THE CONDOR

VOLUME 60 NOVEMBER-DECEMBER, 1958 NUMBER 6

BREEDING OF THE PARULA WARBLER AT POINT LOBOS, CALIFORNIA

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This paper records the first known occurrence of the Parula Warbler (*Parula americana*) in California. It also describes the first two instances of nesting of the species in the state. Our records were made at Point Lobos Reserve State Park, just south of Carmel, Monterey County, on the coast of central California, in 1952. Although no specimen was taken at the time, identification as to species was made certain by numerous observations at close range. Identification in the field was corroborated by J. M. Linsdale, C. G. Sibley, and R. W. Storer, who also saw the birds during their period of breeding at Point Lobos in 1952. Because none of the birds was collected, it was deemed advisable to withhold a full account until evidence of the occurrence of the species in the state could be provided. The recent collecting of a Parula Warbler in California (Gould, 1957) now justifies the publishing of our purely observational account. We observed at least three individuals in Point Lobos Reserve State Park and just outside the park's eastern boundary almost daily from May 18 to July 16. Two nests were found, and it was ascertained that at least one young was fledged from one nest and two from the other.

The topography, habitat types, and vertebrate fauna of Point Lobos Reserve State Park have been described by Grinnell and Linsdale (1936). The park comprises 336 acres and encompasses the entire point of land, which projects about 1½ miles into the Pacific. "As at other places along the coast of central California the most noticeable climatic features at Point Lobos are the moderate temperatures, frequent fogs, and high winds" (*op. cit.*:7). The predominant forest growth consists of Monterey pines (*Pinus radiata*) frequently mixed with coast live oak (*Quercus agrifolia*). "An important feature of the forest here which owes its presence to nearness of the ocean is the abundant growth of lichens, especially *Ramalina reticulata,* which hang from the limbs of nearly all the trees" (*op. cit.*:16).

Initial observations.—The first observation of the species was made by Williamson who, on May 18, saw a male singing on the north side of Rat Hill, a pine-covered knoll within the park just south of its main entrance. On May 23, Williams and Legg, accompanied by R. W. Storer, saw two Parula Warblers on Rat Hill and heard one of them singing the characteristic song of the species, "a steady buzzy trill that rises in pitch and ends in a sharp slurred note" (song type "a" of Borror *in* Griscom and Sprunt, 1957:28). On May 26, Legg again heard the Parula Warbler on Rat Hill and saw a male in pursuit of a female. The birds were also watched in the same general area on May 27, 29, 30, 31, and on June 6. On June 8, a female was watched for ten minutes; it was foraging in a partially dead wild lilac bush (*Ceanothus thyrsiflorus*) on the southeast side of Rat Hill, near the place where nest number 2 was eventually discovered. Also, on June 8, Williamson heard a Parula Warbler singing for some time in the area in which nest number 1 was later found, across the highway paralleling the eastern boundary of the park, opposite Rat Hill. On June 9, a pair was seen in this latter area and watched for one hour and ten minutes. The male sang frequently and pursued the female. At

one time the pair perched on the mass of *Ramalina* which was later ascertained to be the site of nest number 1. We had no difficulty at any time in distinguishing male from female.

The nests.—Nest number 1 was situated outside the park, 80 yards east of the bordering highway. The nest tree, a Monterey pine, stood on a gently inclined northwest-facing slope; it was in a rather open stand of mature pines of this species, interspersed with a few coast live oaks, near the edge of a pasture. There was a rather dense but low understory of coffeeberry (*Rhamnus californica*), poison oak (*Rhus diversiloba*), and blackberry (*Rubus vitifolius*), with some wild lilac, bush monkey flower (*Diplacus aurantiacus*), and snowberry (*Symphoricarpos mollis*).

The nest was situated in a mass of *Ramalina* which was hanging from twigs about 10 inches in from the tip of a limb 10 feet long, growing in a westerly direction from the trunk, at a height of about 30 feet (fig. 1). Except for a few twigs which had live needles, the limb bore only dead branchlets. Almost all of the pines in the vicinity of the nest tree had some lichen streamers on their branches. The chosen nest site, however, was in a mass of lichens which was noticeably thicker and more extensive than those on the other trees, or on the other branches of the nest tree.

Because of its situation, the nest was inaccessible for close inspection. After the young had been fledged, however, the nest limb was cut down. It was then found that the nest consisted of a rather thick-walled, loosely constructed cup, the bulk of which was composed of strands of *Ramalina reticulata,* scantily lined with grasses (?) and a few horse hairs. Visible on the rim and outside edge were several tufts of plant down and a thistle achene. The nest measurements in centimeters were as follows: inside diameter, 3.5–4.0; outside diameter, 6.5–7.0; inside depth, 3.2; outside depth, 4.2. The nest cup was fastened at the bottom to, and stood up from, masses of lichens. These lichens were attached to twigs a few inches above and on either side of the cup rim. Whether these hanging skeins supporting the cup had been woven together by the bird to form the support, or whether they had grown together in this hammock-like formation in the course of their naturally reticulate development, was not definitely determined by us. However, in the field on June 10, we noticed that some strands beneath the area where the nest cup was later known to be situated, instead of hanging directly downward, as were the strands on either side, seemed to have been looped up, as though by action of the bird. The warbler had made an entrance through the lichen mass slightly above and to one side of the nest rim, toward the distal end of the branch.

About fifty-seven hours were spent observing the activities of the Parula Warblers at, and in the vicinity of, this nest, from June 9 until July 16, the third day after a young bird was first seen out of the nest. Nest building may have been under way when the site was first discovered by us. From June 10 to 14, the female made frequent trips to the nest. On some of these trips, she could be seen bearing small bits of material which seemed to be plant down. During periods when the female was in the nest, the whole lichen mass would often vibrate violently and appear to be manipulated from within. Since the bulk of the nest cup was made of *Ramalina* strands, and since we did not observe the transport of such material, we though it possible that these violent motions of the lichen mass, although perhaps caused only by "molding actions," may actually have been due to the pulling loose of strands from the festoon itself and the arranging of them into the nest cup on the spot. After retrieving the nest, we found that it was possible to tease out a strand of lichen and trace it back to the supporting curtain, indicating that the bird had actually followed this procedure. On June 11, a definite silhouette of what proved later to be the nest cup could be seen through the lichen curtains. At 7:21 a.m. on that day, after the female had entered the nest, one of us (Williams)

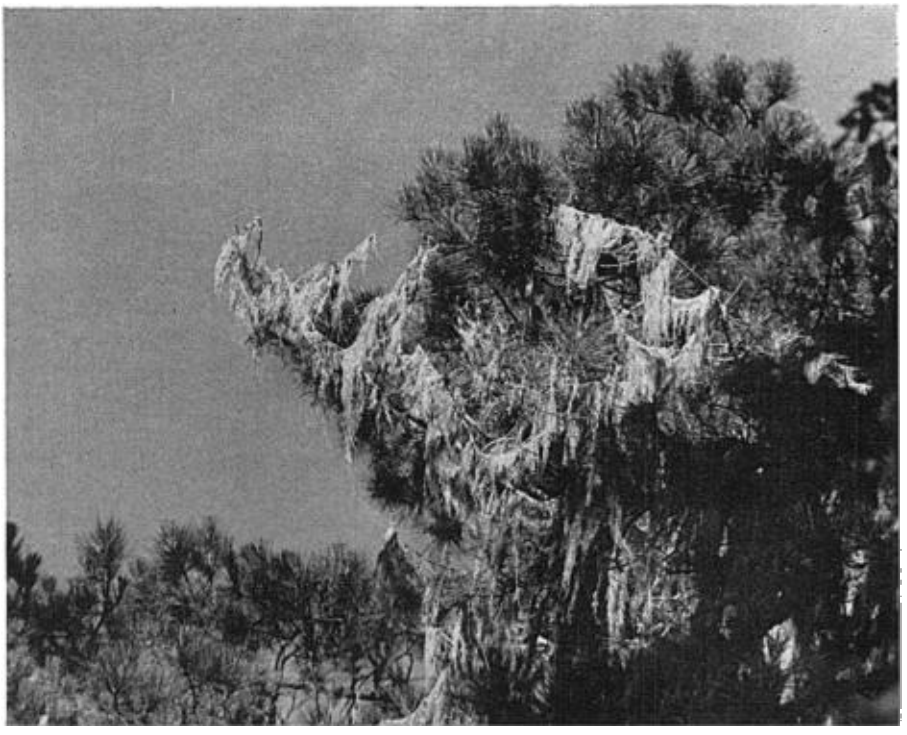

Fig. 1. Site of nest number 1 of Parula Warbler (*Parula americana*), Point Lobos Reserve State Park. Nest was placed in *Ramalina reticulata* hanging from a Monterey pine.

saw her head and bill appear at the nest entrance, at which time she briefly arranged a strand of lichen.

From June 9 to 24, the male was seen and/or heard in the vicinity of nest number 1 on each of the 13 observation days in this period, except on June 19 and 20, when only 15 minute checks were made. Singing was frequently heard within a radius of about 240 feet of the nest tree. The bird sang both the type "a" and type "e" songs of Borror (*in* Griscom and Sprunt, 1957:28) together with what seemed to us to be a variation of type "e." The male accompanied the female on her return trips to the nest at least once per day on June 9, 10, 14, 17, 22, and 24. On these occasions, he often alighted on the nest limb with his mate, but after she had entered the nest he flew off. He was never seen to carry nest material or to enter the nest festoon proper.

After June 24, no male was seen again at the nest tree, nor was any heard singing within a radius of 240 feet. Incubation and the care of nestlings and fledgling(s) were accomplished by the female alone. Incubation was assumed to have begun not later than June 22, to judge by the rhythm of the female's periods on and off the nest.

On July 3, we observed food being taken to the nest for the first time. On July 12, food was still being taken to the nest and only to it. On July 13, a fledgling was seen. It was close to the ground in a *Rhamnus* thicket near the base of the nest tree. The female fed this fledgling, but she also continued to feed at least one nestling whose food calls could still be heard from within the nest. On July 14, in one hour of observation, only one fledgling could be seen. All food was taken to this young bird (18 feedings), except on the occasion of one trip by the female to the nest when it was thought that she

might have fed a nestling from the nest entrance, although no food calls were heard from within. On July 15, no trips to the nest were observed and all food was brought to one fledgling near the base of the nest tree (34 feedings in one hour).

A thorough search of the nest area was made on July 16, but no fledgling could be found. The female, however, was in the immediate area and was carrying food, but she was never seen to deliver it, nor could the food calls of any young be heard. It was presumed, therefore, that although at least one young bird had left the nest on July 13, neither this fledgling, nor its siblings, survived after July 15. Nothing further was known of the female after July 16.

Nest number 2 was situated within the park on the south side of Rat Hill, 145 feet west of the highway and 556 feet southwest of nest number 1. The nest tree was a much smaller Monterey pine than that of nest number 1, and it was growing in a somewhat denser stand of pines. The rather sparse undergrowth consisted principally of a few small, scattered live oaks, some poison oak, and a few wild lilac bushes.

The nest was suspended within a long festoon of *Ramalina* which was hanging from a drooping dead branch and was 15 feet above the ground (fig. 2). An entrance had been made by the birds through an opening at one side on a level with the rim of the nest cup, which was just out of sight behind the curtain of lichens. A twig across the threshold of the opening served both as a partial support for the nest and as a perch for the entering birds. However, it was impossible to determine whether the lichen material of the cup walls was drawn from the surrounding strands of the festoon, or whether it was brought in from elsewhere. The cup was thinly lined with unidentifiable flowering plant material. The nest measurements in centimeters were: inside diameter, 4.0; outside diameter, 6.0–6.5; inside depth, 3.3; and outside depth, 5.5.

The nest was not removed, but, after the fledging of the young, it was examined from a ladder. It then became obvious that at this nest site many of the outer strands of the festoon had been looped up and tucked in to form a foundation under the bottom of the cup. On July 2, the female was seen on three occasions pulling, or arranging, lichens at the nest entrance.

Legg discovered this nest on July 1, five days before the fledging of the young. Eighteen hours and twelve minutes were spent observing the activities of parents and young, at and near the nest, from July 1 through 13, the seventh day after the second of the two fledglings had left the nest.

On July 1 and 2, both parents were caring for the young, the female feeding and brooding, the male feeding the young and singing frequently. The male's rate of feeding the nestlings exceeded that of the female on both days. Both parents removed excreta. On July 3, no observations were made. On July 4, the female was not seen, nor was she seen again thereafter. Her disappearance took place sometime between 6:48 p.m. on July 2 and 6:06 a.m. on July 4. The male, however, continued to feed the young unaided.

On July 4, the male was still feeding the nestlings. On July 5, he fed one fledgling, which left the nest sometime between 8:15 and 10:21 a.m., but he also fed at least one young which remained in the nest until 4:35 p.m. or later. On July 6, two fledglings were seen, one about 100 feet from the nest, the other only 8 inches above the nest entrance. The male fed both of these but was not seen to make any trip to the nest. It was therefore concluded that at least two young had been fledged.

The male was last seen on July 13 as he was feeding two fledglings which were fairly high up in trees about 40 feet apart and at a maximum distance of 150 feet from the nest. One young could be examined well enough to note an advance in the growth of the rectrices since the fledging date, one week previously. The growth stage of these fledglings was definite evidence that neither was from nest number 1.

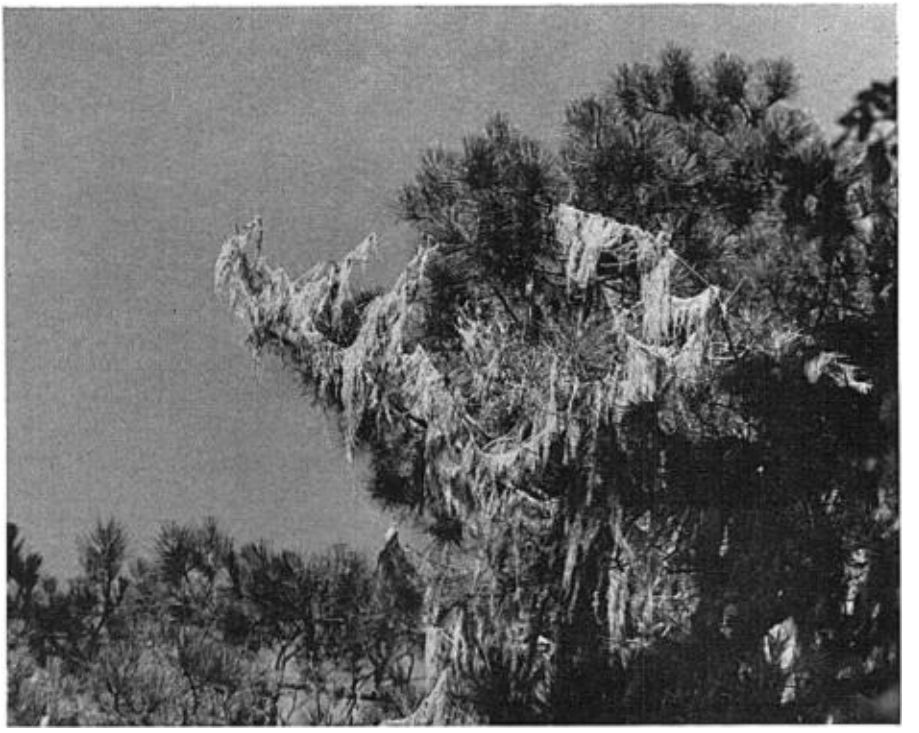

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Fig. 2. Female at entrance to nest number 2 of Parula Warbler, Point Lobos Reserve State Park, July 1, 1952. Nest was placed in festoon of *Ramalina reticulata* in Monterey pine.

With regard to the time of breeding at Point Lobos compared to the time of breeding in the normal range, Wilde (1897:291) states that in New Jersey the species starts nest building by the second week in May. Full clutches of fresh eggs may be found on May 20, and on June 4, 1893, Wilde found a nest containing young (*op. cit.*:294). Mousley (1926, 1928) observed nests being built in Quebec between May 25 and 28, 1924, and May 22 and 31, 1925. He watched a nest with young between June 13 and 19, 1921 (Mousley, 1924). In their brief study of four nests in Michigan, Graber and Graber (1951) found one nest in the building stage on July 11. In two nests, the clutches of three eggs each were completed on July 13 and 14. In one nest, the two young fledged on July 3, and in another the single remaining young left the nest prematurely on August 4.

nest number 2, in the care of the male only, survived at least until July 13, seven days after fledging. Nothing further was known of the Parula Warblers after female number 1 was last seen on July 16. Assuming that the male and his two young were alive at least until July 16, then only two adults and two young had survived up to that date.

In 1953, the year following the appearance of the species at Point Lobos, two of us (Williams and Legg) made a number of searches, both in the study area and in other lichen-draped pine woodlands of the adjacent Monterey Peninsula region in May, June, and July, but no Parula Warbler was found, nor has any been recorded subsequently.

DISCUSSION

The American Ornithologists' Union (1957:485–486) delimits the western boundary of the normal breeding range of the Parula Warbler as extending from Winnipeg, Manitoba, south to Kerrville, Texas, and cites only one record of casual occurrence for any locality west of the Rocky Mountains and the southwestern deserts. This was a male taken at San Xavier Mission, Arizona, on March 26, 1938 (Monson, 1942). There is another record for Arizona, a female seen near Tucson on December 28, 1940 (Monson, *loc. cit.*). But we could find no other published record of penetration into, or west of, the Rocky Mountain-Sierra Madre Occidental axis until 1952, the year of their occurrence at Point Lobos Reserve State Park.

In 1952, there were two, or possibly three, cases of western occurrence in addition to the one which is the subject of this paper. On May 24, 1952, a male "in full song" was taken in Gunnison Valley, elevation 7800 feet, Colorado (Hyde, 1953); a "singing male of the genus *Parula*" was seen at Roosevelt, Arizona, on May 31, 1952 (Monson, 1952); and a "pair" was taken in riparian woodland in the Sierra de Los Ajos, in northeastern Sonora (J. T. Marshall, 1957:108). In the latter instance, a male with enlarged testes was collected on July 16, 1952, and a female with an old brood patch was collected at the same site on July 29, 1952. In none of these cases, however, was actual breeding observed. The record from Point Lobos is therefore the first instance of the breeding of the Parula Warbler west of the breeding range as outlined by the American Ornithologists' Union (1957). It is also the first occurrence of the species on the Pacific coast north of México. The next occurrence of the species in the west coastal region of the United States was the collecting of a male 11 miles east of Palm Springs, Riverside County, California, on April 29, 1956 (Gould, 1957).

It has been suggested that the Parula Warblers that appeared at Point Lobos in May, 1952, had been "wind-drifted" from their normal spring migration route (Peterson and Fisher, 1955:311). In this connection, it should be noted that another "displaced" parulid, an Ovenbird, was seen by Williams at Carmel Highlands, about one mile from Point Lobos, on May 31, 1952, the first record of the species in Monterey County. This warbler is considered a rare migrant in California by Grinnell and Miller (1944:408–409), who list three specimens and one sight record for the state. Although the Parula Warblers and the Ovenbird may have reached the central coast of California as a result of the same factor or factors, we have made no attempt to correlate the appearance of these birds in our area with any meteorological phenomenon, and we can offer no suggestion as to why they appeared.

Grinnell (1922:374), commenting on the role of the "accidental" as it applies to the avifauna of California, makes a brief for the concept that "the occurrence of individual birds a greater or less distance beyond the bounds of the plentiful existence of the species to which they belong is the *regular thing, to be expected.* There is nothing really 'accidental' about it; the process is part of the ordinary evolutionary program." In further discussion of pioneering individuals, Grinnell (*op. cit.*:377–378) points out that "the

vast majority of such individuals . . . are foredoomed to early destruction without any opportunity of breeding . . . . In the relatively rare case two birds comprising a pair . . . may even stumble upon a combination of conditions in a new locality the same as in its parent metropolis, and there start a new detached colony of the species."

Although no permanent "colony" was established at Point Lobos, since no repetition of breeding, or even of occurrence, has been recorded in subsequent years, at least three Parula Warblers, diverted far westward by unknown causes in 1952, happened to "stumble" upon environmental conditions which were, at least in part, congenial to them there. Disregarding any other possible factor, or factors, it is suggested that the birds at Point Lobos found an element among the physical features of the environment which stimulated breeding responses. This element was probably *Ramalina reticulata* in abundance. *Ramalina* in superficial appearance and drooping manner of growth, resembles the usual nest site requirement of the species over most of its normal breeding range, in other words, the "beards" of the lichen *Usnea* in the northeast, and the flowering plant, "Spanish moss" (*Tillandsia* sp.), in the southeast (Chapman, 1907:103–109; Bent, 1953:135–149; Griscom and Sprunt, 1957:97–98). Further, in the lower Mississippi Valley, Parula Warblers have been stated to breed in many localities in which *Usnea* is largely or entirely replaced by species of *Ramalina* (Ridgway, 1902:486, footnote).

At Point Lobos, the Parula Warblers encountered little, if any competition for nest sites. None of the breeding birds there uses exclusively lichen festoons for nest emplacement or support. According to Grinnell and Linsdale (1936:16–17), a majority of nests in this area are composed mainly of strands of *Ramalina reticulata,* especially the nests of the Common Bushtit (*Psaltriparus minimus*), Hutton's Vireo (*Vireo huttoni*), and House Finch (*Carpodacus mexicanus*). However, the Common Bushtit was the only species that utilized lichen festoons for nest sites, and it did not make use of them frequently. Of the 21 nests of that species at Point Lobos described by these authors (*op. cit.*:93–94), only three were built in lichen masses. Aggressive encounters were noted between the Parula Warblers and five other species: Allen's Hummingbird (*Selasphorus sasin*), Western Flycatcher (*Empidonax difficilis*), Western Wood Pewee (*Contopus sordidulus*), Chestnut-backed Chickadee (*Parus rufescens*), and Wilson's Warbler (*Wilsonia pusilla*). However, none of these species could be considered a nest site competitor of the Parula Warblers.

With regard to the actual construction of the nests which we observed, it should be noted that Parula Warblers, in their normal breeding range, utilize several different types of nest construction, ranging from nests which are situated independently of the festoon of lichens or *Tillandsia* (Brewster, *in* Bent, 1953:139; Mousley, 1926:185–187) to nests which are situated within the festoon proper (Thayer, *in* Chapman, 1907:107; Wilde, 1897:292; Graber and Graber, 1951:75, 78). Indeed, some nests are built in areas completely devoid of either *Usnea* or *Tillandsia* (Petrides, 1942; Nice, *in* Bent, 1953:140; Peterson, 1946:197; Cunningham, 1947:158; Schwilling, 1951). Our nest number 1 appears to resemble the "suspended basket" type of construction described by Thayer (*in* Chapman, 1907:78). Nest number 2 resembles in most respects the suspended structures described by Wilde (*loc. cit.*) and Graber and Graber (*loc. cit.*). In short, the nest materials and types of nest construction used by the Parula Warblers at Point Lobos fall within the range of variation for these aspects of nest building demonstrated by the species in its normal breeding range.

Thus, it seems likely that the breeding of the warblers at Point Lobos resulted from two main factors. First, individuals of both sexes appeared at this extralimital locality

at a time of year when the active phase of the reproductive cycle would be under way, in the male at least. Second, the birds came to an area of moderate climate in which familiar nest sites and nest materials were present. It may be that the presence of these necessities, and the presence of a sexually active male (or males), stimulated the reproductive physiology of the females to the point of actual nesting. Although the male enters full breeding condition apparently through the stimulation of increasing day-length, there is some evidence suggesting that the attainment of full reproductive capacity by females is dependent, at least in part, on the presence of a sexually active male, proper nest sites, nest materials, and an adequate food supply for the young (see, for example, Burger, 1949; A. J. Marshall, 1951). We suggest that the situation at Point Lobos involved the presence of Parula Warblers of opposite sex in an area which, although far from the normal breeding range, fulfilled the breeding requirements of the species.

SUMMARY

The first known occurrence of the Parula Warbler in California was recorded at Point Lobos Reserve State Park, Monterey County, on May 18, 1952, when one male was seen. Between May 18 and July 16, two females and at least one male were observed. This was the first record of the species west of the Rocky Mountains and the southwestern deserts.

Two nests were found. Both were situated in festoons of the lichen *Ramalina reticulata*, hanging from Monterey pines.

At least one young was fledged from one nest, and two young were fledged from the other. The young from one nest apparently did not survive beyond the second day after fledging. At the other nest, the two young were known to have survived at least eight days after fledging.

Our observations suggested that, although two males might have been present at the beginning of our study, one disappeared and the other was believed to have become polygynous.

It is believed that, other conditions being suitable, the fortuitous occurrence of individuals of both sexes in an area in which an abundance of lichens hanging from trees provided nest sites and materials similar to those used in the normal breeding range of the species induced breeding in these birds.

ACKNOWLEDGMENTS

We wish to express our thanks to Mr. and Mrs. T. F. Riley for giving us access to their property, on which one nest was situated. Miss Isabelle Tavares, of the University of California Herbarium, identified samples of lichens which we forwarded to her. We feel particularly indebted to John Davis who helped us greatly in the preparation of the manuscript.

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Carmel, California; Eureka, California; and Anchorage, Alaska, August 13, 1958.