SOME NOTES ON YOUNG DESERT HORNED LARKS

WITH TWO ILLUSTRATIONS

By LEON KELSO

From September 1, 1928, to July 30, 1930, the writer had under observation a small area of level waste land within the city limits of Aurora, Colorado. The Desert Horned Lark (*Otocoris alpestris leucolaema*) was found here throughout the year. Four nests of this bird were found in the spring and summer of 1929, and one in the spring of 1930. Some observations made upon the birds are thought to be worth recording.

The area concerned was rectangular in shape, extending 700 yards north and south by 500 yards east and west. It was bordered on the south by Montview Boulevard, a busy thoroughfare running from Aurora west through the adjacent city of Denver. In the east-central part of the area was a small colony of prairie-dogs (*Cynomys ludovicianus*) numbering about eight individuals.

The Environment.—The Horned Lark is closely associated with the plant life of the environment in which it lives. Therefore the following notes on the vegetation of the area are presented. The nomenclature used is that of Coulter and Nelson's New Manual of Rocky Mountain Botany. The identifications have been checked from material in the herbarium of the University of Wyoming. Common names are not available for many of the species, so none is given.

The short-grass association covered most of the north and central portions of the territory, about 70 per cent of the ground. This is the principal association throughout the range of the bird studied. It prefers this for roosting and nesting. The dominant species were grama grass (*Bouteloua oligostachya*) and slender fescue-grass (*Festuca octoflora*). Subdominant species were *Muhlenbergia gracillima, Chrysothamnus plattensis, Opuntia polyacantha,* and *Gutierrezia sarothrae.* Less frequent species were *Allium nuttallii, Leucocrinum montanum, Buchloe dactyloides, Viola nuttallii, Lepidium apetalum, Hedeoma hispida, Plantago purshii, Gaura coccinea, Aristida longiseta, Erysimum asperum, Phellopterus montanus, Eriogonum effusum,* and *Gilia micrantha.* There were also on bare ground two species of low moss and two species of lichens. Leaves of *Bouteloua oligostachya* comprised 60 per cent or more of the material in each nest.

The ruderal association occurred on ground that recently had been cultivated, in an old yard and along the road in the southern end and in the northwest corner. This type of vegetation covered about 10 per cent of the area in all. Here the larks preferred to feed, for it provided many seeds in the winter and supported much insect life in the summer. The young larks were often escorted here on account of food and better protection while yet unable to fly. Different plant species were dominant in different parts of the association. These were *Helianthus annuus, H. petiolaris, Iva xanthifolia,* and *Salsola pestifer.* Subdominant species were *Bromus tectorum, Sitanion elymoides, Chaetochloa viridis, Schedonnardus paniculatus, Poa pratensis, Kochia scoparia,* and *Chenopodium album.* Less frequent species were *Amaranthus retroflexus, A. blitoides, Lappula erecta, Norta altissima, Malvastrum coccineum, Sophia pinnata, Cryptanthe crassisepala, Aster hebecladus, Artemisia aromatica,* and *Centaurea picris.*

The wheat-grass association was found in irregular scattered patches in the western and southern parts of the territory. In the winter the grass dies down, leaving open bare ground with many small depressions between the tufts in which

larks roost when there is little, if any, snow. The dominant plant species were *Agropyron occidentale molle,* and *A. pseudorepens. Chrysothamnus plattensis* was in places a subdominant, while *Grindelia squarrosa* and *Carduus filipendulus* were less frequent members of the association. Leaves of *Agropyron* comprised 10 per cent or more of the material of each nest.

The semi-aquatic association appeared about some temporary pools during the rainy days of April and May, disappearing in the dry days of June. *Myosurus minimus* was dominant. *Eleocharis acicularis, Marsilea vestita,* and *Oscillatoria* sp. were found in a few places.

Notes on nests.—The first nest was found, April 24, 1929, in the north end of the territory. The female flushed when the observer happened to come near the nest about 6:30 p. m., but it flew only a few feet away. The nest was only slightly sheltered by a few stems of *Agropyron.* It contained two young about two days old.

Fig. 11. NEST AND EGGS OF DESERT HORNED LARK.

At any slight noise they would strain their necks upward with their mouths open, uttering an *ihh* sound, audible only a few feet. Length of extended wing of *a,* the larger, 10.5 mm.; of *b,* 10 mm.

April 25. Skin of young, dark purplish, tinged with pink; down, creamy-white, 6-8 mm. long; eyes open. Egg-tooth present; this remained until after the young had left the nest. Neither of the parents came near the nest.

April 26. Pin-feathers starting from back of neck and back, but none on wings; extended wing of *a,* 22 mm.; of *b,* 20 mm.; lining of mouth, reddish orange. Each nestling uttered the previously mentioned sound when holding up its mouth for food.

April 27. Pin-feathers starting on primary area; wing of *a,* 23 mm.; of *b,* 22 mm. The sun shining on the young caused them to breathe heavily; they no longer extended their mouths for food on false stimuli.

April 28. The two young almost filled the nest cup; extended wing of *a,* 30 mm.; of *b,* 27 mm.

April 29. The feathers were growing rapidly, the secondaries being 10-12 mm. long. The tips of the body feathers had emerged from the bluish-black sheaths 2 to 3 mm. all over the body; the exposed part was ochraceous to whitish. The color of the beak had changed from blackish to grayish black, with the egg-tooth yellowish-white. Down still clinging to the head, upper wing-coverts and secondaries. Wings of both, exclusive of feathers, 4.4 cm. When the observer was within 5 feet of the nest the young suddenly extended their heads with their mouths wide open, but instantly perceiving their mistake, drew back, huddling motionless with the eyes closed.

April 30. Wings of young 4.8 cm. long; feathers of back expanded 3 to 4 mm. from the sheaths.

May 1. At 8:00 a. m. a wet snow 2 inches deep covered the territory; the temperature was 36° F and the young were wet and evidently uncomfortable. The general color of the upper parts was dusky flecked with ochraceous; below white with a slight tinge of dusky across the chest, and yellow on the throat. By 6:00 p. m. all the snow had melted away and the young were comfortable though restless. They seemed to perceive the observer at a distance of 20 feet, immediately crouching motionless.

May 2. Visit at 8:00 a. m. The young had left the nest and were huddling side by side in a small depression about 8 feet from it. The parents flew about nearby, showing much concern. One of the young was collected. The length of its wing, exclusive of feathers, was 5.6 cm.

May 3. The remaining young lark was being fed by its parents in the ruderal association about 150 yards northwest of the nest.

May 8. The family was not again found in the nesting territory until this date. The young bird could fly well and was picking up its own food. The parents were still anxious for its welfare, following it when it took flight. At other times it followed them. On May 14 the family was again found. The young bird could still be distinguished by the black flecks on the back and the shorter tail. Its only note was a thin, high chirp somewhat resembling the *tseet* of the adult. On May 17, the three birds were found roosting within three feet of each other in an open spot about 10 yards south of the nest. They were again seen in the territory on various dates until the last of July. On May 28 it was noted that the dark area across the breast and other characters of the first winter plumage were becoming well defined, and that the *tsit-tseet* call was uttered in a tone similar to that of the parents. The latter now showed less solicitude for its welfare. Once the male interrupted courting activity to chase the youngster far out of the territory.

The second nest was found on July 5, when the female was flushed from it just at nightfall. It was located on the western edge of the prairie-dog colony, and was sheltered by only a small tuft of *Eriogonum effusum*. It contained three eggs.

July 6. One of the eggs hatched; female incubating.

July 7. A second egg hatched by 7:00 a. m.; the third egg remained unhatched at 6:30 p. m.

July 8. The third egg had hatched by 8:00 a. m.; female brooding.

July 9. No changes noted in appearance of young.

July 10. Pin-feathers appearing on back and wings of *a*; eyes of *a* and *b* open. Male parent sang from top of tall sapling recently planted near house in north end of territory. An immature bird reared by this pair in April was feeding in the nesting territory.

July 11. The pin-feathers of *c* had appeared; feathers of *a* expanded 1 to 1.5 mm. by 7:30 a. m. At 6:00 p. m. they had expanded 2.5 to 3.5 mm.

July 12. Young all appeared speckled dusky and yellow above, from the expanding feather tips. Temperatures at 12:00 m. were as follows: air, 89.6°; soil, 129.2°; nest wall, 95°; young,[1] *a*, 107.6°; *b*, 104°; *c*, 107°. They no longer extended their open mouths for food, but crouched motionless with their eyes closed.

July 13. The plumage of the young (fig. 12) was well-developed; down remained only on the superciliary areas and some of the secondaries and upper wing-coverts. By 5:30 p. m. *a* had left the nest; the other two stirred about restlessly.

July 14. At 8:30 a. m. *a* was being fed by the parents about 20 yards west of the nest. When I first looked, the other two were still in the nest. A few

Fig. 12. THE SECOND NESTLING OF NEST *2*, SEVEN DAYS OLD.

minutes later, *b* was crouching in the grass a few yards away from it. Temperatures: air, 75.7°; soil, 59°; young, *c*, 100.4°.

July 15. At 6:30, *c* was still in the nest. A few minutes later it ran out from it and crouched in the grass two feet away. The family was not seen in the nesting territory again.

The third nest.—This nest was located within 6 feet of the car tracks of the road along the south end of the area, on July 11, 1929. Unlike the others it was located in the ruderal association, sheltered by tufts of *Elymus canadensis* and *Psoralea tenuiflora*. There were three young two to three days old in the nest. Pin-feathers not evident, eyes closed. Temperatures of young from 8:00 to 9:00 a. m.: *a*, 93.2°; *b*, 94.1°; *c*, 95°.

July 12. Eyes of all young open; pin-feathers appearing on wings and other parts of body. Temperatures at 7:30 a. m.: *a*, 98.6°; *b*, 98.6°; *c*, 99.5°.

July 13. Quills well grown out and beginning to open. Temperature of *a*, 98.6° at 7:30 a. m.

[1] Taken by mouth. All temperatures Fahrenheit.

July 14. Both parents carrying food to the young throughout the day, visits being made to the nest every two or three minutes.

July 15. Young well feathered. Temperatures at 7:30 a. m.: air and nest wall, 71.6°; soil, 68°; young, *a*, 100.4°; *b*, 95.9°; *c*, 95°.

Temperatures at 1:15 p. m.: air, 89°; nest wall, 113°; soil, 134.6°; young *a*, *b*, *c*, 107°.

July 16. When the nest was visited in the morning, the young larks appeared almost lifeless, their heads lying limp on the side of the nest with the eyes closed. Some enemy bird had picked the tops of their heads so severely as to remove part of the feathers and make the top of the head appear crushed and pulpy. A small hole had been opened in the top of the head of *c*. Only slow breathing and very feeble resistant reactions when handled indicated they were alive. Late in the forenoon it was noticed that the parents were bringing food to the nest as before, one mouthful every 2 to 3 minutes. The young lay with their mouths open, panting on account of the heat. Temperatures from 11 a. m. to 12 m.: air, 89.5°; nest wall, 86°; soil, 86°; young, *a*, 107°; *b*, 107.5°; *c*, 109.2°.

July 17. The young were developed sufficiently to leave the nest, but still showed less vigor than normal nestlings. Temperatures at 7:00 a. m.: air, 74.3°; soil and nest wall, 69.8°; young, *a*, 96.8°. On a second visit early in the afternoon *a* was crouching 4 feet from the nest; *b* was 2 feet from it. When disturbed they uttered a chick-like chirp. The bird with the wound in the top of the head, *c*, still remained in the nest. It lay with the head limp on the side of the nest, the eyes closed; temperature, 89.6°; weight, 263.85 grams. By 5:00 p. m. all the young were gone from the vicinity of the nest.

The fourth nest.—Found May 3, 1930, in short-grass association in south part of area, under a short tuft of *Eriogonum effusum*. Bird flushed after dark; found on nest again three minutes after.

May 4. Four eggs in nest. Weights, *a*, 45 grains; *b*, 44 gr.; *c*, 46.5 gr.; *d*, 45 gr.

May 10. Four young in nest, 3 to 4 days old as evidenced by size and development of pin-feathers.

May 17. Young large enough to leave nest. Weights, *a*, 248 grains; *b*, 253 gr.; *c*, 288 gr.; *d*, 248 gr. During the latter part of the forenoon a strong wind and a heavy wet snow brought the temperature down to 33°. Temperature of *a*, 56°; of *b*, 60°; *c* and *d* were barely alive; their temperatures were not taken.

May 18. Two of the young were dead; the others quite well. One, *a*, left the nest in the forenoon. The temperature of the remaining bird was 107° at 1:00 p. m. and 100.4° at 5:00 p. m. It left the nest before nightfall.

By May 4, of the summer of 1929, a pair of Burrowing Owls (*Speotyto cunicularia hypugaea*) had begun nesting activities in one of the burrows of the prairie-dog colony. By July 1, four young owls appeared at the mouth of the nesting hole. They were there at all times of the day, the parents always busy bringing food to them. They could be heard uttering a *shh-shh* call at all times except late in the evening when the parents took them on excursions into vacant lots some distance from their home. At no time, to my knowledge, were the larks disturbed by the owls. The second nest was about 70 yards from the nesting burrow, while adult larks were often picking up food within a few yards of the owls; but the latter never showed any inclination to pursue them.

Summary.—It is evident that rate of growth and length of time spent in the nest by nestling Desert Horned Larks varies according to the time of the year. The

young of nests 1 and 4, in the months of April and May, respectively, remained in the nest at least ten days, while those of 2 and 3, in July, stayed in the nest not more than 7 days. The size attained appeared to be comparable in all instances. As has been noted before, by various writers, the nesting material varies in kind and amount at different times of the year. The first nest had a lining of thistle-down, contained 1505 pieces of material and weighed 16.75 grams; the second had no lining, was built of 805 pieces, and weighed 7.7 grams.

The temperatures of one brood showed a diurnal rhythm as has been noted in other species of birds. Their temperatures were highest in the early afternoon. The rise seemed to correspond with the rise in the temperature of the surroundings.

A local pair of Burrowing Owls did not prove to be enemies of the larks. The second brood of larks studied was reared well within the hunting range of these owls, while the latter were hard-pressed to feed a family of four youngsters as large as their parents.

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