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HABITS AND NEST LIFE OF THE DESERT HORNED LARK

WITH FIVE ILLUSTRATIONS

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These notes were first written a number of years ago. In the meantime an exhaustive study of the horned larks of the closely allied race *Otocoris alpestris praticola* has been made by Dr. Gayle B. Pickwell (Trans. Acad. Sci., St. Louis, 27, 1931, 153 pp.). There is probably little that is now really new in the time-worn notes here presented, but they do indicate conditions peculiar to the Montana prairies. The observations, necessarily casual, were made in Teton County, Montana, beginning in the fall of 1914. The nests that were found there during four nesting seasons were described in detail in the *Condor* for March, 1935 (37, pp. 56-64).

Horned Larks were present in Teton County throughout the winter, though the species was much less abundant at that season than in summer. The majority of the wintering larks were probably visitants from a region where the summer ranges of the Desert and Pallid horned larks overlap, rather than typical birds of either race. Possibly some of them were intergrades of *O. a. arctica*, *O. a. leucolaema* and *O. a. hoyti*; but typical individuals of the Desert race were undoubtedly present in midwinter. During the month of February (1916) birds were observed with all degrees of throat coloring, from bright yellow to pure white.

The dates of fall migration are difficult to determine. It seems probable that the larks continue to move slowly southward as long as the mercury continues to descend; and if this is so, it brings the wintering birds gradually from farther north to replace, though in less numbers, the departing summer residents. On the return migration the north-bound birds arrive in flocks early in March and soon become common.

Whatever may be the status of the intermingled races at other seasons of the year, it is the Desert race (*Otocoris alpestris leucolaema*), breeding on the Teton slope south of the Teton River, with which the following observations are concerned. My cabin there was one more human habitation thrust among them on their ancient nesting ground—a short-grass area of high, dry bench-lands.

The larks, being strictly ground birds, are walkers and runners; they never hop. They walk with surprisingly long strides, as evidenced by their footprints in the snow. They run along a prairie road ahead of any human wayfarer who may happen to be traveling there. When standing on the ground, especially when feeding, they persistently keep their earth-colored backs turned toward the human observer so that it becomes quite difficult to obtain a front view of them. They have a way of standing as high as possible on their legs and stretching up their necks to look about.

They take their dust baths on the little bare spots in the prairie sod. They sleep on the ground; I often flushed them from their roosting places after dark. Frequently they alight on a stone or other slight elevation; and, with the coming of the settlers, they avail themselves of the higher lookouts afforded by the flat tops of the fence posts. They undoubtedly destroy quantities of weed seeds; and in the nesting season they feed larvae to their young.

The song of the Desert Horned Lark is so cheerful and hearty that it is always a welcome sound. There are two common forms of song. The first and more musical of these bears some resemblance, in its general form, to the song of the Dickcissel. It is commonly heard throughout the day. The other is a "chattering song" which sounds like a series of alternate inhalations and exhalations, the notes being similar to the first notes of the Dickcissel song. When they fly, the larks usually utter a song, and they have a call, somewhat similar to the traveling notes of the goldfinch, which they sing out when traveling on the wing. At dawn and after sunset, the singers join in a general chorus. There are times of atmospheric calm when the singing of many birds in concert must surely arrest the attention and stir the fancy of any prairie dweller. One evening in April there was such a special occasion, when no other sound came over the prairie, and the larks were singing everywhere. They all poured forth their "chattering song." It was past sunset and they continued to sing through the dusk until almost dark, the chorus then gradually subsiding.

The springtime ceremonies of the horned larks are especially interesting by reason of the aerial maneuvers performed by the birds. The most remarkable of these maneuvers is the song flight, in which the male bird rises to such a height that he is barely visible as a speck in the sky. The ascent is not a uniform flight but is rather, a series of steep rises, with rapid wing beats, alternated with brief coasting intervals during which the wings are closed. It proceeds, usually, in the course of a wide helix, thus carrying the bird slowly around in the arc of a circle as viewed from beneath;

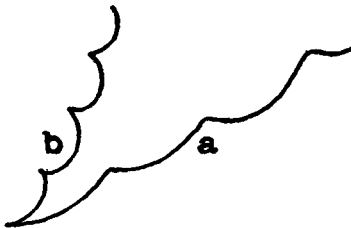


Fig. 8. Diagram illustrating variations of steepness of ascent in the song flight of the Desert Horned Lark: (a) usual course; (b) course against a strong wind.

but sometimes when a strong wind is blowing, the bird faces continuously against it, and the resultant course may then be almost vertically upward. The steepness of the stairs he climbs depends upon the wind, and probably also on the bird's experience and individual preference (see fig. 8). As he continues to mount higher and higher he occasionally utters his song. The aerial song is commonly the one having the form of the Dickcissel ditty, but sometimes both that form and the "chattering" form of song are employed while the bird is at his greatest height.

After remaining aloft for a time, singing his best song, which comes to the human ear but faintly from so great a height, the bird suddenly folds his wings and drops like a bullet. With ever increasing velocity he descends until one might fear for his life; but he spreads his wings just in time to avert a violent end, skillfully turning his course into a glide which carries him horizontally, near the ground, until his momentum has been spent. He then alights quite easily, as though nothing important had happened. The velocity of the vertical descent is so great that it produces a distinctly audible sound. By looking quickly, upon hearing the whiz of a diving lark, it is possible to see the bird on the final glide. I doubt that the bird world holds a more awe-inspiring event than this headlong drop from the sky. It far surpasses the perform-

ance of the nighthawk, though the nighthawk's dive ends with a "boom," while the final glide of the lark is silent. The song flight is not confined to any particular time of day. It may be witnessed occasionally in the evening.

One March day, the 10th, I watched what seemed to be the practice of an inexperienced youth. Mounting only about as high as the longspurs, he maintained this elevation, repeatedly singing the usual song and occasionally pretending to make a dive, which was no more than a little swoop. After practicing thus for a time he mounted about half as high as the experts go, made several false swoops, then folded his wings and made the descent very creditably, swooping out over a plowed field to alight.

Another ceremony of the season is the fighting exhibition, which takes place in the air a few feet above the ground. The two males engaging in it begin their advance and attack while on the ground but immediately rise together in a whirl and flutter of gallantry. At first sight these affairs appear to be real fights; I thought they were waged in dead earnest; but more careful observation convinced me that they are ceremonial combats, rather than real fights. There seems never to be an injury, nor even a victory. I have never seen a drop of blood drawn or a feather lost in the encounters. But the tilts are waged with such great persistence that they might well be tests of endurance. On one occasion, larks which were going through their "show fights" near the cabin on the 13th of March kept it up during the 14th and 15th.

The third sort of maneuver is an exciting chase. Two, three, or four birds usually take part in it. They fly in close formation with great swiftness and remarkable skill. It looks like a game of follow the leader, with instant response to every change of the leader's course—a course of rapidly changing, meandering curves.

The ceremonies sometimes begin very early in the season. In the second year (1916), during warm weather which occurred from the 13th to the 27th of February, I several times heard the projectile-like whiz of a diving lark and saw the bird alight. In the same period birds were seen in two's and three's engaged in the swift sinuous chase. The characteristic song was frequently heard. But by the second of March the weather had turned cold and all of these antics had ceased. The song flight was observed again, however, several times before the middle of March.

In general, the song flights are at the height of their popularity about the middle of April, and they have been noted up to the ninth of May. One summer a lark was observed singing the flight-song in the evening of July 19, but the flight was not a very high one, and I did not see whether he finished it with a dive. The first "show fights" were noted March 13 the first year, and March 16 the second year, from which it appears that these affairs begin later than the song flights. On the 17th of the same month four larks were flying together in the rapid chase. The earliest indications of actual nesting were in the second year, when the horned larks began excavating cavities for their nests the first week in April. Cavities were found April 4, 5, 6 and 7, one each day.

The finding of a nest was often by accident; some nests were found by searching. In several instances no bird was in evidence to show ownership. One bird was seen to poise above her nest and alight there to inspect her eggs, thus disclosing the location. Somewhat less than one-fourth of the nests were found by flushing the parent bird or by seeing her fly away.

The habitual subterfuge of the birds when a human intruder is near the nest is to feign disinterest. They will walk about in the short prairie grass, at a considerable distance, pretending to be industriously engaged in picking food from the ground or vegetation. Sometimes both birds engage in this ruse. At a newly found nest, after I had withdrawn from the immediate vicinity, the lark ostensibly searched for food

among the grass tufts and worked her way back and forth in the vicinity of the nest, gradually getting nearer to it. This continued during the entire time that she and I watched each other, which was nearly half an hour. In some cases there is not much of the feigning; often the birds keep hidden from sight.

The nest-building habits, as reflected in the nest itself, its situation, concealment, excavation, structure, lining, orientation, dimensions, and the placement of pieces of sun-baked mud crust, were noted in the previous article. Most interesting of these matters is the habit of placing the flat cakes of mud crust at the entrance side of the nest, and sometimes around the rim. The constancy with which the nests face approximately toward the east is also especially noteworthy.



Fig. 9. Desert Horned Lark on lookout rock near nest number 38; photographed on July 23, 1916.

During the period of nest life, both parents are usually very watchful for signs of danger; but there is a great difference in individuals in regard to shyness. While some do not show themselves, others seem quite fearless after a little acquaintance. At three nests I was unable to catch a glimpse of the birds, though at one of these the parent had evidently slipped away from her warm eggs while I was approaching. A certain pair of larks with young in the down and pin feather stage never visited their nest while I was watching. At another nest, neither of the birds could be found until three days after incubation of the eggs had started.

In pronounced contrast, one bird came into her nest while I sat near it; another stood about ten feet away while I inspected her two eggs and afterward permitted me to pass within four feet of the nest as she sat incubating her full clutch of four eggs (nest 54, described in previous article). Two other incubating birds permitted me to see them sitting in their nests. A nest which was built only a few rods from the cabin seemed to promise sociable neighbors, but the female stood up whenever I came outdoors; and would fly if I approached within thirty or forty feet of her.

A horned lark of most striking temperament was flushed one evening in April of the first year. This bird ran along the ground uttering notes of distress and feigning a disabled left wing which she held out from her side as she ran. There was no nest, only a bare spot scratched in the ground that seemed to mark the beginning of an excavation.

The hardships of rain and cold weather seem to make for larger families. The spring of the third year was the most backward that any settler in the neighborhood could remember, and it was extremely rainy, following a winter of much more than normal snowfall. The small prairie meadows near at hand became ponds of water which persisted for a long time and were frequented by waterfowl. Nature seemed to favor her marsh and water birds, at the same time placing every obstacle in the way of the larks. During that season I found seven sets of four eggs of the Desert Horned Lark and only two sets of three. The other three years, all together, brought to light only seven sets of four, as compared with thirty-one sets of three.

The eggs are usually deposited in the morning; in one instance between 8:00 and 9:00 a.m.; in another before 7:00. In general the eggs all hatch on the same day, though two exceptions were noted. In one of these instances the parent had been sitting in the nest (nest 38) before the clutch was complete. Counting from the date of completion, the hatching date was $9\frac{1}{2}$ days thereafter for the first egg, and eleven days for the last one. The normal period of incubation is ten or eleven days, as noted at other nests.

Apparently the male never assists in the duty of incubation, but both parents take part in feeding the young as soon as the eggs have hatched. The food for the young is evidently of a solid nature from the beginning. A parent was observed carrying a smooth green caterpillar in the afternoon of the day of hatching. Large larval insects are fed to the young birds after they are strong of flight. Parent birds were seen carrying excreta away from the nest when the nestlings were two and three days old.

The earliest aspect of the infant larks was disclosed by an egg hatched in the hand. Taken from a nest one morning late in June, the egg was kept in a warm place. The following day at supper time it plainly was cracked around the middle. The crack widened; and about nine o'clock, while the egg rested in the palm of my hand, the chick managed to wriggle out of the shell. It felt cold to the touch. When it had been warmed between my hands, it soon became more active, and in less than half an hour held up its head and opened its mouth. There were three tiny black spots on its tongue, and a black spot on the inside of the lower mandible at the tip. Soon the little creature began to repeat the lifting of its head at regular intervals of about twenty-four seconds, keeping its mouth open four seconds each time. Later, this rhythm was broken and the intervals became irregular, varying from ten to forty seconds.

At hatching, the young bird showed only a few thin, moist threads about its back and head. In half an hour these had begun to unfurl and separate, some of them having been twisted together by a complete turn or more. Each of the delicate filaments of down, when viewed under a strong magnifying glass, showed numerous finer branches.

Within three-quarters of an hour from hatching, a clear chirp or "whit" could be heard when I held the infant close to my ear. The chick was supplied with warmth through the night in a cotton-lined box in the writer's bunk. Next morning it emitted a speck of excrement although it had not taken any food. When it was ten hours old, nearly all of its natal down was dry, fully three-eighths of an inch long, and very fluffy—a marvelous transformation!

From this stage on, development is surprisingly rapid. The skin, above, is blackish; but at the age of one day the upper surface of the nestling seems covered with the curious long, buffy down. At two days the rapid growth has become especially noticeable. The eyes may begin to open. The long, dead-grass-colored down, though it grows only on certain tracts in decided bunches, appears to cover the whole body of the young bird as it squats in the nest. When three days old the skin has become noticeably blacker and some "pins" are beginning to appear. The nestlings stretch



Fig. 10. Desert Horned Lark nestlings four days old, on May 21, 1915, in nest number 8.

up their open, orange-lined mouths and utter little squeaks. By the next day pin feathers are coming through the skin on all the feather tracts. At the age of six days three youngsters fill the nest; they are covered with a combination of down and pin feathers which exactly matches the dry grass in general color effect. At the age of seven or eight days the nestlings are fairly well feathered and the natal down is confined to the feather tips.

When nine days old, though the young larks are well feathered, the protective coloration remains perfect. All feathers on the upper parts are blackish, broadly tipped with dead-grass color. The feathers of the underparts are white. The tail is about three-eighths of an inch in length. One nestling which I placed outside the nest ran through the grass and squatted six or eight feet away. When ten days old the young have left or are, in most cases, leaving the nest. They are not able to fly but can run very well. It appears that they usually leave in the fore part of the day.

There is evidence that the young sometimes venture out of the nest for a short



Fig. 11. Desert Horned Lark nestlings seven days old, on June 21, 1915, in nest number 20.



Fig. 12. Desert Horned Lark attending young in nest number 8; photographed on May 21, 1915.

distance before they are ready to leave it permanently. There was much excrement in the vicinity of one nest (nest 12) to a distance of a foot or two, while the well feathered young were still in the nest. At a nest in a pastured area I found two young squatting side by side, in true brotherly fashion, a few inches from home. In another instance the brothers had gone in different directions, ten feet and six feet respectively, and doubtless they had no intention of returning.

It is easy to identify the horned lark nestlings, at any stage of their development, by looking into their mouths. The mouth lining is orange, and there are distinct black marks in the mouth and on the tongue. This distinguishes them at once from the nestlings of McCown and Chestnut-collared longspurs, which have plain pink mouths and throat linings. When the young larks have grown up, the orange color fades and the black marks disappear.

The first young are on the wing in the early part of May, my earliest records being May 9, 5 and 11, in the first, second and fourth years, respectively. By the middle of June, or soon thereafter, when the young are fully grown, it is common to see them in family groups, the young following their parents. In flight, the immature birds then show white margins at the sides of their tails, while the tails of the adults show only black at the outer edges.

On their nesting grounds the Desert Horned Larks have to contend with their share of enemies and sources of accident. Among the natural enemies, weasels, skunks and ground squirrels came to my attention, not to mention man, whose poisoned baits set out for ground squirrels apparently kill more birds than spermo-philus. One day, by quick action, I intercepted a weasel on his way to a nest to get the last nestling. The birds, of course, are powerless to defend their young against weasels and skunks. It is believed that the abundant ground squirrels often destroy eggs, and possibly sometimes take a nestling; but the adult larks are not afraid of them. It is common to see the larks driving a trespassing squirrel away from their premises. They go after him from the air, in a series of dashes; and quite often the two birds attack together.

The barbed wire fence, new in part of the region when these notes were made, was a source of unexpected danger. Several carcasses of horned larks were found at different times beneath wire fences. One evening at dusk, while walking along a fence, I was startled to hear the top wire suddenly vibrate as though struck a violent blow. Looking quickly, I saw a horned lark fall to the ground. It was instantly killed. A very slight wound on its throat showed the point of impact. On another occasion an immature bird was found hanging by one wing from a barb. The momentum of this bird's flight had turned its body upward around the wire, winding the broken wing once around it.

Storms cause the greatest destruction of nestlings. Eggs and young are kept dry during all ordinary rains. But in some years the destruction of nests by severe and protracted storms is doubtless, over an extensive region, practically total. A continuous rainstorm of three days duration, coming first from the east, then from the north and finally from the northwest, killed all nestlings that were known to me. When the storm was over I found one young lark at the edge of the road, that had survived in good condition. Although too young to fly it had perhaps been out of the nest, and able to run, before the storm began; for it must have found effective shelter somewhere. During the driving rain storms, numerous horned larks and longspurs found refuge in the lee of my cabin, sometimes at the doorstep by the open door.

Excelsior, Minnesota, November 3, 1935.