

Henslow' Sparrow to the clear, plaintive, whistle of the White-throated Sparrow, and the serene, spiritual hymn of the Hermit Thrush. While the simpler, more primitive songs are given forth only during courtship excitement, it is evident that many, especially the more complicated and aesthetic ones, although at their best and sometimes elaborated or extended under courtship excitement, are often continued and repeated for the mere enjoyment of the performer in his own music. The autumnal recrudescence of the amatory instinct, often displayed in song, is well known.

The subject of bird song is one apart by itself, and I have alluded to it in this brief manner merely to round out the classification, made in the beginning of this paper, of *display*, *dance* and *song*—the important features of bird courtship.

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OBSERVATIONS ON THE HABITS OF BIRDS AT LAKE BURFORD, NEW MEXICO.

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(Concluded from p. 247.)

19. **Botaurus lentiginosus** (Montagu). AMERICAN BITTERN.—One was heard pumping in the rushes several times on the morning of May 29. Another was found at the first of the small lakes in the canyon below on June 11. It was pumping also so that it is possible the Bittern breeds here.

20. **Ardea herodias** Linnaeus. GREAT BLUE HERON.—Present during migration. Three were seen on May 29, and one on May 30 and June 3.

21. **Egretta candidissima candidissima** (Gmelin). SNOWY HERON. Found at Lake Burford during migration. One was seen at the crossing of the Brazos River below Park View, N. M., on May 23, and another was observed at Lake Burford that evening. Two were noted at the lake on May 26, and another was seen on the morning of June 5. One flew past the cabin several times on the evening of that day and finally alighted in the rushes nearby where it was collected. It was an adult

female in full plumage, with the ova showing some development. It seems probable that these birds were on their way to the mouth of Bear River at the northern end of Great Salt Lake, Utah, as that is the only interior breeding colony in the region. These late migrants would reach there in time to form the breeding units that came in to the colonies as late as the middle of June.

22. **Nycticorax nycticorax naevius** (Boddaert). BLACK-CROWNED NIGHT HERON.—Fifteen pairs of these Herons were found at Lake Burford and at the time of my departure were preparing to breed in the rushes at the upper end of the Laguna de la Puerta. It is possible that there may have been another colony established later at the main lake. A few were present when I first arrived at Lake Burford, but they did not become common until May 29. Birds were flushed from the rushes during my work along the lake shore or were seen occasionally, five or six together, enjoying the sun on open beaches. In evening they flew back and forth in front of the cabin to convenient points from which to watch for the water-dogs (*Ambystoma*) that with frogs formed the only food-supply available here. On one occasion while I was sitting in a blind in the rushes a Night Heron flew by and spying a dead Axolotl floating in the lake alighted on the water (where it was six feet deep) to seize the water-dog in its bill. After resting thus for a minute the bird rose easily from the surface and flew off with its prey. It was somewhat of a surprise to find the Night Herons acting as scavengers, but they kept the dead Axolotls well cleaned up until the last part of my stay, for though I saw many floating on the surface of the water, comparatively few were found at any time washed up along the shore.

The birds often were found during the day time watching for water-dogs in the shadow of rocky points. Until the first of June I thought that at times they were rather hard-pressed for food for, as the water was cold, the *Ambystoma* seemed still inactive, and dead ones had not appeared on the surface in any numbers.

Night Herons in second year plumage were seen at intervals.

23. **Rallus virginianus** Linnaeus. VIRGINIA RAIL.—One was heard calling on May 25 and one was flushed in a narrow band of tules on the lake shore on May 27. Others were heard calling on June 7, 10, 11 and 12, so that it is possible that one pair at least nested here.

24. **Fulica americana** Gmelin. AMERICAN COOT.—Next to the Eared Grebe and Yellow-headed Blackbird the Coot was the most abundant breeding species here and it was estimated that 150 pairs in all were nesting at the lake. Many were in pairs on the date of my arrival, but until June 5 small flocks of unmated birds remained feeding in the open bays or rested in little bands on open beaches. Toward the latter part of this period these flocks at short intervals presented a scene of great animation as the birds displayed and fought savagely with one another. A little later on the companies broke up entirely. Each male selected an

area of shoreline in the tules and remained near this constantly, guarding it jealously, taking frequent occasion to drive away ducks and Eared Grebes who might chance to trespass, and having many fights with neighboring males. In these encounters they drove at each other with heads extended on the water and the wing-tips elevated. When near they began striking viciously with their bills and then, lying back, struck heavily first with one large foot and then the other, a most effective means of fighting as their claws were long and sharp, and their leg muscles powerful. Each tried to guard against these blows by seizing the feet of his antagonist so that often the two held each other by means of their feet, while they thrust savagely with their bills. The females frequently took part in these squabbles also, so that sometimes three or four birds were engaged at one time, while neighboring males came rushing up also seeming minded to interfere. When they separated the males sometimes rested for several minutes with heads down on the water and wing-tips raised, eyeing each other like two game cocks.

Their mating actions were interesting. Males frequently rushed after females, paddling over the surface of the water with flapping wings, while the females made off in the same manner, ten feet or so ahead. Frequently the females made merely a pretense at escape, striking out with their feet and making a great splashing but traveling slowly, but if too closely pressed they dove leaving the males looking about for them on the surface. In the most common act of display the male came paddling out with head and neck prostrate on the water, wing tips raised high above the tail, and the tail spread and elevated so that the white markings on either side were very prominent. As he came near the female usually assumed the same attitude. When two or three feet away the male turned and presented the prominently marked tail to the female, swimming off slowly and then returning to repeat the performance. This action was seen constantly whenever coots were under observation. Paired birds often swam toward one another from a distance of several feet with heads extended on the water calling *kek kek kek kek*. As they met they assumed a more erect attitude and then as they brushed against one another and turned about they dabbled in the water with quick jerks of the open bill that threw drops of water from side to side. Frequently the female reached over and worked her bill gently through the feathers on the male's head and then lowered her head while he preened her feathers in return.

A nest foundation was found on May 29 and on June 3 one bird was observed resting in a completed nest. By June 7 nests were common and by June 12 nests newly begun or containing sets of eggs were to be found in every projecting point of tules. In building the female arranged the dead stems of the round-stalked *Scirpus occidentalis* to form a platform, bending them over and striking them repeatedly with her bill to make them stay in position, causing a peculiar knocking, hammering noise that at this season was to be heard in the rushes on all sides. Frequently

the first one or two eggs of a set were laid on a mere platform and the completed nest built up later, depending perhaps upon the need of the female for a place to deposit her eggs. A complete set of seven eggs with incubation begun was seen on June 7 and after this sets were common. The males seemed to take no part in nest building, but stood about in the rushes a few feet away. This guard continued as the eggs were laid and incubation began. When the females were on the nest it was amusing, as I approached slowly in the boat, to see the males stalk truculently down and slide into the water, eyeing me closely all the while. Frequently at this season they rose on the surface of the water, treading heavily for a few strokes, making a loud turmoil in the water and driving themselves backward for a foot or more with the force of the effort, apparently a threatening act intended to frighten away an intruder.

Many of the nests were mere floating platforms anchored among the tule stems in two or three feet of water so that I was able to pass a boat paddle beneath them without meeting with any obstruction. Some were built in exposed situations where they were visible on all sides, so that the birds evidently have no fear of enemies approaching from the water. Incubating females frequently sat closely, allowing me to pass within a short distance, but took care to turn their heads so as to conceal the prominent white bill. One nest examined in an isolated clump of tules was composed entirely of green stems but this was unusual, as it was customary to utilize dried stalks only, even when it was necessary to carry them from a distance of several yards.

One bird was seen eating algae and slime that had collected on dead tule stems floating in the water. It fed eagerly on this material, seizing and stripping one piece after another.

25. *Steganopus tricolor* Vieillot. WILSON'S PHALAROPE.—This species was present here in migration. On May 24 about twenty, most of them males, were feeding on the open water in two small flocks. On May 27 a dozen were found on a mud bar in the upper end of Hayden's Lake. On June 8 two males and a female were found on one of the islands in the lower lake and it seemed as though they might be ready to breed here as the locality was a favorable one. They disappeared at once however, and, though a pair was seen in another locality on June 14, this Phalarope did not nest here this season.

26. *Himantopus mexicanus* (Müller). BLACK-NECKED STILT. Four were found in an open area on the north shore on May 30. They passed on at once.

27. *Catoptrophorus semipalmatus inornatus* (Brewster). WESTERN WILLET.—One was seen on May 27.

28. *Actitis macularia* (Linnaeus). SPOTTED SANDPIPER. The Spotted Sandpiper was found during the spring migration but none nested at Lake Burford, though they bred only ten or twelve miles away, along the Brazos River. Two were observed on May 24, while on the following day

there was a considerable influx of migrants so that about twenty-five were seen. The species was fairly common until May 28 and then decreased in numbers. Single birds were seen on June 1, 3 and 5. On June 18 an adult appeared, probably a bird come from the breeding grounds nearby, the forerunner of the summer migrants.

29. *Oxyechus vociferus* (Linnaeus). KILLDEER.—One pair of Killdeer nested on the western shore of Lake Burford and another pair bred at the Laguna de la Puerta.

30. *Meleagris gallopavo merriami* Nelson. MERRIAM'S TURKEY.—Old Turkey sign was seen in a gulch east of the lake on May 26 and the birds were reported as fairly common farther south.

31. *Zenaidura macroura marginella* (Woodhouse). WESTERN MOURNING DOVE.—The Western Mourning Dove was an abundant breeding species in the forested hills surrounding Lake Burford and often was seen along the rocky shores or in the sage brush. Pairs came down to water on the open beaches, or occasionally flew out and alighted upon floating masses of dead tules and walked down the edge to drink. Males were heard cooing and were seen in the short sailing flights, made with stiffly spread wings that are characteristic of the breeding season. In the early morning many came down on the floor of the open canyon below the lake and sometimes two or three hundred were gathered in a small space. They seemed to prefer the shaded side of the canyon, even though the mornings were crisp and cool. The birds were very nervous here, frequently flushing and flying for short distances perhaps through fear of predatory hawks. Later on in the day they rested in Pinyons or cedars or fed on the ground in the shadow of these trees.

One was found that had been killed by a Sharp-shinned Hawk.

32. *Cathartes aura septentrionalis* Wied. TURKEY VULTURE.—The Turkey Vulture was fairly common about Lake Burford and individuals often were seen soaring above the hills or about the broad sandstone ledges in the canyon below

On June 15 six pairs of these huge birds were seen walking about on a rocky beach where apparently they were looking for dead axolotls that often were washed up here by the waves. I drifted up in the boat until I was within thirty yards of one pair, and others showed little fear even when I landed and walked about. Two walked solemnly down to the water's edge and drank, dipping in the water and then raising the head (but not throwing the bill up) in order to swallow. They clambered over the piles of Potamogeton and algae cast up last year and left on the shore, pecking at it experimentally, pulling off the surface and digging into the interior with their bills as they would into carrion. One, suddenly feeling the warm sun extended its wings and spread its tail, remaining thus for several minutes. On the following day a pair came to search for bird bodies and other refuse at the cabin. It is probable that food was scarce at this time as bands of sheep that had been grazing here had all been moved

farther south into the mountains so that carrion from this source was no longer available.

33. **Circus hudsonius** (Linnaeus). MARSH HAWK.—On May 29, a female was observed high over the lake and one was seen four miles above El Vado on May 31. An adult female was noted at the lake again on June 14. Apparently this species did not nest here.

34. **Accipiter velox** (Wilson). SHARP-SHINNED HAWK.—This hawk nested in small numbers in the pine-grown hills around the lake. A male was seen playing in the air with a Cooper's Hawk on May 26. On May 27 one came darting through the sagebrush near the cabin and on June 2 one was seen in the gulch east of the lake. On the evening of June 6, attracted by an uproar among the Yellow-headed Blackbirds, I found a sharp-shin in the sagebrush just above the lake and shot it. This bird was a breeding female and had both right and left ovaries present and about equally developed, a common peculiarity among hawks of this group. The right ovary had produced two mature ova as was shown by the ruptured follicles and had another partly developed. The left ovary had already produced one egg and had another ovum greatly enlarged. The left oviduct only was developed.

35. **Accipiter cooperi** (Bonaparte). COOPER'S HAWK.—One was observed on a forested hill east of the lake on May 26.

36. **Buteo borealis calurus** Cassin. WESTERN RED-TAIL.—One or two pairs nested in the rocky hills bordering the canyon below the lake. Individuals were seen at short intervals from May 26 to June 14.

37. **Aquila chrysaetos** (Linnaeus). GOLDEN EAGLE.—Single birds were seen three miles above El Vado on May 31 and June 12, and on the latter date a pair of these eagles was observed near the Laguna de la Puerta. Apparently they nest in the rock ledges bordering the canyon below the lake. Limb bones of a Golden Eagle were picked up near the East Bay.

38. **Falco mexicanus** Schlegel. PRAIRIE FALCON.—A pair of these falcons had a nest containing young on an inaccessible ledge high up on the sandstone cliffs bordering the canyon below the lake. The adults frequently came across to hunt along the lake shore and harried the Yellow-headed Blackbirds so mercilessly that these set up an outcry whenever a bird of any size appeared on the skyline. Near the nest these falcons frequently perched in dead trees as well as on the rock ledges. The nest was easily located by watching and following the adults but was on a rock shelf where it could not be reached without ropes.

39. **Falco peregrinus anatum** Bonaparte. DUCK HAWK.—A pair of these swift-flying falcons had a nest in the canyon south of the lake and the adults were observed hunting at the lake and in the open country around it. The young left the nest about June 10 and were heard calling from rocky points nearby for a day or two afterward. One was shot from the boat on June 15 but was lost as it fell in a great expanse covered with sagebrush above a shale bluff.

40. **Falco sparverius phalaena** (Lesson). DESERT SPARROW-HAWK. The sparrowhawk was fairly common about Lake Burford and one or two were seen daily. One fed much of the time on a small flat below the cabin where it seemed to be catching the abundant grasshoppers. Often it perched on anthills or clumps of dead rushes in default of other resting places. On June 10 one was seen pursuing a magpie through a grove of cedars, striking at it repeatedly. These little falcons delight in playing with other hawks and were seen darting down at Redtails and Cooper's Hawks as they circled about in the air.

41. **Bubo virginianus occidentalis** Stone. WESTERN HORNED OWL. Horned Owls were fairly common in the timbered gulches above Lake Burford. On two occasions birds were heard hooting during the early forenoon and June 15 several were heard calling in the evening. On June 16 one was seen in a gulch east of the lake, and a large nest in the top of a Yellow Pine nearby may have belonged to this bird. That evening at dusk as I sat in the grove of Cottonwoods above the cabin a Great-horn came flying down from the hills above and alighted in the top of a tall dead tree over my head. It eyed me closely when I squeaked, but soon lost interest and continued looking around. Once it scratched the side of its head violently with one foot. After watching it a few minutes I shot it and found that it was a female bird of large size. The wing measured 405 millimeters, and the specimen appears to be typical of the form *B. v. occidentalis*.

42. **Dryobates villosus** (Linnaeus). HAIRY WOODPECKER.—Hairy Woodpeckers were fairly common and were nesting in the forested hills around Lake Burford. A male was seen drumming on a dead pine on June 2 and a female was found near the same place on June 9. One was observed in pines below the lake on June 11 and another came into the grove of cottonwoods above the spring on June 17. None were taken.

43. **Sphyrapicus thyroideus** (Cassin). WILLIAMSON'S SAPSUCKER. Fairly common among Yellow Pines on the hills above Lake Burford. On June 2 I found a pair of these birds east of the lake. The female was working steadily at a new row of drill holes in the bark of a Yellow Pine, where the area covered by old pits was already a foot square. This pair had a nesting hole driven in the trunk of a dead Yellow Pine about 50 feet from the ground, and the male remained on guard near it to prevent House Wrens and Violet-green Swallows that were busy about other cavities in the same tree from usurping it. He made little demonstration save to fly down to the hole and look in when one of the other birds came near it, but this was sufficient as they remained at a safe distance. After each inspection he sidled around on the other side of the trunk from me. The call note of this sapsucker is a low rattling *keh-h-h* given in a somewhat guttural tone. It resembles the call note of *S. varius* in a general way but is given in a stronger, more decided manner, and is louder. On June 16 a female in another location was working at a new row of pits in a large limb of a Yellow Pine.

44. **Colaptes cafer collaris** Vigors. RED-SHAFTED FLICKER. Flickers were fairly common in this area. One pair nested in a dead cottonwood near the spring hole above the cabin and others were breeding nearby. These birds spent much time in feeding on the ground in the sage brush. Ants were very abundant here so that food was easily secured.

45. **Chordeiles virginianus henryi** Cassin. WESTERN NIGHTHAWK. The first nighthawk, a female, arrived at Lake Burford on June 2. A male was heard calling and booming on June 6 and the birds were fairly common until June 16. On the following day there was a great increase in their numbers and evidently the bulk of the breeding birds arrived at this time. These birds frequented the rocky ridges covered with open forest above the lake, but came down over the flats to feed. On the evening of June 17 a number of pairs were seen and males were calling and booming excitedly. Locally it is believed that the male has a hole in either wing that he opens in producing the loud whirring boom, as he dashes down through the air.

46. **Aeronautes melanoleucus** (Baird). WHITE-THROATED SWIFT. The high cliffs of light-colored sandstone in the canyons near Lake Burford furnished suitable nesting sites for these swifts and the birds were fairly common about the ledges. From May 30 until June 4 flocks of them seemed to be in migration and were seen circling high in the air or feeding over the flats. Near the cabin they joined bands of Violet-green Swallows that were coursing back and forth above the sage brush, feeding on the swarms of chironomids driven in here by the wind. A few were collected here but it was difficult to pick them out from the innumerable swallows and shoot before they had darted away out of range. The call note of this bird is a shrill laughing *he he he he* heard usually when two or three are coursing along together.

47. **Selasphorus platycercus** (Swainson). BROAD-TAILED HUMMINGBIRD.—This hummingbird was fairly common about Lake Burford and was seen daily among the pines and pinyons or crossing the flats.

48. **Tyrannus vociferans** Swainson. CASSIN'S KINGBIRD.—This Kingbird was first observed on May 25 and from then on it was fairly common. They frequented rocky hillsides where scattered Yellow Pines rising above the low undergrowth made convenient perches from which to watch for insects and look out over the valleys. The birds nested here in small numbers and males were seen at intervals in crazy zigzag sky dances made to the accompaniment of harsh calls and odd notes, similar to those of none of our other birds. Toward dusk they called constantly their harsh, stirring notes making a pleasing sound that mingled with the songs of House and Rock Wrens, the scolding of an occasional Mockingbird and the cheerful calls of the Robins.

49. **Myiarchus cinerascens cinerascens** (Lawrence). ASH-THROATED FLYCATCHER.—One was found among cedars on a sage-covered hillside on the afternoon of May 26.

50. **Sayornis sayus** (Bonaparte). SAY'S PHOEBE.—Say's Phoebe was fairly common on the open flats below Lake Burford, and was heard calling plaintively in the evenings. Occasionally they were seen hovering over open flats in much the same manner as the Mountain Bluebird. The call note is a whistled *phée-ur*. A nest found on June 9 in a deep, narrow arroyo was placed on a narrow shelf three feet above the bottom, where the overhanging bank concealed it from view. This nest was composed of a few bits of weed stems and rootlets, bound together with spider webbing, and was felted firmly with a mass of sheep's wool gathered from the surrounding sagebrush. The interior was made almost entirely of wool, and was very soft and resilient. It contained four pure white eggs.

51. **Myiochanes richardsoni richardsoni** (Swainson). WESTERN WOOD PEWEE.—The Wood Pewee was fairly common among the Yellow Pines on the hills above Lake Burford.

52. **Empidonax wrighti** Baird. WRIGHT'S FLYCATCHER.—This small flycatcher was common among junipers and pines in the dry hills back of Lake Burford. It was first seen on May 25, but was probably present on my arrival. These birds were found over the dry hillsides above the gulches, perching near the ground, or, at times, mounting thirty or forty feet in the Yellow Pines. Sometimes they hopped restlessly from one perch to another, trying several in succession before being satisfied. The birds were often shy and difficult to approach. The ordinary call note was a loud *tsee-wick*, given almost as one syllable, that when heard near at hand was startlingly like the *chebec* of the Least flycatcher. At a distance however this resemblance was lost. The males had a peculiar jerky song divided into couplets with slight pauses between that may be represented by the syllables *see-wick, tsee-ee, se-wick, tsil-ly tsee-ee*.

53. **Pica pica hudsonia** (Sabine). MAGPIE.—One or two pairs of Magpies nested near the eastern shore of Lake Burford. The birds were seen almost daily and one or two old nests were observed.

54. **Cyanocitta stelleri diademata** (Bonaparte). LONG-CRESTED JAY.—This Jay was common among the Yellow Pines on the hills above Lake Burford. Well grown young out of the nest were observed on June 16.

55. **Perisoreus canadensis capitalis** Ridgway. ROCKY MOUNTAIN JAY.—One was seen on a high hill east of the lake on June 16.

56. **Corvus corax sinuatus** (Wagler). AMERICAN RAVEN.—Common around Lake Burford and nesting along the cliffs in the canyon below the lake. Ravens came over daily to feed along the lakeshore and in the sage-brush above it. On May 28 one alighted near the cabin and picked up and ate several white-footed mice that I had trapped in the cabin and thrown out near the door.

57. **Corvus brachyrhynchos hesperis** Ridgway. WESTERN CROW.—Several pairs nested about the lake and came down daily to the shore.

Here they walked about in the open hunting for beetles, or flew along low over the rushes searching for the nests of blackbirds. The male Yellowheads and Redwings flew up and attacked them savagely but the crows paid them little attention.

58. **Cyanocephalus cyanocephalus** (Wied). PINYON JAY.—The Pinyon Jay was common among the Pines and Cedars on the hills around the lake. During May and the first part of June little parties of half a dozen or more were observed at intervals flying in the open or working through the pinyons. On June 14 a flock of about 100 appeared and fed among the sage-grown knolls until the time of my departure. On the ground these jays walked quickly, holding themselves upright with heads very high. This attitude, with the short tail and general build gave them a striking resemblance to Starlings though the neck appeared longer than in that species. When startled the whole flock flew off by easy stages through the cedars giving their pleasant, curiously modulated call notes. A considerable number of these birds were young of the year, and some of these, though well grown, were still being fed by their parents. In color these young birds appeared distinctly grayer, less blue, than the adults, and their call note was a persistent *quay-quay, quay-quay* that at once attracted attention.

59. **Molothrus ater** (Boddaert). COWBIRD.—The Cowbird was not observed at Lake Burford until May 30, when a female appeared near the cabin. On the following day a male was seen. This second bird took up his residence at the cabin and, becoming very tame, remained within a few yards of it constantly until my departure. When not feeding on the ground nearby he was usually to be found in the top of a low bush near the cabin door. The performance in singing was as follows: the bird would rest quietly for a few seconds, then expand the tail and draw the tip slightly forward, erect the feathers of the back and to a less extent those of breast and abdomen, and then sing *bub ko lum tsee*. In giving the first three notes he rose twice to the full extent of his legs and sank back quickly. After singing the bird relaxed and sat quietly for a short time. At noon on June 1, while watching this bird, I heard a low call like *tsee tsee*, to which the bird under observation responded. At once a second male came flying in, and, suddenly checking when two or three feet from the bush, extended the bill straight up and in this attitude came down slowly to a perch three feet from the first bird. This one at once assumed the same attitude, and the two remained thus for two or three minutes with bills pointing straight in the air, twisting their heads around but seeming never to look directly at one another. Finally first one and then the other lowered his bill and glanced at his neighbor but immediately stiffened up again in the erect attitude. The newcomer gradually relaxed, finally sinking down and fluffing out his feathers to remain almost asleep. The original male then began to sing, opening his wings wide and then closing them again in addition to his other motions, and at times nearly overbalancing in the violence of his display. >

The original male was mated on June 2 and the pair of Cowbirds remained constantly nearby for ten days or more. On June 5 and 6 a second female appeared and fed with the others. The male was seen running at them with his bill pointing straight in the air and then pausing to sing and display. The second female disappeared at once while the pair remained together until June 13. After this the male was seen alone. He continued to sing during the remaining time that I was there but ceased displaying almost entirely. If observations made here are a proper criterion the breeding season for the Cowbird is very short.

60. **Xanthocephalus xanthocephalus** (Bonaparte). YELLOW-HEADED BLACKBIRD.—Next to the Eared Grebe the Yellow-headed Blackbird was the most abundant breeding bird at Lake Burford and the small lakes nearby. It was estimated that in all 210 pairs were nesting here. The adult males were settled in large part on their breeding grounds on my arrival, though many of them were not yet mated. Each selected a stand in the tules at the border of the lake, and, unless away feeding, was certain to be found in the immediate vicinity constantly from that time on. The birds were always tame but certain individuals whose domain I passed almost daily on foot or in a boat soon became fearless and I was able to recognize and look for these in certain spots constantly. At this season the male seems fully conscious of his handsome coloring and in his displays makes every effort to attract attention. In the most common display the male started towards the female from a distance of 30 or 40 feet with a loud rattling of his wings as a preliminary. The head was bent down, the feet lowered and the tail dropped while he flew slowly toward his mate. The wings were brought down with a slow swinging motion and were not closed at all so that the white markings on the coverts were fully displayed, the whole performance being reminiscent of a similar wing display of the Mocking-bird. In flying from one perch to another males often dangled their feet, frequently breaking through small clumps of dead tules with considerable racket. Or they clambered stiffly along, hobbling over masses of bent-over rushes, with heads bent down, tails drooping and back humped, appearing like veritable clowns.

The song of these Yellowheads was subject to much variation, but ordinarily resembled the syllables *Klee Klee Klee Ko-Kow-w-w*, the last low and much drawn out. Their colonies were always noisy, and strange cat-calls, drawn out wailing notes, and chattering protests came to my ears constantly from birds in the rushes below camp as I worked on notes or specimens. The ordinary call note of the males was a liquid *cluck*, somewhat unlike the call of any other blackbird, while the call of the female was more Redwing-like.

Some of the birds had nests on my arrival and by May 28 nest-building was going on everywhere. This task was performed entirely by the females who worked at it nervously and energetically, using wet or damp materials and molding them rapidly into shape. One brood of young had left the

nest, and another nest contained young from two to five days old, on June 14. Most of the birds, however, still had eggs at the time of my departure. The nests examined were all suspended in growing clumps of green tules (*Scirpus occidentalis*) over water from one to three feet deep, and were in danger of being overturned by the unequal rate of growth of the stems which frequently thrust one side of the nest high above the other. The adults seemed to take no steps to alter this condition beyond constructing their baskets with deep cup-shaped hollows to hold the eggs in if possible.

In feeding the Yellowheads gathered in little flocks containing both males and females, and flew back into the sagebrush where thousands of Chironomids blown in to shelter by the wind were gathered. The birds walked quickly along on the ground or clambered over the bushes, picking up the luckless insects and moving along quite rapidly. Sometimes these feeding flocks penetrated a mile or so inland but more often they were found near the lakeshore. Should a hawk appear, as frequently happened, males in the marsh below rose in the air with shrill chattering calls, giving the alarm to their feeding companions. These immediately rose and flew swiftly, low over the slopes, down to the shelter of the rushes. On calm still evenings when the gnats were emerging in numbers from the lake and were flying in toward land the Yellowheads remained in the rushes, and rising at short intervals captured the insects in the air as they passed. During the day flocks of the birds were continually passing up and down the slopes on their way to or from their feeding grounds.

The feet of the Yellow-head are relatively very large with long, strong toes and the birds use them to advantage in walking about on floating aquatic vegetation or soft mud. In the rushes they prove themselves expert gymnasts. Often they alighted near the tips of the tall round-stemmed tules and as these swayed under their weight the birds supported themselves by their wings while they slid their feet quickly down to a new hold, trying several grips until finally they were low enough so that the rush supported them. This was done with great quickness as the birds shifted from grip to grip rapidly. At times instead of sliding down they reached out and grasped a second stem with one foot, dividing their weight between the two and standing suspended with the feet five inches or so apart.

61. **Agelaius phoeniceus neutralis** Ridgway. SAN DIEGO REDWING. —The Redwing was abundant at Lake Burford and it was estimated that 20 pairs were nesting here, scattered along the shore of the lake among the abundant Yellowheads. A nest found near the cabin on June 14 contained four eggs. This nest was placed in a mass of dead tules of last year's growth where it had a secure foundation. Later it was robbed by crows. One male near the cabin in evening often slowly ran along the ground with wings partly spread and half-raised and epaulets showing to their fullest extent, a very pretty display.

62. ***Sturnella neglecta*** Audubon. WESTERN MEADOWLARK.—Meadowlarks were fairly common in open localities about the shores of the lake. On June 11 a nest containing four eggs and two newly-hatched young was found below the cabin at the edge of the marsh, placed in a last year's growth of Foxtail and Salt grass. As several bands of sheep had been trailed through here it was only by chance that this nest survived. Another young bird hatched on June 12 and a fourth one on the following day. The other two eggs may have been infertile as they had not hatched on June 19 when I left the region. The adult meadowlarks savagely attacked Redwings and Yellowheads that chanced to approach the nest site and permitted no intruders whatever.

63. ***Euphagus cyanocephalus*** (Wagler). BREWER'S BLACKBIRD.—A pair nested near a hayfield below the Laguna de la Puerta, where they were observed on May 31 and June 12 and 19. None were found nearer the large lake.

64. ***Carpodacus cassini*** Baird. CASSIN'S FINCH.—A male was seen among Yellow Pines on a high hill east of Lake Burford on June 9. It was perched in the top of a very tall pine and was singing. The song in general was like that of the Purple Finch but was given more rapidly and emphatically.

65. ***Carpodacus mexicanus frontalis*** (Say). HOUSE FINCH.—A House Finch was observed near the eastern shore of Lake Burford on June 16.

66. ***Spinus pinus*** (Wilson). PINE SISKIN.—Pine Siskins were seen in the hills above the lake on May 26 and 28 and on June 16.

67. ***Poocetes gramineus confinis*** Baird. WESTERN VESPER SPARROW.—The Vesper Sparrow was common through the sage brush on the flats and knolls surrounding the lake and males sang constantly around the cabin. On June 6 a female flushed from a nest near the western shore of the lake, ran away along the ground through the bushes with her wings extended and held stiffly above her back. The nest was placed in a small hollow at the foot of a partly dead sage where the trunk arched out over it, protecting and partly concealing it, a needed shield from the trampling feet of sheep that were grazed here. The nest was a large, well-formed cup of dried grasses, lined with finer material of the same nature. It contained two young apparently five or six days old, partly covered with grayish white down.

68. ***Passerculus sandwichensis alaudinus*** Bonaparte. WESTERN SAVANNAH SPARROW.—Savannah Sparrows were found in small numbers in dead weatherbeaten growths of Bayonet Grass near the open shores on the northern and southern sides of the lake. Apparently they bred, as birds were noted here on May 28 and 30 and June 6, but no nests were found. On June 6 a male was singing.

69. ***Chondestes grammacus strigatus*** Swainson. WESTERN LARK SPARROW.—Fairly common in the country near El Vado. At Lake Burford one pair nested on an open flat above the grove of large cottonwoods.

70. **Zonotrichia leucophrys** (J. R. Forster). WHITE-CROWNED SPARROW.—These sparrows appeared in migration in the bushes near the lake on May 28 and remained until June 4. During this period they were fairly common in growths of *Amelanchier* and *Ribes* and were also found in the sagebrush.

71. **Spizella passerina arizonae** Coues. WESTERN CHIPPING SPARROW.—The Chipping Sparrow was fairly common in junipers near the lake shore and was found also among the pines covering the hills back from the lake.

72. **Spizella breweri** Cassin. BREWER'S SPARROW.—The Brewer's Sparrow was one of the most common breeding birds in the extensive sage grown areas surrounding the lake. The birds were seen constantly and males sang daily about the camp. A nest found June 4, placed in a fork in a sage 14 inches from the ground, was a small compact cup of grasses and weedstems, firmly woven externally, and lined with horsehair and bits of fine grass. The three eggs were clear pale green in color, spotted with brown. On June 12 a nest containing two newly hatched young was seen, and the following day another containing three eggs was found. A nest examined June 15 contained four eggs that were apparently fresh, two found June 16 contained two and three eggs respectively, and one seen June 17 contained 3 newly hatched young. All were similar in form and location to the one first described.

The birds themselves were quiet and unobtrusive merely flying up to lookout points on the tips of sage or hiding in the thick growth when disturbed. The song of the male with its shifting repetition of notes reminded me of a vocalist practising scales.

73. **Amphispiza nevadensis nevadensis** (Ridgway). SAGE SPARROW.—Locally distributed and breeding in the sage grown areas. A breeding female was taken May 30 and other sage sparrows were seen on June 4 and 6.

74. **Melospiza melodia montana** (Henshaw). MOUNTAIN SONG SPARROW.—The Song Sparrow in the main inhabited the fringing clumps and growths of dead tules (*Scirpus occidentalis*) remaining from last year, venturing up into the sage brush to feed, or occasionally to nest. In the dead tules the birds made a great rustling in creeping about so that I looked continually for larger birds, when I heard them. A nest found May 28 was placed on the ground in a slight hollow at the foot of a sage about 30 feet above the border of the rushes. It was a slight cup of grasses lined with hair from horses' tails and contained four eggs. I judged from their actions, however, that most of the birds were nesting in the more secure shelter of the tules. A female was seen carrying excrement from a nest on June 1, and June 4 young were heard calling. After this date young became common.

75. **Pipilo maculatus montanus** Swarth. MOUNTAIN TOWHEE.—This Towhee was common on the slopes and in the gulches above the lake,

seeming to prefer for cover, thickets of scrub oak and clumps of *Ribes* and *Amelanchier*. The birds were common on my arrival and males were singing, but they may be late in nesting as a mated female collected June 9 was not yet ready to lay.

76. **Oberholseria chlorura** (Audubon).* GREEN-TAILED TOWHEE.—Fairly common on the sage grown slopes above the lake. Males were heard singing daily, and occasionally the birds were observed skulking about in the dense growth. A nest found on June 11 was placed in a sage about two feet from the ground. It was large and well-cupped in form and was composed externally of grass and weedstems while the lining was made of finer material. It contained three eggs whitish in color, well spotted with brown and lilac.

77. **Zamelodia melanocephala** (Swainson). BLACK-HEADED GROSBK.—This grosbeak was rather rare in occurrence about the lake. Males were observed on June 2 and 9 in a gulch in the hills.

78. **Piranga ludoviciana** (Wilson). WESTERN Tanager.—This Tanager was fairly common among the Yellow Pines in the hills. The song resembled that of the Scarlet Tanager but was short, slightly more broken and somewhat less harsh in tone.

79. **Progne subis** (Linnaeus). PURPLE MARTIN.—Migrant birds were observed above the lake on June 8, 9 and 13.

80. **Petrochelidon lunifrons lunifrons** (Say). CLIFF SWALLOW.—One cliff Swallow was seen with a flock of Violet-green Swallows on May 25 and on the morning of May 26 a flock of 25 appeared. The birds were common from then on. Old nests were observed under the cliffs in several localities but the birds did not begin building this year until June 9. On June 11 they were building nests on the sandstone cliff above the Laguna de la Puerta. The birds came down to the lake shore in little bands of ten or a dozen and alighted close together with trembling wings extended at an angle from their backs, standing high on their legs to avoid soiling their feathers. After alighting they leaned over, filled the mouth with mud with one or two sharp digs and then rose to fly back up the steep slopes to the colony. Males frequently alighted on the backs of the females as they gathered mud and copulation took place while the birds were on the ground. Males as well as females took part in nest-building, as a male shot here had the mouth filled with mud held in a mass in the mouth cavity above the tongue.

81. **Hirundo erythrogastra** Boddaert. BARN SWALLOW.—A male came about the cabin at the lake on June 10, examining ledges under the eaves, and a pair was seen on June 14.

82. **Tachycineta thalassina lepida** Mearns. NORTHERN VIOLET-GREEN SWALLOW.—These swallows came in flocks about the cabin at the lake during May and swung tirelessly back and forth in the wind, barely skimming over the tops of the sage brush, in search of the many Chironomids that had taken refuge there. Often they came beating about me,

**Oreospiza chlorura* of the A. O. U. 'Check List.'

almost passing within reach, so that I heard the soft click of their bills as they seized their prey. On calmer days they circled high in the air or at intervals returned to sweep down over the sage. Occasionally in early morning I saw them resting in little flocks in the sun in the tops of still leafless cottonwoods. By June 2 the flocks of these swallows had retired to the hills where they were found about the limbs of dead yellow Pines inspecting woodpecker holes with much chattering and flying about. The birds then often hovered in the air with rapidly moving bills, the males seeming to endeavor to seize the females by the feet, or the feathers of the abdomen, while others circled about calling excitedly. Cold storms during the first week of June frequently brought them back in flocks to feed over the flats but when the sun came out again they disappeared once more in the hills. After June 7, though fairly common in the gulches above, comparatively few came down along the shore of the lake.

83. **Stelgidopteryx serripennis** (Audubon). ROUGH-WINGED SWALLOW.—Single individuals were observed on May 24 and 25, and a pair was found in an arroyo near the cabin on June 8.

84. **Vireosylva gilva swainsoni** (Baird). WESTERN WARBLING VIREO.—These Vireos were found in the thickets lining the gulches and among groves of aspens. They were not observed until June 2 but probably arrived two days or more earlier, as I found one pair on that date with a nest partly constructed in a chokecherry tree (*Padus melanocarpa*).

85. **Lanivireo solitarius plumbeus** (Coues). PLUMBEOUS VIREO.—The Plumbeous Vireo was common among the Yellow Pines in the hills above the lake on May 26, and was noted on all of my subsequent work in areas suited to it. On May 26, males were in full song, and one was observed carrying a bit of nesting material about with it and singing at the same time. The birds were found entirely in the Yellow Pines and often ranged in the tops of the tallest of these. They continued in full song until the middle of June and then became more silent. Some of the call notes given by this bird reminded me of the chattering calls of *Lanivireo flavifrons* while many notes introduced into the song were similar to some of the phrasing used by the White-eyed Vireo.

86. **Vermivora virginiae** (Baird). VIRGINIA'S WARBLER.—This warbler was common among the thickets of small oaks in the gulches and on the higher slopes around the lake, but was so secretive that it was difficult to observe. The males often sang from the tops of tall yellow pines, where they chose a hidden perch and remained motionless. When disturbed by some one moving about below they flew off for some distance, sometimes remaining in the pines and continuing to sing, or again pitching down into the undergrowth where they were hidden from sight. The song varied somewhat but usually could be identified without particular trouble. An incubating female was shot on June 16. The callnote of this species is a sharp emphatic chip, but though the birds scolded at me frequently it was seldom that they came out in sight to do so.

87. **Vermivora celata celata** (Say). ORANGE-CROWNED WARBLER.—This Warbler nested in small numbers in the gulches below the lake. Apparently it was a late migrant as it was not observed until June 2, when a female was collected in a grove of quaking aspens. On June 9 a male was encountered on an oak-grown hillside over which small Yellow Pines and Douglas Firs were distributed. This bird was rather inactive and often flew up into trees, usually conifers, to remain quiet and sing from some hidden perch. Once or twice while under observation it stopped to rest in the sun on a dead limb. The song, given constantly, was a rapid hurried trill, resembling the syllables *tsee-ee-ee-ee-er-er-er*.

88. **Dendroica aestiva** (Gmelin). YELLOW WARBLER.—This warbler apparently was found at the lake only as a migrant, though it nested along the Brazos River farther east. Single individuals were observed along the lake shore on May 23 and June 1 in willows and small cottonwoods. No specimens were taken.

89. **Dendroica auduboni auduboni** (J. K. Townsend). AUDUBON'S WARBLER.—This warbler nested in fair numbers in the Yellow Pine areas surrounding the lake. Males were found singing from the tops of the tallest Pines and were slow and leisurely in their movements in great contrast to their habit at other seasons. Frequently while singing they remained on one perch for some time so that often it was difficult to find them. The song resembled the syllables *tsil tsil tsil tsi tsi tsi tsi*. In a way it was similar to that of the Myrtle Warbler but was louder and more decided in its character.

90. **Dendroica graciae** Baird. GRACE'S WARBLER.—A small number of Grace's Warblers were encountered at the head of one of the gulches east of the lake, first on June 9, and again on June 16. Males only were observed. In actions and general appearance they reminded me strongly of *Dendroica dominica*. Usually they were found in the tops of the Yellow Pines where they worked about rather leisurely, exploring the smaller limbs and at short intervals pausing to sing. The song was a rapid repetition of notes somewhat reminiscent of the efforts of the Chipping Sparrow, but with the notes evenly spaced, not blurred at the end, and closing abruptly, so that the last syllable was as strongly accented as any of the others. It resembled the syllables *chip chip chip chip chip* given in a loud tone. Occasionally one was found working about through the oak undergrowth at times coming down almost to the ground. The flight was undulating and rather quick and jerky.

Grace's Warblers showed some curiosity toward me but in the thick brush it was difficult to follow them about. The callnote was a very faint *tsip* that carried only a few feet at best, and was so weak and soft that it was hard to locate the direction from which it came, so that birds that could not be found were heard often among the oaks.

91. **Seiurus noveboracensis notabilis** Ridgway. GRINNELL'S WATER THRUSH.—One of these birds was observed at the spring near the cottonwoods on May 23 and 25.

92. **Geothlypis trichas occidentalis** Brewster. WESTERN YELLOW-THROAT.—It was estimated that fifteen pairs of Yellowthroats were nesting around the lake. These birds were found in the tules, usually in that part of the growth that was standing in water adjacent to the shore. They sang constantly, but were so retiring that they seldom came under observation though it was usually possible to call them up into sight in the rushes by squeaking. Occasionally they gave the grasshopper-like trill that is sung so commonly by eastern birds.

93. **Wilsonia pusilla pileolata** (Pallas). PILEOLATED WARBLER.—A few of these birds occurred during migration. A female was shot on May 26 in oak scrub on a dry hillside and one was seen on June 2 near the spring at the cottonwoods. The specimen taken belongs to this form and all other notes are included here.

94. **Oreoscoptes montanus** (J. K. Townsend). SAGE THRASHER.—This Thrasher was observed first on May 29 after which it was fairly common in the areas covered with sagebrush about the lake. Males frequently sang from perches at the summits of the tall sage and the birds were observed occasionally in passing across the knolls and flats. At its beginning the song is somewhat like that of a grosbeak. As the notes wander on, to change and become more intricate, burring calls, that while harsh are not unmusical, creep in as an accompaniment to clearer whistled notes that are varied and pleasing. Low trills and changing combinations mark the song, reminding one of the improvisation of some gifted musician who, playing apparently at random, brings forth tones that follow one another in perfect harmony.

95. **Mimus polyglottos leucopterus** (Vigors). WESTERN MOCKING-BIRD.—The mockingbird was fairly common in the junipers on the flats and in the canyons near the lake. Males were heard singing frequently and one pair nested not far from the cabin.

96. **Salpinctes obsoletus obsoletus** (Say). ROCK WREN.—The Rock Wren was common around the lake and was seen frequently. Long slopes covered with fragments of broken sandstone were their favorite haunts.

97. **Catherpes mexicanus conspersus** Ridgway. CANYON WREN.—On June 2 I found a pair of these wrens about some sandstone ledges in a gulch east of the lake. The female was working busily carrying nesting material into a rock crevice, while the male remained nearby but made no effort to assist her. Once as the female passed him he ran out across the rock face with spread tail, and wings partly open and trailing, giving a low churring note. And at short intervals I heard his fine song ringing through the woods. The female ceased her labors once and sat for a few minutes in the warm sun to preen her feathers, finally resting for some time with eyes partly closed, apparently almost asleep.

On June 9 I examined the nest site and found the female on the completed nest, which however was empty. She remained on the nest until I had nearly touched her, though I had made considerable noise in climbing

along the rock face as I approached. The nest was placed on a small shelf of rock in the top of a shallow cave or hollow in a sandstone cliff. This ledge was about fifteen feet from the floor of the gulch, and the cave was approximately three feet high.

On June 16 this nest contained four eggs. The female darted from the nest as I came up to it and went on away without stopping to scold. The male was singing a short distance away but did not come near. The nest measured 8 inches across the base and 3 inches tall. The cup containing the eggs was $2\frac{1}{2}$ inches in diameter and 2 inches deep. The foundation was composed of a dozen or more small twigs upon which were placed moss and masses of spider webbing with bits of leaves, catkins and bud scales. The nest lining was composed of a heavy felting of sheep's wool, most of it white, though a few bits of dark brown wool were mixed through it. In addition, in the cavity containing the eggs, were a few feathers of Great Horned Owl, Violet-green Swallow and Cassin's Finch. The eggs were translucent white in color, dotted mainly about the large end with small spots of reddish brown.

98. **Troglodytes aedon parkmani** Audubon. WESTERN HOUSE WREN.—The House Wren was fairly common in the wooded areas on the hills above Lake Burford, and was nesting in Woodpecker holes and other cavities in trees.

99. **Telmatodytes palustris plesius** (Oberholser). TULE WREN.—On May 27 a Tule Wren in very worn plumage was seen creeping about in a stand of dead rushes, but no others were observed during the course of the work at the lake. The growths of tules seemed favorable for them in every way so that their absence was rather surprising.

100. **Sitta carolinensis nelsoni** Mearns. ROCKY MOUNTAIN NUTHATCH.—This Nuthatch was fairly common among the pines above the lake.

101. **Sitta pygmaea pygmaea** Vigors. PYGMY NUTHATCH.—The Pygmy Nuthatch was fairly common among the Yellow Pines and was breeding here as incubating females were taken on June 9 and 16. This was one of the few mountain birds that showed marked curiosity and responded readily to squeaking.

102. **Penthestes gambeli gambeli** (Ridgway). MOUNTAIN CHICKADEE.—Fairly common in the Yellow Pine forests about Lake Burford. On June 16 I found a nest of this species in a living quaking aspen in an old woodpecker hole located about five feet from the ground. The tree grew on a slope in a narrow gulch and the nest opening was well concealed in the brush so that I had some difficulty in finding it. Cutting into the nest I found that it contained five young nearly fledged. Later in another locality I saw a female carrying food to young.

103. **Planesticus migratorius propinquus** (Ridgway). WESTERN ROBIN.—The Western Robin nested commonly in the gulches around Lake Burford and one or two pairs were found in the grove of cottonwoods

near the spring. Two empty nests found on June 16 were placed in scrub oaks on sloping limbs about six feet from the ground.

104. *Sialia mexicana bairdi* Ridgway. WESTERN BLUEBIRD.—A few of these birds were found among the Yellow Pines on the hills above the lake. They were nesting here and were observed at frequent intervals.

105. *Sialia currucoides* (Bechstein). MOUNTAIN BLUEBIRD.—The Mountain Bluebird was common about Lake Burford, ranging from the lake shore to the tops of the hills. A nest found May 25 near the cabin was placed in a cleft between two forking limbs of a cedar four feet from the ground. A cavity about ten inches deep had rotted out here and the bluebirds had built in the bottom of it. Immediately beside the opening was a notice printed on muslin, posted by Biological Survey trappers to warn against the theft of wolf traps. The nest when found contained five eggs that hatched about June 3. It was interesting to note that young were found out of the nest among the pines on the hills on May 26, another instance of the fact that the season was farther advanced on the hills than it was in the valley below.

U. S. Biological Survey, Washington, D. C.

NOTES ON THE BREEDING HABITS OF THE RUSTY BLACKBIRD IN NORTHERN NEW ENGLAND.

BY FRED H. KENNARD.

Plates XIX-XX.

WHILE the Rusty Blackbird is a common spring and autumn migrant in New England, and is known to breed along our northern boundaries, but little seems to have been written about its nesting habits, except by Bendire, who has described them in some detail; while its eggs are comparatively rare in collections. Hence, in the spring of 1914, I fell a victim to the blandishments of Owen Durfee and agreed to join him in a hunt for their nests. I had noted Rusty Blackbirds several seasons before, while fishing for landlocked salmon in Essex County, away up in the north-east corner of Vermont, and thither we decided to journey.