

A TRANSITION ISLAND IN THE MOHAVE DESERT

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Clark Mountain in northeastern San Bernardino County, California, rises to a sharp crest, 7900 feet in elevation. It is somewhat isolated from the lower Ivanpah and Mescal ranges to the south, and on the north is surrounded by low desert basins. The upper parts of the mountains in this section of the Mohave Desert are openly forested with junipers and piñon pines and present a forbidding aspect to summer resident species that frequent Boreal and Transition life-zones.

On May 17, 1939, after hunting up through the Upper Sonoran Zone of the south side of Clark Mountain, I came abruptly to the brink of cliffs that formed the north face of the peak. Below, partly in the shadow of the cliffs, I became aware of a scattering of fir trees, and within a few minutes the song of a Mountain Chickadee carried up to me from the forest below. Here was an extremely small insular area of Transition Zone that challenged exploration to determine what avian species had there found an extent of habitat sufficient for summer residence.

On May 20, 24, and 28 members of our party visited the base of the cliffs. Mr. Ward C. Russell and Mr. Ronald Smith spent the night of the 28th there. The firs (*Abies concolor*) occurred in two patches at the heads of canyons where the rock walls rose 300 to 500 feet above. Each patch was roughly triangular, broadest at the base of the cliff and tapering down the slope below to a point about a quarter of a mile distant. The slopes were extremely steep and for the most part rocky. At the bases of the cliffs were small patches of snow which must have persisted until June 1. There was no surface water.

It could be seen that local conditions were in several respects ideal for the maintenance of a Transition biota at this comparatively low elevation in the desert. The cliffs formed a cirque, the center of which faced northwest. The northeast ridge of the mountain cut off the early morning sun and the top of the peak shaded the area early in the afternoon. Some of the firs received only four or five hours of sunlight on May 20 and the entire area was shaded in the morning until 8 a. m. Although there were no streams, snow at the bases of the cliffs must afford a substantial reservoir of moisture during the spring and a good supply of underground water evidently was available to plants high up in the drainage channels.

Floral associations were nevertheless distinctly mixed. The firs in no place formed a pure stand but had piñons interspersed, often to the extent of 40 per cent or more. Small firs formed solid stands in a few places in the bottoms of ravines and here there was fair top soil. Currant bushes (*Ribes cereum*) provided extensive ground cover and there was a good scattering of service berry (*Amelanchier alnifolia*). Snowberry (*Symphoricarpos longiflorus*) and alum root (*Heuchera rubescens*), plants of montane type, also occurred. In among the wild currants was an occasional sickly opuntia cactus, pale green and stunted, that must have dropped down from the arid crest above.

The two patches of firs were separated by about 300 yards of dry rocky slope. Each patch comprised approximately 20 acres. The eastern area (A) extended up to 7300 feet and the western area (B) to 7100 feet elevation. The apex of each triangular area was about 500 feet lower than the base of the cliff.

The circumscribed nature of the Transition areas made it possible to determine rather accurately the number of breeding pairs of most species of birds restricted to them and thus the population density per unit of habitat area. As will be seen in the species accounts which follow, the breeding population of each restricted species was exceedingly small.

Clark Mountain is 50 miles south of the Charleston Mountains of Nevada, from which range van Rossem (Pac. Coast Avif. No. 24, 1936) has reported a Transition and Boreal avifauna. Most of the species are there represented by races with affinities to the east or to the north. As would be expected, the birds of Clark Mountain are racially identical in nearly all instances with the Charleston birds and constitute southern or southwestern records for the breeding season.

Flammulated Screech Owl. *Otus flammeolus flammeolus*. A female (no. 77347, Mus. Vert. Zool.) was taken May 20 at 9 a.m. in a fairly dense stand of young firs. No eggs had yet been laid, but yellow ova up to 4 mm. in diameter indicated that nesting was under way. Heretofore this species has not been known in the Great Basin region south of southern Utah (Woodbury, Condor, vol. 41, 1939, pp. 157-158) and the Argus Mountains of Inyo County, California (Huey, Auk, vol. 49, 1932, p. 107). Although it usually breeds above the Upper Sonoran Zone, several have been taken in the lower margins of the Transition Zone (L. Miller, Condor, vol. 38, 1936, p. 228), and the one from the Argus Mountains in the piñon association. Because the species occurs south through Arizona and Mexico, it probably is present on other desert ranges, such as the Charleston and Hualpai mountains.

Broad-tailed Hummingbird. *Selasphorus platycercus platycercus*. This hummer was especially numerous in the tangles of *Garrya flavescens* from 6000 feet upward on both north and south slopes of the mountain. Where this plant formed thickets over the dry water courses, males were stationed and diving over females. As many as five males were counted in one patch of brush 200 yards long. A female was seen gathering material from the ground. No nests were found, but it seems fairly certain that the species was breeding in this particular association of the piñon belt and also in lesser numbers in the patches of Transition timber, where a few were seen. Broad-tailed Hummers are absent in the Providence Mountains to the south. Van Rossem found them to be abundant in the Charleston Mountains, but at elevations above 7500 feet. In the White Mountains of California this hummer also breeds in the upper piñon belt (Grinnell, Condor, vol. 20, 1918, p. 87). Comparison of five males (nos. 77361, 77362, 77364-77366) from Clark Mountain with material from central Nevada and Arizona revealed no constant pattern of geographic differentiation, the situation being much as described by van Rossem (*op. cit.*, pp. 26-27).

Hairy Woodpecker. *Dryobates villosus leucothorectis*. A pair was nesting in Area A and had just laid eggs on May 20. The nest was situated in the dead top of an old fir tree where there was a series of holes suggesting long utilization by these woodpeckers. No other Hairy Woodpeckers could be found in either area of firs. The birds (nos. ♂ 77377, ♀ 77376) are typical of *leucothorectis*, the breeding range of which race thus is extended southward in California.

Violet-green Swallow. *Tachycineta thalassina lepida*. These swallows were nesting fairly commonly in cliffs above the Transition areas and on shaded cliffs of canyons on the south side of Clark Mountain above 6500 feet. No accurate estimate of numbers could be made. Although distinctly a high zone type, here reaching its southernmost breeding post in the lower Colorado River basin, the species was of course in no way directly related to the patches of fir association. A female (no. 77468) collected on May 21 had an egg in the oviduct.

Mountain Chickadee. *Parus gambeli inyoensis*. One male was situated in Area A and two males in Area B. The males were singing regularly and were unaccompanied by females or young. Their behavior was typical of males during the incubation period and their testes were of maximum size. The population in the 40 acres may be assumed to have consisted of three pairs. Area A seemed to provide room for one more pair, in view of the situation in area B, but repeated efforts to locate others in A failed. The male chickadees usually confined their movements to the firs, only briefly visiting the interspersed piñons. This race of chickadee is abundant in the Charleston Mountains above the 7500 foot level. In the condition of moderate wear which the specimens (nos. 77440-77442) show, it is not apparent that the characters of *inyoensis* are developed in unusual degree, as van Rossem has suggested for the Charleston Mountain birds.

Hermit Thrush. *Hylocichla guttata polionota*. In Area A, two birds were in full song on May 20. Before the sun struck the area, they sang from exposed piñons on the ridge, but later they retreated to the densest groups of young firs near the middle of the area. A female (no. 77515) was taken here on this date. The ova were developing (1 mm. in diameter), but laying was not imminent. The female behaved as do breeding birds, whining and flying about nervously in the firs. On May 24 a male (no. 77516) was taken in Area B; the testes were of maximum size (9 mm. in length). There possibly were two pairs in B and the total population may be estimated at four pairs.

Mexican Bluebird. *Sialia mexicana bairdi*. Two males (nos. 77520, 77521) were taken; each was accompanied by another bluebird. Observations indicated the presence of one pair in Area A and

probably two in B. The population fairly certainly did not exceed three pairs. The bluebirds did not stay in the firs all the time, but none was seen far distant from them. The males taken were in full breeding condition and it is supposed were nesting. They show an extreme extension of brown dorsally across the back and posteriorly on the flanks and must therefore be designated as *bairdi* pending much needed revisionary study of the characters and ranges of *bairdi* and *S. m. occidentalis*. Van Rossem found that specimens from the Charleston Mountains were closer to *occidentalis*.

Virginia Warbler. *Dendroica virginiae*. Two males were stationed in Area A. One had a beat near the base of the cliffs in open firs and piñons, with open tracts of shrubs between. The other was in the lower limit of the area on a slope with piñons and service berry, but just across from a small patch of firs which it occasionally visited. Area B had one male and possibly another. The total population may be placed at four pairs. Virginia Warblers find suitable habitat in associations of Gambel oaks, mountain mahogany, or open conifers in adjacent parts of Nevada and Arizona. Zonally these associations are classed either as high Upper Sonoran or low Transition. The warblers seem to require more ground cover and shrubbery than is usually present in a pure stand of piñons. On Clark Mountain there are neither oaks nor mountain mahogany and presumably for this reason the species is restricted to the vicinity of the firs. The specimens from Clark Mountain (males, nos. 77572, 77573) constitute the second reported breeding station for California. Previously they were known from the White Mountains of Inyo County.

Gray-headed Junco. *Junco caniceps caniceps*. One male, in full breeding condition (no. 77686) was taken on May 20 in the shadiest part of Area A as it sang rhythmically from a fir top. This part of the area had a good ground cover of currant and the litter of fir needles on the ground was fairly continuous locally and damp from recent snow. A singing male was observed in Area B on May 24 in a similar currant patch, but was not secured. No females were seen; they probably were occupied with incubation. The male from Clark Mountain is characteristic of *J. c. caniceps*, except for some pinkish color in the sides and is like certain of the birds from the Charleston range (see Miller, Condor, vol. 41, 1939, pp. 211-214). A more detailed treatment of the juncos of this region is included in a paper now in press.

A summary of population numbers for those species dependent upon the 40 acres of Transition Zone timber is as follows:

	Pairs
Hairy Woodpecker.....	1
Mountain Chickadee.....	3
Hermit Thrush.....	4
Mexican Bluebird.....	3
Virginia Warbler.....	4
Gray-headed Junco.....	2

Additional species of Boreal type which were detected in the firs were: Western Tanager (*Piranga ludoviciana*); Audubon Warbler (*Dendroica auduboni*); a single male Red-breasted Nuthatch (*Sitta canadensis*), no. 77468; a single female Evening Grosbeak (*Hesperiphona vespertina brooksi*), no. 77632; and Pine Siskin (*Spinus pinus pinus*), nos. 77644, 77645. Some of the tanagers may have stayed and bred and there may have been a pair of resident Audubon Warblers. Siskins were numerous and might have nested also, but the Evening Grosbeak and the nuthatch were undoubtedly vagrants.

An incongruous mixture of Upper Sonoran and Transition birds occurred at times in the firs as a result of the proximity of the piñon forest on all sides. Bush-tits and Western Gnatcatchers often crossed through parts of the areas and linnets sang from the cliffs above the juncos. Once a Scott Oriole stopped in a fir top to sing above the thickets where Hermit Thrushes were active. The Transition island with its precariously small populations of Boreal types was regularly washed over by the tide of Upper Sonoran species.

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