A NESTING STUDY OF THE MOUNTAIN BLUEBIRD IN WYOMING

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Nesting of the Mountain Bluebird (*Sialia currucoides*) has been reported at an elevation of only 3000 feet in the central Sierra Nevada near Fyffe, Californa (Barlow and Price, Condor, 3, 1901:184), but there seems to be no limit of altitude above this in the western United States at which this bird will not nest providing a suitable nesting situation can be found. Being a hole-nesting bird that normally seeks cavities in trees, the species would not be expected to breed above timberline, but lack of nesting cavities seems to be the only deterrent. Rowley (Condor, 41, 1939:250) has reported an instance of its breeding at an elevation of 12,000 feet in Mono County, California, well above timberline. Here the nest was placed in a niche in the side of a cliff. I once found a nest under construction in a building on the summit of Pike's Peak, above 14,000 feet, which I am sure was built by this species, for the adults were flying about. Thus, the climatic conditions of wind, light exposure, cold and snow which the Mountain Bluebird can not only withstand but apparently seeks, are worthy of note.

The observations reported here were made in 1947 on the western edge of Kemmerer in southwestern Wyoming, at an elevation of 7000 feet, in an area of virgin sagebrush hills. The mean annual precipitation is about 10 inches. Originally the only trees in the area were cottonwoods and willows along the streams and very widely scattered groves of stunted junipers among the hills. These trees remain, but in addition there are now in the town many trees that have been planted by man. The concentration of bluebirds in the area seems to be due to the large number of suitable nesting sites provided by man-made structures, including bird houses.

The bluebirds arrive in March and leave in October. My studies have shown that after a pair of bluebirds takes possession of a nesting site, there is a period of approximately a month between nesting-site acceptance and the beginning of nest building in which the birds are absent from the nesting site most of the time and may be entirely absent for days at a time. They do not, however, leave the general vicinity of the nest-site.

In 1947, bluebirds arrived in the locality on March 16, and it seemed that nearly all of the local summer residents actually arrived on that day. Nesting-box inspection began immediately. One of the boxes put up on our premises was placed on a telephone pole north of the house, about 8 feet from the ground, facing east. This box was built of cedar shakes with a hinged lid, 8 inches by 5 by 5. It was advantageously located for observation, being easily seen from several windows of our home, and I could watch the box in the early morning by merely opening my eyes while lying in bed. First inspection of the box by a pair of bluebirds was noted in the early morning of March 18. In these activities the male always took the initiative, flying back and forth between the box and the female, apparently trying to prevail upon her to accept it. On the morning of March 20 the pair had apparently accepted the box as a nesting site and both individuals were within it together at one time.

On March 22 the pair was active about the box on the pole at dawn, and on the 23rd a half inch of fresh snow was on the ground. High winds, severe snow squalls and cold weather occurred on the following day and the birds were less in evidence. On the 25th a battle occurred in a neighboring yard between a pair of English Sparrows and a pair of Mountain Bluebirds which was finally won by the sparrows. All boxes that I put up originally had a 1½-inch diameter hole. The birds would look into these boxes but would not enter. The second day after the birds arrived, March 19, all holes were en-

larged to 1¾ inches. A 1½-inch opening is the recommended size for the Eastern Bluebird, but it is apparently too small for *currucoides*, a species slightly larger than the former.

The established pair was seen only occasionally about the box from March 26 to April 13. On the 14th for the first time, the female was seen carrying nesting material into the box. The material consisted of shreds of sagebrush bark which she pulled from the living bushes. Examination showed that perhaps a fourth of the necessary material was within the box, placed as a wreath on the bottom. Thus, 29 days after the species arrived in Kemmerer and 25 days after a particular pair accepted a nesting-site, nest-building had begun. Then the birds abandoned the box for two days, and the female resumed nest building on the 17th. Her usual procedure would be to pull off a shred of sagebrush bark while standing on the ground, fly directly to the box alighting on the edge of the hole, spend less than a minute within the box, fly out and alight for less than a minute on a telephone wire and then fly to the ground for more bark. Meanwhile, the male would sit on a nearby wire watching the procedure without singing or assisting in any way, although occasionally he chased off an English Sparrow. The pair abandoned the box again on the 18th but did a little work on the 19th, and on this day the male was seen once to carry in nesting material. This was the only time during the season he was seen to participate in nest-building. Very little progress on the nest was noted in the examination made on the 20th, and the birds again left off work and were not seen about the nest at all from April 22 through April 28. They returned on the 29th but were not active about the house for the next few days. Even on May 2 very little progress in nest-building could be noted, and the nest was nearly in the same condition it had been on the evening of April 14, the first day nesting material was carried in. Considerable work was done on the nest on May 3 and 4, and on the 5th it was apparently complete. (A careful examination of the nest at the end of the season showed it to be composed entirely of sagebrush bark except for 3 or 4 small chicken feathers and one tiny shred of tinfoil. There was practically no lining, but the lining bark was slightly softer and in finer shreds than that in the remainder of the nest.) Thus, 22 days were required to build the nest, and it was not completed until 46 days after the site was accepted.

On May 6, 7 and 8 the bluebirds were very active about the nest in the early mornings, the female spending much time within the box and the male much time looking into the box. In the afternoons they were usually absent from the box. In this period no additional work on the nest was noted. In the early morning of May 9 the first egg was laid, 25 days after nest building began. Very frequent examinations of the nest revealed that one egg was laid on each of the next four days, all very early in the morning. The sixth egg was laid on the sixth day between noon and 4:45 p.m. The female started incubating that day, May 14, about 8:00 p.m. and would not leave the nest when the box was tapped nor when the lid was removed.

During the incubation period the female always made early morning feeding trips. The male did not incubate but was seen to enter the box once for a few minutes while the female was absent. In guarding the nest the male was much more active and aggressive than the female. He also spent a good deal of time looking into the box, and the female spent considerable time looking out.

On May 26 there were still six eggs in the nest, but on the 28th five eggs had hatched. The sixth egg never hatched. The incubation period was thus 13 or 14 days. The newly hatched young were naked and inactive and made no attempt to feed when I tried to excite them. Some of them may have been dead. This day the temperature was 26°F. with a strong east wind, driving snow and near blizzard conditions.

During the period that one or more young were in the nest, I wrote down in detail all activities of the parent birds during the 15-minute period each day between 5:45 and 6:00 a.m., choosing this time of day because it seemed to be about the time of greatest daily activity. I quote from my notes herewith the record for May 29, which is typical. "5:45 a.m., heavy frost. Male flies to wire near nest. Female emerges from box and sits by male. Parents fly away in opposite directions. Male returns to box and enters, then leaves and flies away. Female returns and enters. Male returns and enters while female is within. Male leaves and then returns with insect larva food in bill and sits on wire near box. Female leaves box and sits beside male. Male feeds female. Female enters box. Male flies away, then returns and looks in box, flies to wire, makes several trips from wire to ground, flies to box and apparently feeds female by leaning into box."

At 5:00 p.m. on the 29th, the nest contained only two young, one apparently dead, and one egg. On the morning of May 30 the nest contained one living young, one dead bird and one egg. By 5:00 p.m., the dead bird had been removed. Thereafter, growth of the one remaining young was rapid. On the 31st there was dark, bluish-gray down on head and back. On June 5 pin feathers were showing and had there been six birds of its size in the nest, the nest could hardly have contained them. The nestling's eyes first opened on June 6, which would be either 9 or 10 days after hatching. By June 8 the body of the young bird was almost completely covered with feathers. The nest was kept clean and only once was a fecal sac noted; this was high on the nest's edge. On the night of the 10th the female did not spend the night within the box, nor thereafter, thus making 27 nights during which she did. During this night of the 10th, there was rain turning to snow and the temperature dropped to near the freezing point. The next day, June 11, it was snowing hard at 10 a.m., and by 5 p.m. there was six inches of snow on the ground. The young bird seemed all right. It snowed most of the night, and on the morning of June 12 the young bird was dead.

It would seem that the death of this young bird was to be expected in view of the severe weather, the absence of other young in the nest, the absence of the parent at night and the probable lack of food. Only once during this storm was the female observed bringing larvae to the box. However, other bluebird nestings in the vicinity that I had under observation did not suffer, and even nestlings at a locality in the Canadian Zone at a 1000-foot higher elevation where weather conditions were more severe were not adversely affected. Such weather conditions are not unusual at these localities. Young robins in a much more exposed nest on our home were unharmed, and four young left it the next day, June 13.

I removed the dead nestling and the egg on June 12. From June 12 to 19 the adults remained about the box a good deal of the time, the male but not the female entering frequently. Then they abandoned the nesting box and spent much of their time about a shed 200 feet away on which was placed a gourd box that had been visited earlier in the same season, first by Tree Swallows and later by House Wrens but without an actual nesting of either. However, the bluebirds took no interest in the box, merely using the shed for a lookout and resting place. They continued to be seen about our home, and on July 16 the male was observed coming out of a box in a cottonwood tree in a neighbor's yard. This box is surrounded by a dense planting of Russian olives and had been used earlier in the season by a pair of English Sparrows. In late July a Western Wood Pewee dominated the area and chased all birds, including the bluebirds. On August 5 the parent bluebirds were seen feeding nearly full grown young in our yard, and it was evident that their second nesting in the birdhouse next door had been successful.

As the season advanced the male, female and young became more difficult to tell

apart. They were seen occasionally about our home until October 13, and other bluebirds were seen in the vicinity until October 22.

The feeding habits of *currucoides* always remind me of those of the Sparrow Hawk. They will perch at heights of 8 to 15 feet above the ground, usually on a wire, and turn one eye toward the ground and watch for insect prey. When this is seen they drop to the ground and take it, all very much in a Sparrow Hawk-like manner. When no high perch is available above the ground where they want to feed, they often fly, keeping their bodies nearly motionless in the air and watch the ground. In this they also resemble the Sparrow Hawk. They seldom look for food on the ground itself but nearly always from above. In the area here concerned the feeding ground was always in the sagebrush. I have seen food in their bills innumerable times but it always seems to be of the same kind, small insect larvae, about ¾ of an inch long. I have never seen them take food in the air, although other writers have. A feeding station was maintained within 50 feet of the box on the pole throughout the year but the bluebirds never used it.

Mountain Bluebirds are hardy and can withstand the weather conditions of high altitudes in early spring and mid-autumn. The species appears to be adjusted to the combined factors of severity of climate and competition for nest sites by early selection of such sites and a protracted period of nest-building. Were nest-building not protracted, the eggs and young would normally be subject to weather conditions which they could not withstand.

SUMMARY

In 1947, Mountain Bluebirds (*Sialia currucoides*) first arrived at Kemmerer, Wyoming, on March 16. Inspection of a nest box by a single pair observed throughout the 1947 nesting season occurred two days later; the site was apparently accepted four days later (March 20). The pair remained in the general vicinity of the nest-box for about three weeks before the female was observed bringing nest material to it (first noted on April 14). Nest-building extended over a period of at least 22 days; most of it occurred on May 3-4, and the nest was apparently completed on the 5th. Six eggs were laid on consecutive days beginning May 9. Incubation started with the sixth egg and lasted 13-14 days. Only 5 eggs hatched (on May 27 or 28) and the nestlings died at various ages up to two weeks (the last found dead on June 12), apparently through exposure to extreme cold. Nest-building and incubation were performed by the female. The male was observed to bring nest material to the box once (March 19). A second nesting of the same pair in a neighboring area was successful.

Kemmerer, Wyoming, March 1, 1948.