of incubation for 49 hours, four of the eggs hatched on May 16, fourteen days after incubation had commenced. The remaining two did not hatch.

The first set of eggs usually numbers five or six; in twenty-two first sets examined one contained four, fifteen contained five and six contained six. The second set usually consists of four eggs; occasionally three and less often five are laid.

Development and care of young.—Newly hatched Bluebirds are blind, nearly naked creatures which exhibit the feeding reflex in a few hours. They grow rapidly and usually leave the nest on the fourteenth to sixteenth day, although a slightly longer period is required for some fledglings to try their wings. The feather tracts first appear on the fourth day; the last to appear is the femoral tract. The feathers of the ventral and flank tracts and the secondaries erupt on the eighth day. On the ninth day the eyes first open. The primaries have a definite blue color, while the belly and breast-feathers are distinctly white. Occasionally this condition may not prevail until the eleventh day. When the birds are twelve days old, the breast-streaking characteristic of the immature bird is evident. At this age the nestlings crowd to the nest entrance and clamor for food, giving the characteristic chirruping note so common to the family. From

DAILY WEIGHT INCREASE IN GRAMS OF BLUEBIRD NESTLINGS

Days	*Brood 1* (5)*	*Brood 2* (5)	*Brood 3* (4)	*Broods 1, 2, 3* (14)	*Daily percent gain or loss*
Hatching	3.15	3.2	2.7	3	
1	5	5.1	4.15	4.75	+58.4
2	6.7	4.65	6	5.78	+21.7
3	8.7	6.4	8.6	7.9	+19.4
4	12.4	9.6	12.1	11.4	+44.3
5	15.3	13.1	14.1	14.2	+24.6
6	19.4	17	16.9	17.8	+24.4
7	21.6	20.5	19.5	20.5	+15.3
8	23.5	23	22.5	23	+13.7
9	24	25.1	23.5	24.2	+ 5.2
10	25.7	25.4	26	25.7	+ 6.2
11	26.9	27.1	26.7	26.9	+ 4.3
12	26.7	27	26.3	26.7	− 1.5
13	27.2	27	26.3	26.9	+ .75
14 (all left nest)	27	28	26.4	27.2	+ 1.1

* Figures in parenthesis indicate number of nestlings weighed.

this period to the time they leave the nest, the youngsters call incessantly from dawn to dusk, occasionally giving lusty cries long after it has become too dark for the parents to gather food.

I saw one brood voluntarily leave the nest box on the sixteenth day after some coaxing by the parents. The largest nestling on its initial flight from the box flew 70 yards. Three others flew to a clothesline 10 yards away, but the smallest missed the line, volplaning to the ground 30 yards from the nest.

The parents commence to feed the first young to hatch, and as the interval between hatching of the entire clutch may be twelve hours or longer, it is evident that the most precocious youngsters secure a good start over their less fortunate nest mates. When the birds are small, about 60 to 90 trips a day suffice, but with increasing size and greater alimental needs, the parents must 'hustle' from dawn to dusk. During a three-hour period (5 a. m.–8 a. m.) the adults made 47 trips to the nest and later on the same day (4 p. m.–8 p. m.) 61 trips were recorded. Cursory observation during midday did not suggest that feeding was curtailed in any way. On this basis we may assume an average of 225 trips a day.

As soon as the first brood has left, the female commences relining the nest, and within a few days has started incubating her second clutch. Meanwhile, the male is caring for the young birds. They seldom venture far from the home site, and may almost invariably be seen within a quarter mile or so of it. When the second brood has hatched, and this may be late July or early August in the event of a late first nesting, the male parent returns and aids in the feeding. Occasionally feeding duties are rendered less arduous by the young of the first brood aiding in these duties.

Nesting Bluebirds which I have observed are seldom concerned over the proximity of other native birds, but I have seen the male vigorously pursue Baltimore Orioles on several occasions, chasing them for two hundred yards or more. On one occasion the male threw two eggs of a Chipping Sparrow from a nest in a nearby plum tree.—W. J. HAMILTON, JR., *Cornell University, Ithaca, New York.*

Unusual nest of the Parula Warbler.—What I am inclined to believe is the first nesting record of the Parula Warbler in this immediate vicinity was secured this month. I discovered the nest along the Chemung River about two miles west of this city on June 10. The nest had been built within a cone of grasses, weed stalks and leaves that had been caught on one of the slender lower branches of a maple tree overhanging the river when it was in flood. The receding waters had left this particular cone about nine feet above the present sloping bank. Lacking the customary *usnea,* the Parulas had utilized fine rootlets, grass fibers, bits of linty material, and the like for the nest itself.

When discovered, the young had already hatched. On June 16 they left the nest. My husband and I subsequently collected the nest, at the suggestion of Dr. Arthur A. Allen of Cornell University, who in the meantime had been notified and on June 12 came and filmed both nest and parent birds. For the Parula to build this type of nest appears so exceptional as to deserve special mention.—OLIVE R. YORK, *862 Hoffman Street, Elmira, New York.*

Bullock's Oriole as a fighter.—While serving as a member of a biological collecting party in southeastern Utah during June and July of 1927, the writer had an opportunity to observe some interesting and unusual activities of Bullock's