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SUMMER BIRDS OF THE RINCON MOUNTAINS, SAGUARO NATIONAL MONUMENT, ARIZONA

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The Rincon Mountains, situated within the Saguaro National Monument just east of Tucson, Arizona, richly merit the attention of those eager to see and understand natural environments in the southwest. These mountains harbor numerous species of Mexican birds responsible for the intense interest of several generations of ornithologists in the neighboring mountains of extreme southern Arizona. They support a varied and beautiful woodland at middle altitudes which differs radically from monotonous stretches of pinyon, juniper, and chaparral at the same level farther north. Trees such as the Chihuahua pine, blue oak, Arizona oak, silver-leaf oak, and Arizona madrone, widely distributed in México, are conspicuous in this woodland, which flourishes next to a boreal forest of majestic proportions. Further, the Rincons contain these contrasting floras and their avifaunas within a moderate-sized area. An hour's walk from a central location, such as Manning Camp, takes one into any of several natural environments, each so different that it is like stepping into a new world. Above the lower limit of oaks, there are about 89 square miles of wooded heights in the Rincons, twenty square miles of which are coniferous forest. Woodland and forest are isolated by desert from the Santa Rita Mountains which lie thirty miles directly south, and they are separated by low hills supporting only scattered oaks in gullies from the Santa Catalina Mountains twelve miles to the northwest.

Mica Mountain, which alone is considered here, lies in the northern part of the Rincons and is of mild relief. The summit area, the highest point of which is 8600 feet above sea level, contains rolling hills and broad drainage basins. Its south slope is of gentle descent; a long ridge inclines to the west; the northwest slope is steep; a barren rocky ridge occupies the northeast corner; and the east end of the elevated forest is bounded by a great cliff, beneath which the land slopes to Happy Valley at the east base of the mountain. Vegetation adorns this uncomplicated topography with a simplicity unique in southeastern Arizona; and contrasting vegetation types meet at the angles of the mountain with rather abrupt transitions. On either side of such a boundary one can determine from the different numbers of a given bird species what it must be choosing for its habitat. Accordingly my purpose, in addition to reporting on variation in House Wrens (a study which first took me to the Rincons), is to represent the relation of breeding birds to vegetation (fig. 1) and to mention unique features of plant and bird life in that portion of the mountain above the desert foothills. The report is based on my notebook entries made on visits on January 20 and 21, 1951, from May 30 to June 11, 1954, and on April 29 and 30, 1955. At least three collections from the Rincons represent most of the summer birds in museums (fig. 1). Herbert Brown, collecting at Manning Camp in July and August, 1911, mentioned in his notebook the grand scenery; Laurence M. Huey made a large collection from Spud Rock Ranger Station in June, 1932; and I took mostly House Wrens in the course of the visits reported here. I know of no published reference to birds of the Rincon Mountains other than the two following. Huey (1944) discusses a remarkable adult male hummingbird collected at Man-

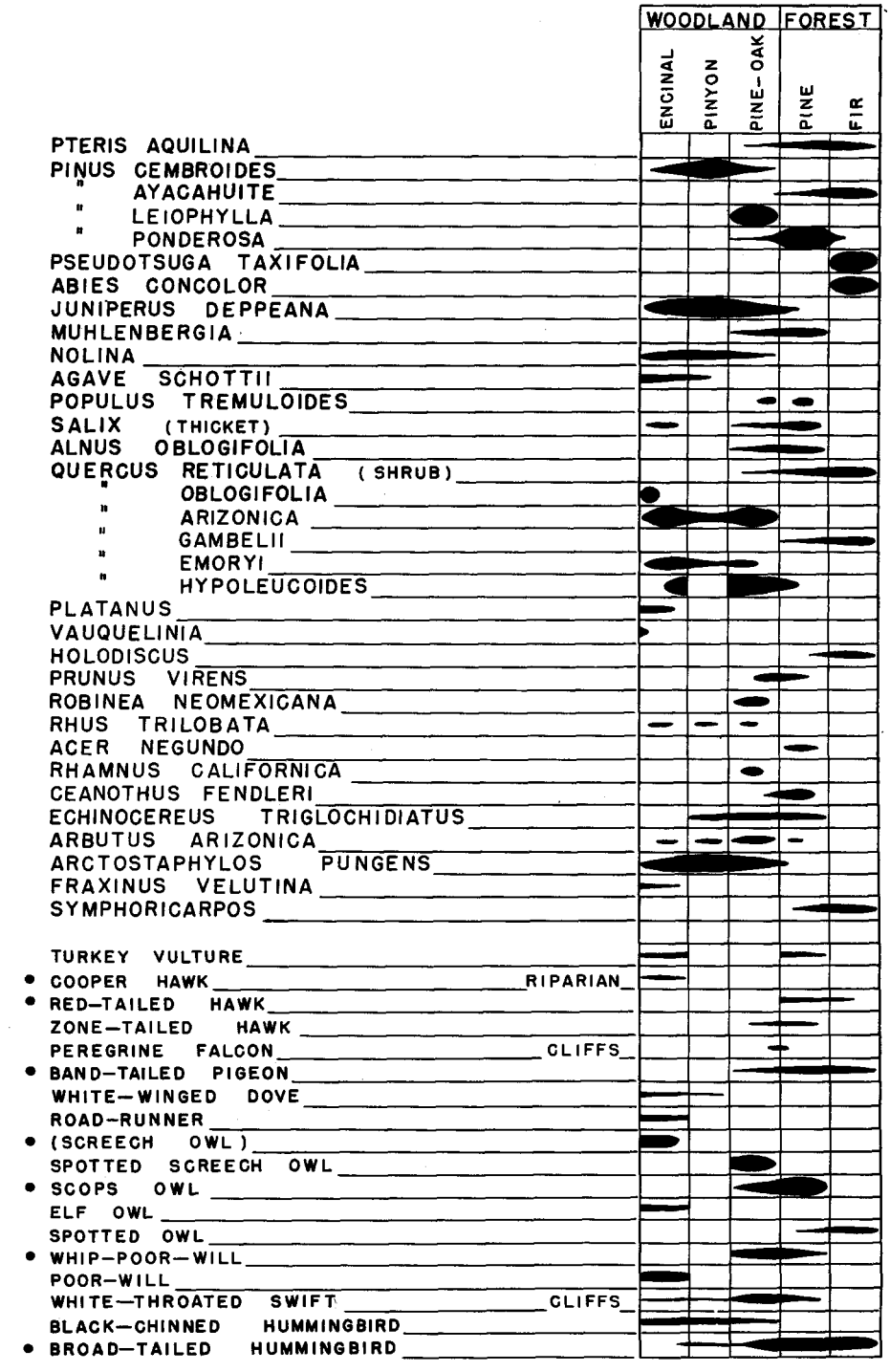

Fig. 1. Occurrence of plants and birds according to types of vegetation or other environments inhabited. A bar ending abruptly at a boundary between plant formations indicates that the bird is to be expected beyond that boundary although it was not seen there.

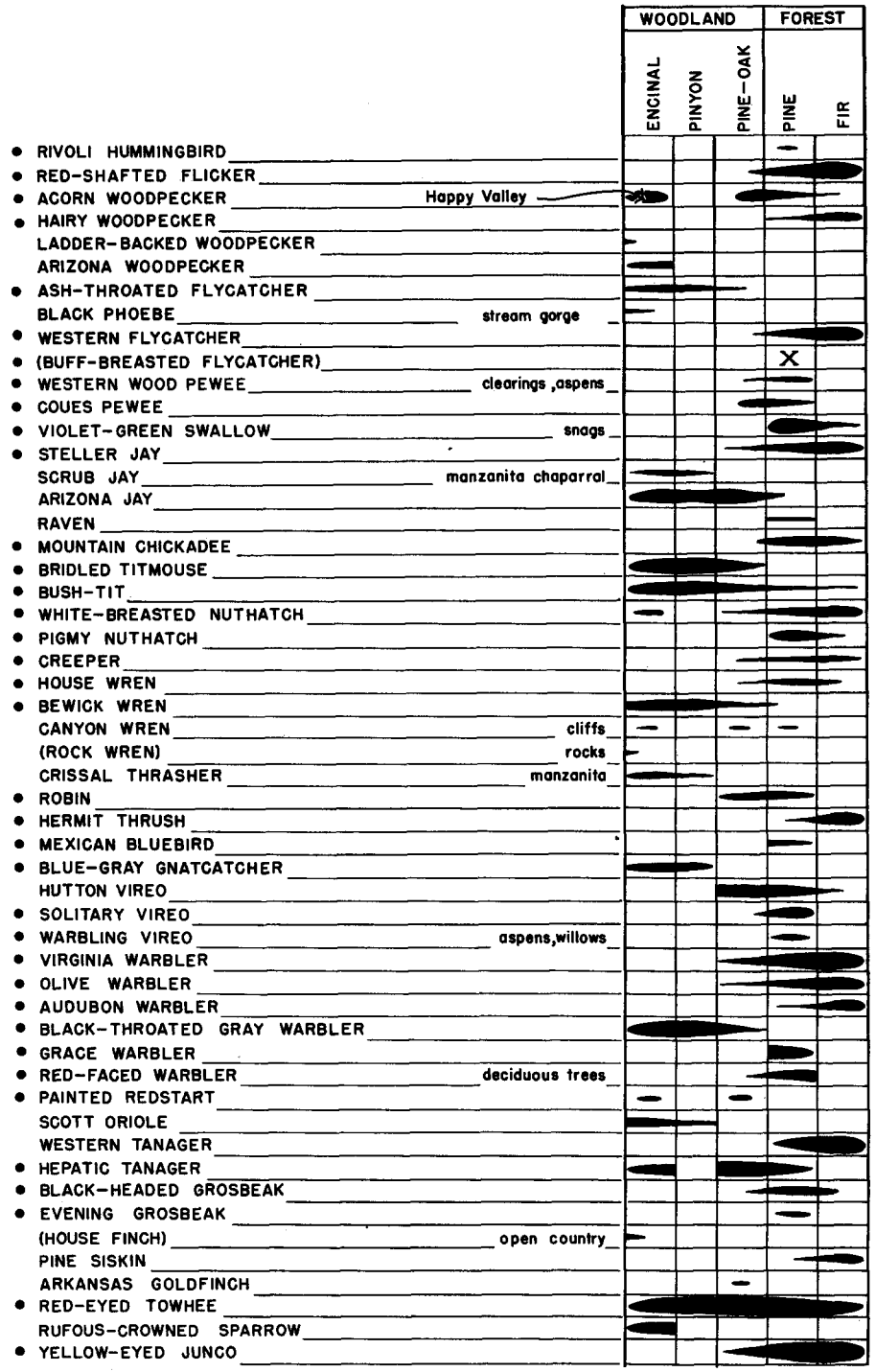

Fig. 1 (continued). A bar chopped off at left margin means that species continued down into desert. A bar at left of species name signifies specimens from Rincons extant in museums.

ning Camp in June. It is a hybrid between the Costa and Broad-tailed hummingbirds. The A.O.U. Check-list Committee (1950:369) includes the Rincon Mountains in the range of the Brown-throated Wren, *Troglodytes brunneicollis,* which was added as a species new to the check-list. In the following discussion, I propose to merge this wren with the House Wren, *Troglodytes aëdon.*

ACKNOWLEDGEMENTS

Superintendent John G. Lewis and his staff of the Saguaro National Monument made my trips possible. I am indebted also to William Fish for playing his recording of House Wren songs, to Laurence M. Huey for a copy of his field catalogue of the Rincons, and to the respective curators who facilitated my examination of specimens of Brown Creepers and House Wrens in the collections of A. R. Phillips, Saguaro National Monument, San Diego Society of Natural History, W. J. Sheffler, and the University of California at Los Angeles.

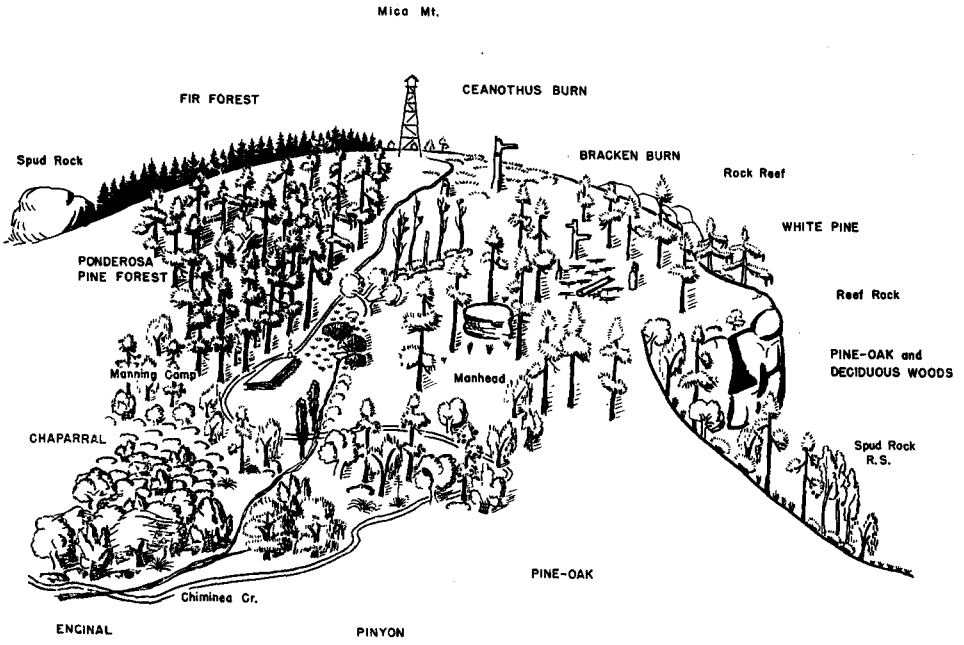

Fig. 2. Idealized arrangement of plant associations on the Rincon Mountains, looking northward. Symbols distinguish the aspen and each species of oak and conifer.

FLORA

Some of the plants important for the distribution of birds on the mountain are listed in figure 1. Ponderosa pine attains here its best development in southern Arizona, both in stature of individuals and extent of unbroken groves. (Most of these trees have needles in fives, but those of the isolated group at Grass Shack, 5300 feet, have needles in threes only.) Likewise Gambel oak and vauquelinia attain exceptionally large size in the Rincons. During my visit, the most attractive and abundant flowers were the hedgehog cactus, growing on the rocks, and the New Mexican locust, covering hillsides on the east slope with masses of blooms. Because of its intermediate position between neighboring mountains, Mica Mountain has no alpine fir, the southern limit of which

is in the Santa Catalina Mountains, and no Apache pine, a Mexican species which reaches the Santa Rita Mountains. These trees are relatively unimportant in those places and cannot account for differences in bird-life in the three mountains.

Some plants are confined to a particular slope of Mica Mountain. White fir occurs only on the northwest face, where it extends upward to within about 200 yards of the crest. Douglas fir reaches this crest, and is likewise confined to the same slope, except for three individuals near Manning Camp. I found the New Mexican locust only on the east wall of the mountain. Aspen is also prevalent there; elsewhere I found it only in a gully near Manning Camp. From Tucson a large patch can be seen part way down the northwest slope. Arizona cypress is absent from the canyons I visited.

VEGETATION

In two respects the vegetation of Mica Mountain differs from that of the Santa Catalina Mountains (Shreve, 1915). First, each major plant grouping is "all in one piece" (fig. 2). All the fir forest is on the northwest slope; the ponderosa pine forest is continuous over the broad summit; and woodland completely encircles the mountain between forest and desert. There is little if any alternation of tracts of pine forest with fir forest or with woodland, or of woodland with desert such as is found on the Santa Catalinas, whose deep canyons support contrasting vegetations on opposite walls. Second, there is a remarkable difference between the east and west slopes of the mountain. On the west, the oak woodland, except on flood-plains, is dwarfed and includes as conspicuous elements *Pinus cembroides, Juniperus deppeana, Nolina microcarpa, Agave*

Fig. 3. Spud Rock Ranger Station, 7400 feet, an area of mixed vegetation. In foreground is a wet meadow of grass and sedge surrounded by tall bracken; farther to right, past a glade of silver-leaf oaks, is a hillside of New Mexican locust overlooked by an open grove of ponderosa pines with bunchgrass. Photograph courtesy of National Park Service.

schottii, Garrya wrightii, and *Arctostaphylos pungens*—all tolerant of dryness and of terrain containing much exposed rock. But the east slope, as shown in figure 3, is a garden of deciduous shrubbery, ferns, robust trees, and a meadow. In this beautiful woodland along with the pines, aspens, and New Mexican locusts, are seen the largest oaks, madrones, chokecherries, and buck-thorns on the mountain. It is the only woods of this composition that I know of in southern Arizona. These differences were analyzed by Blumer (1910) who felt that protection of the east slope from desiccating winds explain them, at least in part.

Fig. 4. Closed encinal of Arizona oak, Emery oak, and alligator juniper on a flood-plain at Grass Shack, 5300 feet. In these and adjacent Arizona oaks, sycamores, and a Chihuahua pine, all within about 100 yards, was a series of at least a half-dozen nests of a pair of Cooper Hawks which nested in an Arizona oak in 1955. Arizona Woodpeckers, Arizona Jays, and Bridled Titmice were also conspicuous at this place, and there was a pair of Black Phoebes at the creek. This and all following photographs were taken either on April 29 or 30, 1955.

Purely for convenience the information on plant distribution in figure 1 is divided into categories corresponding with the unmixed types of vegetation in places I selected for recording birds. In order of increasing altitude these are *encinal* (oak woodland, fig. 4), some patches of *pinyon woodland* on rock exposures (fig. 5), *pine-oak woodland* (fig. 6), and *ponderosa pine forest* (fig. 7). Down the northwest slope is a *fir forest* (fig. 8) whose transition from ponderosa forest is abrupt in spite of blending by continuity of Mexican white pines and a scattering of ponderosa pines. Another imposing

change is from lower encinal down to desert as the blue oaks and vauquelinias yield their dominance to mesquite scrub and finally to saguaros.

Except for ponderosa pine forest, these types of vegetation occupy in pure form less area than do mixed and intergrading assemblages of plants. One senses an independence in distribution of the plant species, so that it is almost impossible to find them in the same groupings in any two places on the mountains. The reason ponderosa pine forest is such a well-defined environment is that it is composed essentially of one species, *Pinus ponderosa*. It is a *population*, not a community! Plant communities become reali-

Fig. 5. Pinyon pines with *Yucca schottii* and *Nolina microcarpa*. Bewick Wrens and Black-throated Gray Warblers occupied such growth.

ties only when they are so grossly defined in this area—forest, woodland, and desert—as to be of no use in describing the environment occupied by a nesting pair of birds. To illustrate how mixed-up are the vegetational features that some of the birds really select, consider again the woodland (upper encinal of Shreve) on the west slope of Mica Mountain. For about one thousand feet of altitude the monotonous rocky slope is dominated by five competing species of plants in every possible combination from equally mixed to pure stands and in a pattern determined by their individual tolerances so that no two successive acres look alike. These species are *Pinus cembroides* (which wins out on the steepest and rockiest places), *Juniperus deppeana* (numerous in individuals but with fewest pure stands), *Quercus arizonica* (dominant at higher altitude), *Q. emoryi* (dominating a few places at lower elevation), and *Arctostaphylos pungens* (most abundant of all, yet rarely able to form a pure patch, fig. 9).

Within the forest are some minor plant formations of importance to birds: willow thickets, an aspen grove (fig. 10), Mexican white pine forest, and burns covered with bracken or ceanothus.

AVIFAUNA

Mica Mountain, in the Saguaro National Monument, is an excellent place in which to see the elaborate displays of Broad-tailed Hummingbirds (*Selasphorus platycercus*), and to enjoy Coues Pewees (*Contopus pertinax*), Hermit Thrushes (*Hylocichla gut-*

Fig. 6. Pine-oak woodland, showing a small ponderosa pine, alligator juniper, Arizona oak, silver-leaf oaks, and bunchgrass. Spotted Screech Owls, Whip-poor-wills, Hutton Vireos, and Hepatic Tanagers were conspicuous at this place.

tata), Virginia Warblers (*Vermivora virginiae*), Olive Warblers (*Peucedramus taeniatus*), and Red-faced Warblers (*Cardellina rubrifrons*). Western Tanagers (*Piranga ludoviciana*) and Hepatic Tanagers (*Piranga flava*) are abundant side-by-side. I was impressed especially by the reverberating mournful cries of Peregrine Falcons (*Falco peregrinus*), the fearful grace of a Red-tailed Hawk (*Buteo jamaicensis*) stooping time and again at a frightened, but not speechless, Raven (*Corvus corax*), and by the assemblage of birds nesting in holes of snags in a burned place in the forest. Illustrative of the long distance that the Spotted Owl (*Strix occidentalis*) roams, a male was once attracted to Manning Camp; doubtless it came from the north side of Mica Mountain, more than two miles away, where the pair roosted. Several years ago a pair frequented the same camp, for Mr. Sam King, then superintendent of the monument, regularly

noted them there. Scops Owls (Flammulated Owl, *Otus flammeolus*) were hard to find, possibly because absence of moonlight suppressed their singing; but one morning I luckily saw several foraging almost until sunrise. Their astonishing vigor of flight was evident, also the launching at seeming full speed, and the abrupt landing which would cause the ponderosa pine limb to shake a few seconds. But the most memorable show was put on by a White-throated Swift (*Aëronautes saxatalis*) which swept repeatedly past our pack train. Rangers Steele and Zerbey said these swifts often follow the train,

Fig. 7. Ponderosa pine forest near Manning Camp, where Scops Owls, Pygmy Nuthatches, Solitary Vireos, and Grace Warblers were frequent.

apparently to catch flies which accompany the animals. Nevertheless, I was certainly startled each time the bird swished by within a yard of my head. I was amused, on account of our labored progress up an incline, to see it maneuver far out over the mountainside in order to plan, aim itself, and get up speed for its dash at the proper time when we were not screened by foliage.

The breeding birds and their distribution by various kinds of environments are listed in figure 1, which includes only the birds I personally saw, plus the specimen of the Buff-breasted Flycatcher (*Empidonax fulvifrons*). An estimate of absolute abundance is represented by the height of the black spot; for example, the Red-tailed Hawk, seen frequently, is represented by a thin line to account for only two individuals, whereas the broad spot for the Scops Owl connotes nine males seen and heard one morning along three-fourths of a mile of trail. Because of their continued presence during the first half of June, these birds are presumed to breed on the Rincons, although eggs, nests,

or young were not seen for all these species. But the Turkey Vulture (*Cathartes aura*), Zone-tailed Hawk (*Buteo albonotatus*), Bush-tit (*Psaltriparus minimus*), Pine Siskin (*Spinus pinus*), and Arkansas Goldfinch (*Spinus psaltria*) may not have nested in the zone indicated. Many Bush-tits were possibly up-hill wanderers, for their span of vegetation types and altitude was greater than expected. Indeed more than once they were encountered within the fir forest. Pine Siskins in a large flock created a din of song, but perhaps were not nesting; and the Arkansas Goldfinch might nest much later than my visits. The birds in parentheses in figure 1 were not found in the breeding season, but

Fig. 8. Fir forest, showing white firs and deep shade of a spot identical to that used as a roost by a pair of Spotted Owls. This is the habitat of the Hermit Thrush and Yellow-eyed Junco.

the Screech Owl (*Otus asio*), Rock Wren (*Salpinctes obsoletus*), and House Finch (*Carpodacus mexicanus*) would doubtless find a congenial summer home at Happy Valley, where I saw them in January. Herbert Brown collected a juvenal Buff-breasted Flycatcher at Manning Camp on August 18, 1911. Its parents could have inhabited the ponderosa pines there; their niche would then have been the same as that of the abundant Western Flycatcher (*Empidonax difficilis*).

Most birds listed in figure 1 depend on some attribute of the kinds of vegetation listed at the top of the chart. Others choose another type of environment, as indicated by the special notations within the several vegetation areas. The hoped-for refinement derived from subdividing woodland did not materialize except to show that some forest birds descend to pine-oak woodland because of the pines, whereas other encinal birds ascend to it because of the oaks. Otherwise such differences as appear in figure 1, among

these very arbitrary categories of woodland, will probably disappear as further observations reveal greater continuity in distribution of woodland birds. A bird like the Red-eyed Towhee (*Pipilo erythrophthalmus*), which spans several vegetation zones, is not thereby insensible to configurations of plants. It chooses bushes at altitudes above the desert, to which it is just as attached as is the Canyon Wren (*Catherpes mexicanus*) to rock gorges, and the Arizona Woodpecker (*Dendrocopos arizonae*) to evergreen oaks. There are only about five mountain birds not distributed according to features of vegetation; these depend upon some configuration of rock surfaces.

Fig. 9. Edge of largest patch of manzanita chaparral, about 80 yards in diameter, crossed by Manning Camp trail. Scrub Jays, Crissal Thrashers, and Blue-gray Gnatcatchers occupy this tract.

I confess that the use of a chart such as figure 1 is a cover for my ignorance of the exact requirements of many species. What, for instance, is the Acorn Woodpecker (*Balanosphyra formicivora*) choosing? Is it a suitable community roost, or abundance of tall tree trunks for nests and storage? Similarly one asks to what is the Hepatic Tanager responding? But certainly the birds actually choose their habitat; none is haphazardly distributed; no two species have exactly the same environment. Therefore we may confidently hope to find something for the Hepatic Tanager which corresponds to the dead conifers with woodpecker holes that the Violet-green Swallow (*Tachycineta thalassina*) requires for nests, or the dense groves of tall conifers essential for the Hermit Thrush and the bushes for the Red-eyed Towhee.

The imposing boundary between ponderosa pine forest and fir forest helps us to appraise the unique requirements of several species. In the nearby Catalina Mountains, the two types of forest interlace because of complicated topography. For instance, at Bear Wallow, Olive Warblers and Grace Warblers (*Dendroica graciae*) flit from one side to the other of the picnic ground, in and out of patches of timber that are predomi-

nantly firs or are mostly pines. But on the Rincons, as one passes from ponderosa forest into the solid stand of firs, he definitely leaves behind the Coues Pewee, Solitary Vireo (*Vireo solitarius*), and Grace Warbler and he is impressed by the striking increase in numbers of the Flicker (*Colaptes cafer*), Hairy Woodpecker (*Dendrocopos villosus*), Western Flycatcher, White-breasted Nuthatch (*Sitta carolinensis*), Hermit Thrush, Virginia Warbler, Olive Warbler, Audubon Warbler (*Dendroica auduboni*), Western Tanager, and Yellow-eyed Junco (*Junco phaeonotus*). The change from woodland down into desert has a greater effect on the birds, for it can be seen in figure 1 that at least eleven important woodland species do not descend below the oaks.

Fig. 10. Aspen grove near Manning Camp, looking southwest on the second House Wren territory. The dark trunks belong to Gambel oaks. Snowberry becomes conspicuous as an undergrowth when in leaf later in May.

One environmental feature, the brush- or bracken-covered burn, causes a simultaneous increase in several kinds of birds, although each requires a different feature of habitat. The Pygmy Nuthatch (*Sitta pygmaea*) finds suitable nest sites in the soft wood of the upright snags; the House Wren (*Troglodytes aëdon*) uses the woodpecker holes for nests and feeds in the brush and under the fallen logs; Mexican Bluebirds (*Sialia mexicana*) abound because of the woodpecker holes in these snags for nesting, together with the open space for feeding; and the Red-eyed Towhee prevails because of the dense low growth.

The Rincons differ somewhat more in their avifauna from the Catalinas and Santa Ritas than these do from their neighbors. The Pinaleno Mountains resemble the Catalinas, and the Santa Ritas and Huachucas are practically identical in their birds. In

common with the Catalinas, and unlike the Santa Ritas, the Rincons contain the Mountain Chickadee (*Parus gambeli*), the Mexican Bluebird, Warbling Vireo (*Vireo gilvus*), and Audubon Warbler; and they lack the Pygmy Owl (*Glaucidium gnoma*), the Nighthawk (*Chordeiles minor*), and Eastern Bluebird (*Sialia sialis*). Of these, the chickadee finds its southern outpost on the Rincons. Both the Rincon and Santa Rita mountains lack the Red-breasted Nuthatch (*Sitta canadensis*), Golden-crowned Kinglet (*Regulus satrapa*), and Orange-crowned Warbler (*Vermivora celata*)—all of which reach their southern limits for this region in the Catalinas. In view of similarities in vegetation on the three mountains and the short distances separating them, these facts resist a ready explanation. There are some southern species which I did not find on the Rincons. I believe they may be found in the following areas which I did not visit: the north slope of Mica Mountain above Italian Ranch, where deep woods should be encountered; the wild rugged country of Rincon Peak to the south; the open pine stand at Happy Valley saddle; and, of greatest importance, the large continuous stands of sycamores within the tall encinal in gullies descending to Happy Valley. These birds are the Turkey (*Meleagris gallopavo*), Mearns Quail (*Cyrtonyx montezumae*), Blue-throated Hummingbird (*Lampornis clemenciae*), Elegant Trogon (*Trogon elegans*), Sulphur-bellied Flycatcher (*Myiodynastes luteiventris*), and Olivaceous Flycatcher (*Myiarchus Tuberculifer*).

RACIAL BOUNDARIES

The Rincons are also unique in possessing populations of the Creeper and House Wren which are intermediate between well-marked geographic races to the north (including the Catalinas) and to the south (including the Santa Ritas). Figure 11 portrays this for the Creeper (*Certhia familiaris*). This is intended to show the reader at one glance the dorsal and ventral views of 83 Creepers. It can be seen that north of the Rincons Creepers are long-billed, white-bellied, brown-backed, and yellowish-brown rumped; whereas to the south they are short-billed, sooty on the belly, blackish-brown on the back, and deep chestnut on the rump. The Rincon birds show what seems to be a random mixture of the contrasting characters so that the population is intermediate. Note that an intermediate specimen is not "medium-long" billed, "tawny-chestnut" on the rump, and "light sooty" on the belly, but instead is apt to be short-billed, pure white, and chestnut, or some other combination of extremes. Some of the specimens are from a season when their plumage is worn, and their colors, except for the rump, are hard to classify. Racial variation in color and proportions correlated with geography is of course a feature common to many animals, but the exceptional thing here is the abruptness of the change over such a small distance, with uniformity of characters prevailing far to the north and south of the Rincons.

Color variation in House Wrens follows a more normal pattern (fig. 12) with gradual reduction in frequency of brown-throated individuals north of central Sonora. But again the Rincons play a decisive role, for Mica Mountain is the farthest point in a northwest direction where wrens with intensely buff throats and light superciliary stripes can be found. The Pinaleno Mountains constitute a similar outpost between the Chiricahua and White mountains, for the single specimen I have seen from there (U.S. Nat. Mus.) has a buff throat and breast. Unlike the color categories of rump and underparts used for Creepers, those of the wren are arbitrary, for there is gradation from light buff to orange-brown underparts. Back color, which becomes somewhat browner southward, is not shown because these are summer birds whose back color is confused by wear.

Brandt's (1945) recent discovery of these wrens with brown throats and whitish superciliaries in the Huachuca Mountains was a noteworthy event, for it added to the United States avifauna a new kind of bird, known previously only from México. It is

often a matter of opinion whether to regard two related populations of birds as the same or different species, and Brandt was not alone in considering his find as a species distinct from the House Wren, known as the "Brown-throated Wren." I shall offer evidence to support my opinion to the contrary.

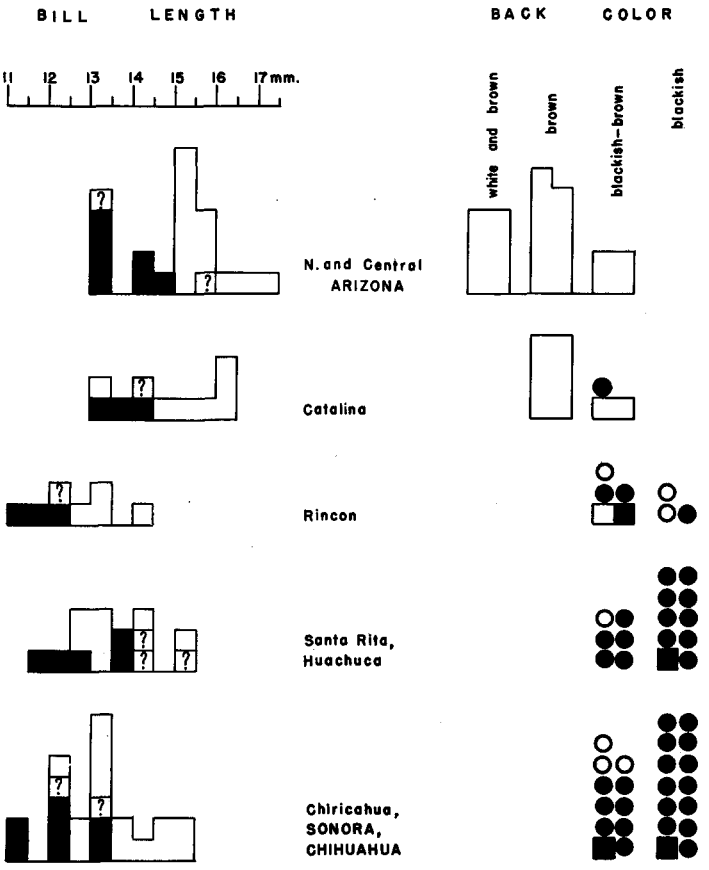

Fig. 11. Geographic variation in the Creeper, *Certhia familiaris*. Five groupings of specimens arranged from north to south. At left, measurement of culmen from tip to beginning of feathers; each square represents an individual; solid square, female; open square, male; question mark, sex in doubt. On right, coloration; round symbol, chestnut rump; square, tawny rump; white means white underparts; black, sooty underparts contrasting with pure white throat. Upper two populations represent *Certhia familiaris montana* of A.O.U. Check-list; lower three, *Certhia familiaris albescens*.

Membership of pairs of wrens, shown by corresponding numbers on figure 12, proves that choice of mates is not based on color. Also, brown-throated individuals are distributed at random through the same habitats and altitudes as those of opposite color. For instance along 300 yards of the gully of aspens near Manning Camp, the following birds were noted from west to east on four consecutive territories. The birds were on the north slope of the mountain among boulders and fallen trees and in *Symphoricarpos* shrubbery beneath the aspens, which were leafless due to damage by caterpillars. Males

sang from high in aspens or the few white pines; nests were in woodpecker holes in dead aspens. (Numbers are from my specimen catalogue, and colors refer just to the throat and chest.) First was a male (4603, whitish) displaying before a female (4604, gray-flecked) which looked into the nest and returned to it later. During this time a

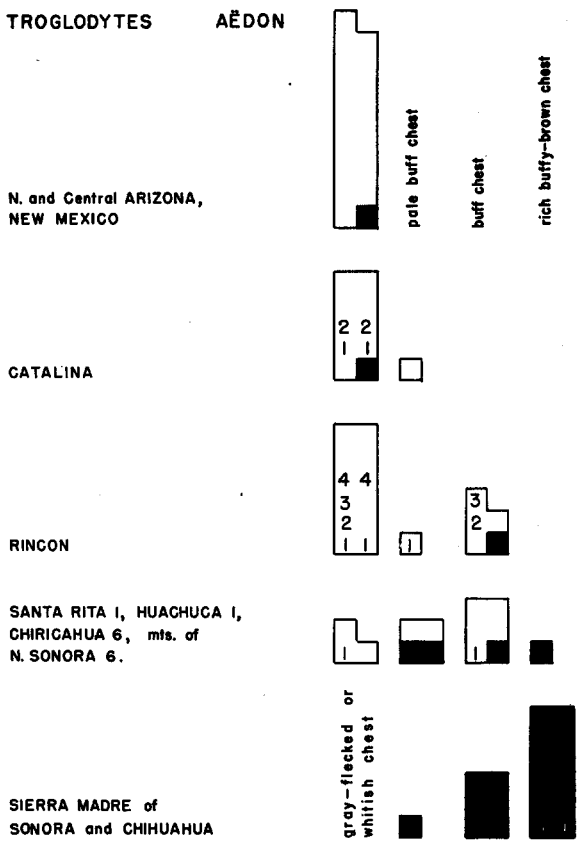

Fig. 12. Geographic variation in the House Wren, *Troglodytes aëdon*. Four vertical columns represent, from left to right, four arbitrary degrees of brownness (the first, no brown) on chest in worn summer skins cleaned with carbon tetrachloride. Each small square represents an individual; solid square signifies a conspicuous whitish superciliary line. Birds with same numeral are members of a pair or *ménage à trois*. These five populations, from north to south, have been known previously as *Troglodytes aëdon parkmanii, T. a. parkmanii, T. brunneicollis vorhiesi, T. b. vorhiesi,* and *T. b. cahooni*. They are here considered to be conspecific under the name *Troglodytes aëdon*.

second female (4605, buff) was sitting in this same nest. The next territory contained a male which seemed whitish at the great height from which he always sang. He began singing long brilliant songs an hour after the pair in the third territory was collected, and he began also to include their region in his song circuit. The pair collected in the third territory consisted of a whitish male (4609) and a female with rich buff throat and chest (4610) taken at their nest. The fourth territory was occupied by a rich buff male (4589, collected June 1) and two other dark looking birds, at least one of which

frequented the nest tree in which two nests had been started, four feet apart. The next day a light gray male was present and was flushed June 3 from the principal nest; he used different song perches. On June 10 his territory had shifted a little to accommodate a new female who hailed from the opposite side of the gully. Both members of this pair proved to be the light gray type (4611, 4612).

Those who credit the "Brown-throated Wren" of southern Arizona with a distinctive song are comparing it with the House Wren of the eastern United States. Recordings of California birds, made by Dr. William Fish, sound identical in pattern and quality with my carefully memorized and written notations of the southern Arizona birds, although they are not always as long. Length of song varies greatly during the nesting cycle, just as does the secretiveness of the bird. There is, however, a gradual change in voice southward so that in the Sierra Madre of Sonora and Chihuahua the songs are longer and more musical. Only on the *average* is this true, for House Wrens at Summerhaven in the Catalinas frequently indulge in long brilliant songs delivered from high on a ponderosa pine branch—in setting and virtuosity identical with Sierra Madrean birds even to the elegant coda of chromatic phrases. Recordings may in the future prove that the difference in the two extremes of this wren's song (geographic as well as individual) is merely one of time intervals between the same successive notes which makes one a jumble, the other a charming musical performance. If the songs of brown-throated and white-throated wrens were so unlike that we and the female wrens could tell them apart, and further if the female wrens would not recognize the singer of opposite color type as a potential mate, then our wrens might be different species because they would not interbreed. But we find no such differences either as we turn from a white- to a brown-throated male's performance, or as we travel from the Catalinas to the Huachucas.

The eggs and nest construction are identical in all these wrens. I inspected six nests in the Rincons and two in the Sierra Madre Occidental (one near Huachinera, Sonora). These are of the usual House Wren construction wherein twigs fill the woodpecker hole to its brim, and the nest is oriented on the vertical axis of the hole, as the confined space demands. An occasional nest built off-center (*cf.* Brandt, 1951) is only an individual variant. I saw one in a natural oak cavity, open at the top, in the Sierra Madre of Chihuahua. Sensibly enough the nestlings were ensconced far to one side so as not to be pelted by torrents of rain. Brandt's (1951:678) measurements prove that eggs of the buff-throated House Wrens are the same size as those of eastern and western races of the House Wren when compared with the figures of Bent (1948:122, 144). Their color is also the same, as revealed by two sets of eggs, one of which I collected in the Rincons (male parent gray throat, female buff throat) and the other in the Sierra Madre of Sonora (both parents buffy-brown). Thus the objections to regarding *Troglodytes brunneicollis* (Brown-throated Wren) as conspecific with *Troglodytes aëdon* (House Wren), are, I believe, dispelled.

SUMMARY AND CONCLUSIONS

Simple topography of the Rincon Mountains provides that some contrasting aggregations of plants occupy mutually exclusive areas on different faces of the mountains. For southern Arizona the boundaries of these plant formations are vivid; particularly is this true of those between desert and woodland and between ponderosa pine forest and fir forest. Such a radical difference between adjacent plant environments marks the tolerance limits of several species of birds simultaneously so that of 25 species dwelling within encinal vegetation, 13 do not enter desert; of 40 species inhabiting ponderosa pine forest, at least 3 do not enter the fir forest, whereas 10 species gain in abundance within the firs. Unexpectedly, in view of their geographic position and proximity to sister

mountain ranges, the Rincons are crucial in the distribution or racial variation of several kinds of birds, of which the Mountain Chickadee, Creeper, and House Wren are examples. The House Wren's variation on the Rincons is interpreted here as proof that it and the "Brown-throated Wren" are the same species.

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