COOPER ORNITHOLOGICAL CLUB

PACIFIC COAST AVIFAUNA
NUMBER 24

Birds of the Charleston Mountains, Nevada

By

A. J. VAN ROSSEM
San Diego Society of Natural History

BERKELEY, CALIFORNIA
Published by the Club
May 1, 1936

COOPER ORNITHOLOGICAL CLUB

PACIFIC COAST AVIFAUNA
NUMBER 24

Birds of the Charleston Mountains, Nevada

By

A. J. VAN ROSSEM
San Diego Society of Natural History

BERKELEY, CALIFORNIA
Published by the Club
May 1, 1936

EDITED BY

JOSEPH GRINNELL

JEAN M. LINSDALE

AND

ALDEN H. MILLER

AT THE

Museum of Vertebrate Zoology
University of California

NOTE

The publications of the Cooper Ornithological Club consist of two series—*The Condor,* which is the bi-monthly official organ, and the *Pacific Coast Avifauna,* for the accommodation of papers whose length prohibits their appearance in *The Condor.* The present publication is the twenty-fourth in the *Avifauna* series.

For information as to either of the above series, address the Club's Business Manager, W. LEE CHAMBERS, 2068 Escarpa Drive, Los Angeles, California.

CONTENTS

INTRODUCTION

The Death Valley Expedition of 1891 entered the Charleston Mountains at several points. C. Hart Merriam, the leader of that expedition, noted numerous species of birds from low altitudes at the south end and east side of the range, and Edward W. Nelson and Theodore S. Palmer collected a few specimens at about 8000 feet altitude in Trout Cañon on the west slope. However, save for the birds and mammals collected by these men, the higher parts of the mountains appear to have escaped the attention of naturalists until 1923. In that year, and in 1925, Edmund C. Jaeger made botanical studies there. Later, this author published a list of 40 species of birds as observed by him in June, 1926. William H. Burt, assisted by Harry H. Sheldon and Thomas Dawson, made collections of mammals in this region in 1928, 1929 and 1930 and brought back with them a few birds collected incidentally.

The last indicated specimens proved to be so interesting that the present writer took as much time as could be spared from his routine duties, and himself made more or less extended field trips into the Charleston region. He spent two weeks in the field in September, 1930, one week in February, 1931, three weeks in October, 1931, the months of July and August, 1932, and one week in November, 1932. It is the material and observations assembled during this total of fifteen weeks that form the chief basis of this report, though supplementary data from the Death Valley report (Merriam, Nelson, Palmer, Bailey), from Burt, and from Jaeger are acknowledged in appropriate places.

Special thanks are due to Thomas Dawson who acted as volunteer assistant in 1932, to Shumway Suffel who performed a like service in 1931, and finally to Casey A. Wood, whose financial aid made possible the greater part of the field work.

GENERAL CONSIDERATIONS

While in the present report the Charleston Mountains receive the most attention, the Sheep Range is treated also, though incidentally. Only four September days were spent in the latter; fifteen weeks covering various periods of time from midsummer to midwinter were spent in the Charlestons. However, conditions are similar in the two ranges, save that the Sheeps are even more arid, have a maximum altitude of 10,000 feet, and the higher zones are consequently more limited in area.

The Charlestons lie in Clark County, in extreme southwestern Nevada, and about 100 miles east of the Panamint Mountains, on the western rim of Death Valley, California. Save for the Sheep Mountains, which are separated from the Charlestons only by the Las Vegas Valley, and which are part of the same general area, no mountains rise above the Upper Sonoran Zone closer than 100 miles to the west and decidedly greater distances in other directions. These two ranges, the Charleston and Sheep mountains, are thus boreal islands, isolated from contact with other boreal areas by at least 100 miles of Sonoran deserts.

The Charleston Mountains are about 50 miles in length and 30 in width at their widest point, and they rise rather abruptly out of a 3000-foot desert to nearly 12,000 feet. Most of the minor peaks and higher ridges do not exceed 10,000 feet in altitude. They are comparable to the San Bernardino Mountains of southern California in linear dimensions and altitude, but are more broken and are of considerably lesser mass. The trend is north-south, bearing slightly west at the northern end and east at the southern end.

According to Longwell (1926), who has made a rather intensive study of the

geology of these mountains, the Charlestons are more likely to have been elevated contemporaneously with the Rockies (early Tertiary) than with the somewhat older (late Mesozoic) Sierra Nevada. Their original outlines were considerably altered, first by thrusts and later, in the Pliocene, by block faulting, but there has been little subsequent change and it is probable that they have existed substantially in their present form since Pliocene times.

The geological structure of the Charlestons definitely affects the present day flora and fauna. The deeply shattered formation effectually prevents the surface flow of streams and prohibits the formation even of small ponds or marshes. Water, after the last snow of the season has disappeared, is in evidence only as small and widely separated seepages. At a few points, such as Cold Creek, Trout Creek, and Indian Springs, small streams which carry perhaps 50 inches of water appear suddenly, flow for short distances and then sink as abruptly as they arose. These brooks are all at relatively low altitudes, however, and do not alter the fact that the Boreal zones are practically waterless after the last snow has melted.

While the snow pack of normal years is sufficient for conifers, there is a complete absence of such water-requiring trees as sycamores and alders. Willows grow in isolated patches at most of the seepage sites, and small aspens, seldom more than three or four inches in diameter, form dense stands wherever the soil is sufficiently heavy to retain some moisture. There is a fair representation of such shrubs as wild rose and currant, and also of flowering annuals. Taken as a whole the flora of the upper zones is a mingling of the middle and southern California montane, the Idaho-Montana, and the Kaibab, the first taking a relatively minor rôle, with the last two, especially the Kaibab, dominant.

Only two classes of vertebrates, so far as I am aware, have been studied sufficiently to hazard any comment on the faunal relationships of the region. Burt (1934) finds that the great majority of mammals inhabiting the Upper Sonoran and Boreal zones are of general Great Basin distribution; that three are of western (Inyo) affinities, and that three have their closest relationships eastward. As regards birds, the emphasis in the Upper Sonoran and higher zones is even more strongly eastward. Of the 53 species and subspecies which occur as permanent residents or summer visitants in the Upper Sonoran or higher zones, 37 are of general western or at least Great Basin distribution; three are seemingly similar to races otherwise restricted to the Inyo region, and 11 are similar to, or have their closest relationships with, races from the Rocky Mountains. There is no single instance of Sierran or trans-Sierran identity save for the widely distributed forms such as the white-throated swift, rock wren, Clark nutcracker, and Cassin purple finch.

The general outline given above emphasizes the Charleston Mountains as a geological, floral, and faunal outpost whose relationships are almost entirely eastward. This comment certainly applies also in part, and probably in whole, to the Sheep Mountains.

ZONAL DISTRIBUTION OF THE BIRDS

The avifauna of the Charlestons is a rather depauperate one and totals only 78 residents and summer visitants for all the zones. This condition may be accounted for in part by the absence of surface water, with the accompanying absence of certain environments, and in part by isolation. In this respect it is interesting to compare with the Charlestons the San Bernardino Mountains of southern California, a range comparable in size and altitude, from which Grinnell (1908) recorded 116 residents and summer visitants. Isolation and aridity undoubtedly supply adequate reasons

for part of this disparity in numbers, but there are many species whose absence from the Charlestons cannot, seemingly, be so accounted for.

On more than one occasion (Jaeger, 1926; Burt, 1934) attention has been called to the excessive interdigitation of plant belts or zones and their attendant animal life, in the higher altitudes of the Charleston Mountains. Several factors contribute to the restriction and consequent crowding of the upper zones, the chief one being the high altitudes attained by the desert influence. Interdigitation is largely because of the north-south course of the mountain range, with a resulting east-west trend of cañons, a trend which provides maximum contrast in slope exposure.

The Lower Sonoran Zone, because of ascending currents of warm air from the surrounding desert, here reaches to about 6000 feet, and its upward limit is usually pretty sharply defined. The lower levels are typical of the Mohave Desert; that is, the intermont valleys are covered with a thin growth of creosote bush (*Covillea*), with more or less extensive patches of mesquite (*Prosopis*) wherever underground water channels occur, and with clumps of cottonwoods planted for shade about the occasional human habitations. At about 3500 feet joshua trees (*Yucca brevifolia*) appear, and these become the most conspicuous features of the landscape on alluvial slopes up to 6000 feet. (See figs. 2-4.)

From the geographical position of the Charlestons one would presuppose a Lower Sonoran avifauna of mixed affiliations, a supposition which proved to be the case. Present as residents and summer visitants, combined, were found 25 forms, 16 of which are of general western desert distribution, six (*Lophortyx gambelii gambelii, Dryobates scalaris cactophilus, Heleodytes brunneicapillus couesi, Toxostoma lecontei lecontei, Toxostoma dorsale dorsale,* and *Lanius ludovicianus sonoriensis*) which are at, or near, the northern limits of their ranges, two (*Dendroica aestiva morcomi* and *Molothrus ater artemisiae*) which here reach their southern limits, and one (*Otus asio* subsp.?) of unknown status.

The 25 forms, 12 of which are known or thought to be resident, and 13 of which are thought to be only summer visitants, are listed below. Some of these penetrate for varying distances into higher zones, occasionally as breeders and in many cases as up-mountain migrants after the breeding season. Residents (known or presumed) are marked with an asterisk.

*Fulica americana americana
*Oxyechus vociferus vociferus
*Zenaidura macroura marginella
*Lophortyx gambelii gambelii
*Otus asio, subspecies?
Chordeiles acutipennis texensis
*Dryobates scalaris cactophilus
Tyrannus verticalis
Myiarchus cinerascens cinerascens
Sayornis saya saya
Empidonax traillii brewsteri
*Corvus corax sinuatus
Thryomanes bewickii eremophilus
*Heleodytes brunneicapillus couesi
Toxostoma lecontei lecontei
Toxostoma dorsale dorsale
*Lanius ludovicianus sonoriensis
Dendroica aestiva morcomi
*Passer domesticus domesticus
Sturnella neglecta
Icterus bullockii bullockii
Molothrus ater artemisiae
*Carpodacus mexicanus frontalis
*Spinus psaltria hesperophilus
Amphispiza bilineata deserticola

The Upper Sonoran Zone, its lower limit sharply defined against the tree yuccas at about 6000 feet, has in these mountains a usual or average vertical range of about 2000 feet, but it varies considerably with slope exposure. On many north slopes (south exposure) Upper Sonoran vegetation persists and even dominates in many places to above 9000 feet, or it may stop on south slopes (north exposure) at 7000 feet. Typical of this zone and forming the chief ground cover on mesas and soil-covered

slopes are sage-brush (*Artemisia tridentata*), several species of juniper, piñon pine (*Pinus monophylla*), and mountain mahogany (*Cercocarpus ledifolius*). This last named plant replaces sage in the higher levels and is sometimes dominant in limited areas down to 7000 feet. On the most favorable south exposures it often forms dense, tree-like forests, twenty feet or more in height and with trunks up to more than a foot in diameter. (See figs. 4-6.)

The 16 birds characteristic of this zone occur as residents (seven) or summer visitants (nine). Eleven of them are of general western or Great Basin distribution; one (*Otocoris alpestris ammophila*) has its distribution center in the Inyo region to the westward, while four (*Psaltriparus minimus cecaumenorum, Vermivora virginiae, Hedymeles melanocephalus melanocephalus,* and *Pipilo maculatus montanus*) center eastward or southeastward. Resident species are marked with an asterisk.

Chordeiles minor hesperis
Empidonax griseus
Otocoris alpestris ammophila
*Aphelocoma californica woodhouseii
*Parus inornatus ridgwayi
*Psaltriparus minimus cecaumenorum
*Oreoscoptes montanus
Polioptila caerulea amoenissima
Vermivora virginiae
Icterus parisorum
Hedymeles melanocephalus melanocephalus
Passerina amoena
*Pipilo maculatus montanus
*Amphispiza belli nevadensis
*Spizella breweri breweri
Spizella atrogularis evura

The Transition Zone is less well marked than in most western ranges. Not only do the Sonoran zones attain altitudes which would normally at this latitude be distinctly Transition in character, but the Canadian and Hudsonian plant belts descend to very low levels on north exposures; in fact on steep slopes which receive a minimum of sunlight these latter plant belts may occur virtually adjacent to the Upper Sonoran. However, by taking the yellow pine (*Pinus ponderosa*) and silver fir (*Abies concolor*) as the most reliable indicators, the Transition Zone begins at about 8000 feet and extends fairly well defined on cañon floors, on most minor ridges, and on the less abrupt north exposures to about 9000 feet. On south exposures yellow pines and firs are scattered sparsely through the Upper Sonoran vegetation to about the same altitude. The wild currant (*Ribes cereum*) is here the most typical shrub of the yellow pine-silver fir belt. It also extends well above the pine-fir belt and even up to 10,500 feet in the Hudsonian forest, though above 9000 feet it is much less common than below that level. (See figs. 7-10.)

Above 9000 feet the bristle-cone and limber pines (*Pinus aristata* and *Pinus flexilis*) are the dominant conifers, although the silver fir ranges somewhat higher than the yellow pine and occasionally reaches 10,000 feet. Above 10,000 feet the forest is practically a pure stand of bristle-cone pines, and the only ground cover present in any quantity is the dwarf juniper (*Juniperus communis*), which sometimes forms patches several yards in diameter. Curiously enough there appears to be little variety on account of slope exposure in the forest cover above 9000 feet; that is to say, there is little to choose from between north and south slopes save that the growth is much heavier on the north exposures. Aspens (*Populus tremuloides*) are most abundant at about 9000 feet. In favorable areas they form dense stands, but individual trees are depauperate and the trunks seldom exceed six inches in diameter. They apparently do not descend below 8000 feet nor go above 10,000, and at both extremes they are so dwarfed as to be almost shrub-like.

Were it not for the rather abrupt cessation of the yellow pines at about 9000 feet, one might be justified in calling everything above the Upper Sonoran a Transition-Canadian-Hudsonian Zone. One may find spots in which trees so diverse, zonally, as

mountain mahogany, junipers, yellow pines, firs, limber pines, aspens, and bristle-cone pines grow within a few yards of one another. At other points one may find an Upper Sonoran stand of mountain mahogany, stunted sage-brush, piñons, and junipers on the south exposure of a cañon, with a bristle-cone pine, fir, and aspen forest on the opposite slope. However, the undoubted Hudsonian character of the highest forests makes the recognition of a division above the Transition necessary, though whether one calls the lower division a Transition-Canadian or the upper one a Canadian-Hudsonian is of little moment, since the few Canadian elements in the flora lap broadly over both. (See figs. 11-13.)

The few hundred feet above timberline, about 11,500 feet, is seemingly a pseudo-Arctic Alpine, for it seems to be more in the nature of a rocky outcrop, unsuitable for timber because of the lack of soil, rather than an elevation above true timberline. At any rate there seem to be no true Arctic Alpine mammals or birds there.

As regards the distribution of birds above the Upper Sonoran Zone I am unable to make any zonal division. The Transition Zone with its infusion of Canadian and touch of Hudsonian below the 9000-foot level is certainly the center of the bird population. In other words *all* the species which occur in the mountains above the Upper Sonoran are just as numerous in the breeding season below 9000 feet as they are above that level. This is just as true for such (normally) Canadian and Hudsonian Zone indicators as Wright flycatcher, Cassin purple finch, Townsend solitaire, Clark nutcracker, and Great Basin hermit thrush as it is for typically Transition species like the broad-tailed hummingbird, Steller jay, brown creeper, pigmy nuthatch, and western tanager. A further complexity is provided by the still lower levels to which such supposedly Canadian Zone species as the Pacific nighthawk and green-tailed towhee descend, species which here penetrate downward into the Upper Sonoran, and by the appearance of such a typically Lower Sonoran species as Costa hummingbird in the Transition.

The effects of the crowding and interdigitation of zones or plant belts on the distribution of bird life are various and no two species seem to be affected exactly alike. One can select examples which follow particular kinds of habitat regardless of altitude, as witness the pigmy nuthatch, spurred towhee, and bush-tit. On the other hand the Wright flycatcher, broad-tailed hummingbird, hermit thrush, green-tailed towhee, and others, appear to relegate habitat to a relatively minor role and to occur only between certain extremes of altitude. The Charleston Mountains depart widely from the ideal orderly sequence of biotic zones, and I was unable to spend even a short time there without experiencing radical revision of some, at least, of my previously conceived beliefs.

Nineteen species and subspecies of birds are known or thought to be permanent residents of the "Transition-Canadian-Hudsonian" Zone, and 15 others were detected as summer visitants. In the combined total of 34, 24 are of general western or at least Great Basin distribution, two (*Parus gambeli inyoensis* and *Sitta carolinensis tenuissima*) are otherwise known only from mountains of the Inyo region to the west, and seven (*Sphyrapicus thyroideus nataliae, Dryobates villosus leucothorectis, Cyanocitta stelleri percontatrix, Sitta pygmaea canescens, Certhia familiaris leucosticta, Dendroica auduboni memorabilis,* and *Junco oreganus mutabilis*) are either Rocky Mountain forms or, if peculiar to the Charlestons, have their nearest relationships in that region.

Although some of the species here listed also occur, sometimes commonly, in the Upper Sonoran and Hudsonian zones, there is none which, locally, can be said to characterize these zones.

*Accipiter atricapillus atricapillus
*Buteo borealis calurus
*Aquila chrysaëtos canadensis
Cryptoglaux acadica acadica
Phalaenoptilus nuttallii nuttallii
Aëronautes saxatalis saxatalis
Calypte costae
Selasphorus platycercus platycercus
*Sphyrapicus thyroideus nataliae
*Dryobates villosus leucothorectis
Empidonax wrightii
Tachycineta thalassina lepida
*Cyanocitta stelleri percontatrix
*Nucifraga columbiana
*Parus gambeli inyoensis
*Sitta carolinensis tenuissima
*Sitta pygmaea canescens
*Certhia familiaris leucosticta
Cinclus mexicanus unicolor
Troglodytes domesticus parkmanii
*Turdus migratorius propinquus
Hylocichla guttata polionota
*Sialia mexicana occidentalis
*Myadestes townsendi
*Corthylio calendula calendula
Vireo gilvus swainsonii
Dendroica auduboni memorabilis
Piranga ludoviciana
*Carpodacus cassinii
*Spinus pinus pinus
*Loxia curvirostra, subspecies?
Oberholseria chlorura
*Junco oreganus mutabilis
Spizella passerina arizonae

In addition to the foregoing lists of species which adhere more or less closely either to special plant belts or altitudes, there were three resident species which occurred so generally in the Charleston Mountain region that they cannot be assigned to any one zone. They are

Bubo virginianus, subspecies
Catherpes mexicanus conspersus
Salpinctes obsoletus obsoletus

Fig. 1. A corner of the reservoir at Indian Springs, a desert oasis at the northeast base of the Charleston Mountains. Some species characteristic of this environment were the western kingbird, Traill flycatcher, yellow warbler, English sparrow, Bullock oriole, and house finch. In fall and winter this pond was frequented by various herons, ducks and shore birds. Photograph taken September 15, 1930.

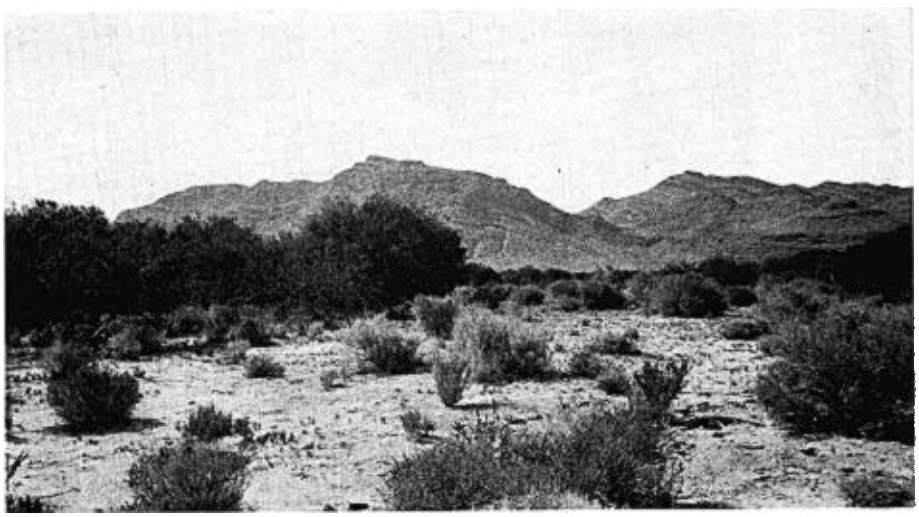

Fig. 2. A mesquite and quail-brush habitat (altitude 3200 feet) near Indian Springs. Species found in this spot were Gambel quail, Texas nighthawk, raven, cactus wren, Leconte thrasher, and desert shrike. Many species of small birds were found in the mesquites during migrations. Photograph taken September 15, 1930.

Fig. 3. Lower Sonoran desert (altitude 4000 feet) on the alluvial fan below Lee Cañon on the east side of the Charleston Mountains, which are seen in the distance. Some of the plants prominent on this type of desert are included in this view; the joshua tree or tree yucca (*Yucca brevifolia*) in the middle distance, the Mohave yucca (*Yucca baccata*) in the right foreground, and the greasewood (*Covillea tridentata*) in the left foreground. Some birds found in this association in the breeding season were Gambel quail, cactus woodpecker, cactus wren, desert shrike, and desert sparrow. Photograph taken September 14, 1930.

Fig. 4. Juncture of Lower and Upper Sonoran zones at 6000 feet altitude near the mouth of Lee Cañon. Here tree yuccas reach their highest point and meet the lowest outposts of piñon pine (*Pinus monophylla*), juniper (*Juniperus californica*) and sage-brush (*Artemisia tridentata*).

Fig. 5. Upper Sonoran Zone mesa near Cold Creek, where sage-brush, piñon pines, junipers, and mountain mahogany (*Cercocarpus ledifolius*) are the dominant plant growths. The dead trees are chiefly fire-killed junipers. Some birds which characterize this association are the gray flycatcher, Woodhouse jay, gray titmouse, sage thrasher, northern sage sparrow, and Brewer sparrow. Photograph taken at 7000 feet altitude on October 24, 1931.

Fig. 6. Upper Sonoran vegetation at Cold Creek, altitude 6200 feet. Prominent in this view are sage-brush, piñons, junipers, and mountain mahogany, with Gambel oaks in the foreground and middle distance. The depauperate form of the oaks is characteristic of the region. Here were found the western nighthawk, Woodhouse jay, bush-tit, Virginia warbler, black-headed grosbeak, spurred towhee, and Brewer sparrow.

Fig. 7. Macfarland Spring, altitude 8000 feet, a place of mixed zonal features. Note the great size attained by mountain mahogany as shown in the center of the view. Here were observed the Virginia warbler, broad-tailed hummingbird, western robin, black-headed grosbeak, and green-tailed towhee. Photograph taken October 24, 1931.

Fig. 8. Macfarland Spring, altitude 8000 feet. The vegetation on the north and east exposures at this altitude is mostly Transition and consists of yellow pines (*Pinus ponderosa*), silver firs (*Abies concolor*), and an undergrowth of wild currant (*Ribes cereum*). The Gambel oak at the left of the view is the largest specimen we observed in the Charleston Mountains. This spot was a summer habitat for the white-breasted woodpecker, Wright flycatcher, southern Nevada crested jay, Inyo chickadee, Great Basin hermit thrush, pine siskin, and chipping sparrow. Photograph taken on October 24, 1931.

Fig. 9. The upper spring, altitude 8700 feet, in Lee Cañon, the only surface water within a radius of several miles, and where more species of birds were found than at any other spot in the mountains. This is near the foot of the north slope (south exposure); above and to the left is a mountain mahogany thicket which extends upward for over a thousand vertical feet, and is mixed with piñons, junipers, and occasional patches of sage-brush, as well as with a few yellow pines. In this mixed growth, chiefly Upper Sonoran in character, were found the broad-tailed hummingbird, Wright flycatcher, Inyo chickadee, western house wren, Great Basin hermit thrush, Woodhouse jay, green-tailed towhee, and spurred towhee. Photograph taken July 13, 1932.

Fig. 10. Looking south from the upper spring in Lee Cañon, altitude 8700 feet. An almost pure growth of yellow pines extends across the cañon floor and lesser ridges to the base of the white rock in the center. The timber on the distant slope, up to the crest of the ridge which has an elevation of about 10,500 feet, is chiefly limber pine (*Pinus flexilis*) and bristle-cone pine (*Pinus aristata*). Some summer birds of this yellow-pine Transition Zone forest were the western goshawk, Nuttall poor-will, white-breasted woodpecker, Wright flycatcher, violet-green swallow, southern Nevada crested jay, Clark nutcracker, pigmy nuthatch, Rocky Mountain Audubon warbler, western tanager, crossbill, and western chipping sparrow. Photograph taken July 13, 1932.

Fig. 11. Mixture of Transition, Canadian, and Hudsonian vegetation at an altitude of 8700 feet in Lee Cañon. Within this view are yellow pines, silver firs, aspens (*Populus tremuloides*), limber pines, and bristle-cone pines. The shrubs in the right foreground are wild currant. It was in mixed associations such as this that the broad-tailed hummingbird and Nevada junco were most often found. Within 100 yards of this spot was the spring above which the vegetation was essentially Upper Sonoran. Photograph taken on August 19, 1932.

Fig. 12. Aspen grove at 9000 feet altitude in Lee Cañon. The small size of the trees is characteristic in these mountains. Bird life is rather limited in this association, the most frequently encountered species being the broad-tailed hummingbird, Great Basin hermit thrush, southern Nevada junco, and western warbling vireo. The last named species is virtually confined to this environment. Photograph taken August 19, 1932.

Fig. 13. View from 9300 feet altitude looking east down Lee Cañon. On the right hand slope is a Canadian-Hudsonian forest of limber and bristle-cone pines, in which a few silver firs are intermingled; the bottom of the cañon is a Transition-Canadian mixture of yellow pines, silver firs, aspens, and a few limber pines; the distant left-hand slope is an Upper Sonoran association of mountain mahogany, junipers, and piñon pines to an altitude of about 9500 feet with, as one ascends the cañon, tongues of Transition in the minor cañons. The last touch of Upper Sonoran vegetation in Lee Cañon is seen in the extreme left middle distance. It consists of a thin growth of mountain mahogany in which may be seen two piñons and a juniper. The high ridge to the left supports a nearly pure stand of bristle-cone pines. Photograph taken on August 19, 1932.

ANNOTATED LIST OF THE BIRDS

The following list contains all of the species and subspecies of birds known to occur at any season of the year in the Charleston Mountains. Such notes and specimens as were taken in the Sheep mountains are included for the sake of the contributory data. The list covers 42 permanent residents, 36 summer visitants, and 82 transients or winter visitors. With further field work the transient list could probably be extended considerably and the summer visitant list slightly, but the resident list is thought to be fairly complete.

Ardea herodias treganzai Court. Treganza Blue Heron.

Two great blue herons, presumably of this subspecies, were seen perched in willows which bordered the reservoir at Indian Springs, on September 15, 1930. They were most probably post-breeding-season wanderers, for no evidence of nesting was noted in the region.

Casmerodius albus egretta (Gmelin). American Egret.

The wing of an egret, said to have been killed about mid-August, was found nailed to the door of a building at Indian Springs, on September 12, 1930. Later the upper mandible of presumably the same individual was found nearby. Wing and mandible were preserved as evidence of the casual presence of the egret at Indian Springs.

Nycticorax nycticorax hoactli (Gmelin). Black-crowned Night Heron.

Adults and young-of-the-year in streaked juvenal plumage were frequently seen in trees about the reservoir at Indian Springs between September 11 and 15, 1930. No evidence of nesting was observed.

Mycteria americana Linnaeus. Wood Ibis.

The remains of four wood ibises were found about the pond at Indian Springs in September, 1930. Residents stated that the birds had been killed in May, July, and August of that year. On September 13, a single bird circled for some time over the pond but did not alight. All four of the dead birds found at Indian Springs (the heads of two of which were preserved) were young-of-the-year, with heads and necks extensively feathered.

Mareca americana (Gmelin). Baldpate.

A female baldpate was killed by a local hunter at Indian Springs on September 12, 1930. Residents stated that this is a common duck on the reservoir later in the fall.

Dafila acuta tzitzihoa (Vieillot). American Pintail.

Remains (heads and wings) of pintails were frequently found at Indian Springs in September, 1930. Most if not all of these birds had apparently been killed a month or more previous to our visit. A solitary female was seen to alight on the pond at noon on September 12.

Nettion carolinense (Gmelin). Green-winged Teal.

On the morning of October 21, 1931, a local hunter shot seven green-winged teal at Indian Springs and I saw the remains later in the day. The hunter estimated that there were at least a dozen other birds in the flock.

Querquedula cyanoptera (Vieillot). Cinnamon Teal.

A hunter at Indian Springs killed two cinnamon teal from a small flock on September 13, 1930. This flock was not on the pond but was puddling in the shallow

water in a flooded, weed-grown pasture. Merriam (Fisher, 1893) killed a female at Upper Cottonwood Springs on April 30, 1891.

There is no evidence that the cinnamon teal nests in the Charleston region, although there is room for a pair or two at Indian Springs were there any protection for them at that season.

Spatula clypeata (Linnaeus). Shoveller.

Desiccated remains of shovellers were found at Indian Springs in September, 1930. In the early morning of September 12, a flock of seven alighted on the pond.

Cathartes aura teter Friedmann. Western Turkey Vulture.

Cathartes aura teter Friedmann, Proc. Biol. Soc. Wash., **46**, Oct. 26, 1933, 188 (Riverside, California).

The only record of turkey vultures in the Charleston region is that by Jaeger (1927) who saw five birds circling about Charleston Peak, on June 21, 1926. Although the late date would indicate that these birds were summer visitants, the facts that they were in a flock and were seen but once suggest that they were casuals or transients.

Accipiter atricapillus atricapillus (Wilson). Eastern Goshawk.

Goshawks certainly breed in the Transition Zone in both the Charleston and Sheep mountains. They also occur in fall and are probably resident. In July, 1929, Burt and Dawson found a nest in a yellow pine at the spring at 8500 feet in the Hidden Forest. At that time two, nearly grown young could be seen standing on the edge of the nest, and both parents were present. On September 16, 1930, Burt and the writer visited this nest and shot an adult female goshawk there. She was very bold and cackled loudly as soon as we came into sight and was finally shot from the top of a dead pine within fifty yards of the old nest. Her actions indicated strongly that she had a proprietary interest in the locality and we believed her to be a member of the resident pair. A second nest, which had evidently been used in the breeding season of 1930, was found in a yellow pine about a quarter of a mile below the first site. Another circumstance which indicated that the bird collected was a resident one was that she was in heavy molt.

In the Charlestons a pair of adult birds was seen in the yellow pines in Lee Cañon on August 23, 1932, near a nest which appeared to belong to this species. Another adult, or more likely one of the same birds, was seen in the same place on October 22, 1931. An adult male, one of a pair of adults, was shot as the two birds flew out of a willow clump at Cold Creek on October 24, 1931. We failed to find any young of the year other than the two which were seen, but not collected, by Burt in the Hidden Forest in 1929.

The two specimens collected belong to the eastern subspecies. Identification is based on the paler color of the upper parts (particularly the anterior parts) as compared with the breeding birds of the Sierra Nevada and the northwest coast. I cannot distinguish them in any way from adults of *atricapillus* from the eastern United States.

Accipiter striatus velox (Wilson). Sharp-shinned Hawk.

We found sharp-shinned hawks to be common migrants through the region. The earliest date of arrival noted was August 19, 1932. Some seasonally subsequent dates were August 30 at Cold Creek; September 11 at Indian Springs; September 14 and October 9 at Lee Cañon, and October 22 at Cold Creek. Individuals were observed over most of the territory covered in the fall months, though the species was most numerous in the more heavily wooded localities. Extremes of altitude were 3500 and 9000 feet.

In the Sheep Mountains from September 15 to 19, 1930, the concentration of sharp-shinned hawks surpassed anything Burt or I had ever witnessed. During these four days we killed twenty sharp-shins in a four-mile-long area of yellow pines, and at least an equal number escaped. At least ten of these hawks made the spring their headquarters, since at that spot were always to be found numbers of migratory small birds.

In spite of marked similarity of environment we found small birds in general to be *much* less common in the Hidden Forest than in the Charlestons in September, 1930, and this scarcity we believe to be attributable mainly to the abundance of sharp-shinned hawks in the former locality. In July, 1929, Burt found juncos present in the Hidden Forest in much the same numbers as in the Charlestons. In September, 1930, although juncos were decidedly more common in the Charlestons (*fide* Burt) than in the summer of 1929, we failed to find a single individual in the Hidden Forest where sharp-shins were so numerous.

We saw no trace of these hawks in the breeding season in either range, but two adults and a group of four young-of-the-year were seen in the Hidden Forest in September under circumstances which suggested that the assemblage was a family party. Both adults plainly resented our presence and refused to leave the vicinity of the remarkably tame young birds.

Three specimens were preserved; they were collected at Cold Creek, August 30, 1932; Indian Springs, September 11, 1930; and Lee Cañon, October 22, 1931.

Accipiter cooperii mexicanus Swainson. Western Cooper Hawk.

Although this hawk was found to be a common and generally distributed fall migrant, not a single individual was observed during the summer and there is no evidence that it breeds in the region. The earliest date of arrival noted was August 15 (1932), when a bird-of-the-year, a female, was taken in the pines in Lee Cañon at 8700 feet. Another young female was secured in the same locality on August 19. At Indian Springs five birds, all young of the year, were present in the mesquites and cottonwoods between September 11 and 15, 1930. On September 19, 1930, an adult and a juvenile were seen in the Hidden Forest in the Sheep Mountains. The latest dates of record are October 11 and 21, on both of which days young-of-the-year were seen at Indian Springs.

Buteo borealis calurus Cassin. Western Red-tailed Hawk.

Red-tailed hawks were noted up to 9000 feet in every mountain locality we visited in the summer and fall months, and in September, October, November and February they were also found to be sparingly but regularly distributed over the Sonoran mesas and deserts. Fisher (1893) reports red-tails from the Charlestons in [February, March, or April] 1891, but gives no specific localities. Jaeger (1927) records "several pairs" as nesting in the conglomerate cliffs in Kyle Cañon, but he gives no dates.

It seems unlikely that red-tails remain in the higher altitudes during the winter, since most of the rodents hibernate at that season. Whether the winter birds seen at lower levels in the late fall and winter represent a downward seasonal migration or whether they were winter visitants from other regions, is not known.

Aquila chrysaëtos canadensis (Linnaeus). Golden Eagle.

A pair of golden eagles was seen almost daily during July and August, 1932, about the cliffs at about 9000 feet in Lee Cañon. Merriam (Fisher, 1893) saw one in the Charlestons on April 29, 1891, presumably at or near Mountain Spring. A single golden eagle was seen on the desert at the west base of the Sheep Mountains on

October 12, 1931. Too few individuals were seen to be significant for seasonal movement; but it seems probable that these eagles are confined to the mountains during the summer and descend to lower levels when cold weather causes the disappearance of small mammals.

Haliaeetus leucocephalus leucocephalus (Linnaeus). Southern Bald Eagle.

On September 26, 1930, a bald eagle was noted flying over the Lower Sonoran desert near the mouth of Kyle Cañon. This bird passed close to us and there can be no mistake in the identity.

Circus hudsonius (Linnaeus). Marsh Hawk.

Three migratory marsh hawks were seen over flooded fields at Indian Springs, on September 11, 1930.

Falco mexicanus Schlegel. Prairie Falcon.

A pair of prairie falcons flew over our camp in Lee Cañon (8000 feet) on October 9, 1931, and another pair, or possibly the same birds, was seen at Indian Springs on the 11th. A female of the year was collected at Indian Springs on October 23, 1931. She had previously been noticed stooping at ducks, quail, and other birds from her regular stand, the topmost branch of a tall, leafless cottonwood at the edge of a pasture.

One would imagine the prairie falcon to be a permanent resident in this desert area where food and nesting sites are adequately available, but to date the species has been noted only as a fall migrant.

Falco sparverius sparverius Linnaeus. Eastern Sparrow Hawk.

Sparrow hawks were found only as fall migrants in the Charleston region, though the contributory data furnished by the Death Valley expedition (Fisher, 1893) shows that they undoubtedly occur as spring migrants also. There is no evidence that this species breeds in the Charlestons or even on the immediately adjacent desert.

The earliest date of arrival noted was July 19, 1931, when a female of the year was collected on the juniper-sage mesa at Cold Creek. A male which was seen in the tip of a dead pine at the edge of a dry meadow in Lee Cañon (8700 feet), August 22, 1932, was a transient, for it was seen on but the one occasion. In October, 1931, a single bird was seen on the 10th in the joshua-tree belt at 5000 feet near the mouth of Lee Cañon; one was seen on the 11th at Indian Springs, and one was seen on the mesa at Cold Creek on the 24th.

The single specimen collected belongs unmistakably to the subspecies *sparverius*.

Lophortyx gambelii gambelii Gambel. Gambel Quail.

The Gambel quail is a common resident throughout the Lower Sonoran Zone. As in other localities, it tends to be more numerous where there is thick protective cover, such as mesquite patches, than on the open desert. However, it was by no means confined to the Lower Sonoran and was found to be a fairly common resident of the piñon-sage-juniper association in the Upper Sonoran. In this last named environment Burt found Gambel quail common at 6600 feet at Wheeler Springs near the north end of the range in June, 1929; we found it in fair numbers at Cold Creek (6000 feet) in July, August, October and November, 1932; and in July it was occasionally encountered on the higher parts of that mesa up to 7000 feet. Merriam (Fisher, 1893) found Gambel quail "abundant" at Mountain Spring and at Upper Cottonwood Spring in late April, 1891. In February, 1931, Burt and the writer found two small covies at 6000 feet at the mouth of Kyle Cañon. At this time there was permanent snow as far down as 6500 feet and alternate snow and thaw at 6000, with sharp freezing at night. This would seem to establish Gambel quail as a permanent resident

up to 6000 feet, with considerable infiltration during the late summer into the Upper Sonoran up to 7000 feet.

What appears to me to be a really remarkable occurrence is the presence of this quail near timberline (11,000 feet) on Charleston Peak in July and August. After Burt made his first trip to the summit, from July 3 to 9, 1928, he asked me what species of quail would be found at timberline, since he had noticed a fair number there, some of which appeared to be young. In response to my request for specimens he shot one from a moderate-sized covey on August 7 of the same year. This specimen proved to be a female Gambel quail, molting into the first annual (first post-breeding) plumage. In order to get to such an altitude it would be necessary for the quail to pass through 2500 vertical feet of limber pine and bristle-cone pine forest, though by keeping to the ridges, fairly open ground could be traversed for most or all of the distance. All in all, it would seem more likely that these quail had led their young in an up-mountain migration, rather than that eggs had been laid and the young hatched at any such distance from the normal Lower Sonoran Zone habitat. Winter conditions would, of course, prohibit residence at any such altitude.

Fulica americana americana Gmelin. American Coot.

Mudhens were found in July, August, September, October, November and February at Indian Springs. Two pairs seen there on July 9, 1932, acted as though they might be nesting, although no direct evidence was obtained on this point. At no time were they numerous, for they were systematically shot by local hunters.

Oxyechus vociferus vociferus (Linnaeus). Killdeer.

Killdeers were fairly common in cultivated areas about Indian Springs in September (11 to 15) 1930, in early February, 1931, in early July, 1932, and in October, 1932. The species is, therefore, apparently resident in suitable localities in the Lower Sonoran Zone. In July, 1932, killdeers were present on the sage-juniper mesa at Cold Creek at a spot where the stream had been diverted and flowed over the flat. One bird taken here on the 20th was a juvenile with filaments of natal down adhering to the tips of the tail feathers; it was probably hatched in the vicinity.

Capella delicata (Ord). Wilson Snipe.

A single snipe, shot in a flooded pasture at Indian Springs on October 25, 1931, is the only fall record of the species. Fisher (1893) reports that "several" were seen by Bailey at Cottonwood Springs in early March, 1891.

Actitis macularia (Linnaeus). Spotted Sandpiper.

An adult male spotted sandpiper, in full summer plumage and with incubation patches on its sides, was taken on an old irrigation ditch at Cold Creek on July 20, 1932. In spite of the early date its actions were not those of a breeding bird and its status was probably that of an early migrant. The only other occasion when this species was noted was at Indian Springs on September 12, 1930, when a bird of the year was collected at the edge of the reservoir.

Tringa solitaria cinnamomea (Brewster). Western Solitary Sandpiper.

The western solitary sandpiper appears to be a rather common fall migrant in suitable localities at the lower elevations. Specimens were taken at Cold Creek on July 20 and August 29, 1932, and at Indian Springs on September 11 and 13, 1930. Several individuals were seen at Indian Springs other than those collected. It is of interest to note that an adult male taken on September 13 still retained large incubation patches on the sides, while an adult female, which by dissection had laid that year (collected July 20), showed no trace of having incubated. This circum-

stance is mentioned because Pickwell (1930) has listed the solitary sandpiper among the species concerning which no incubation data are available.

All five specimens collected have the freckled inner web of the outer primary, probably the most reliable single character for distinguishing the race *cinnamomea*. The three fall immature birds have buff-spotted upper parts; the adult male is changing from a white-spotted summer to a buff-spotted winter dorsal plumage, and the adult female, which is still in complete summer plumage, has white-spotted upper parts like the remains of the summer plumage in the adult male.

Ereunetes mauri Cabanis. Western Sandpiper.

The western sandpiper was noted only as a rare fall migrant at Indian Springs, where single birds were shot on July 11, 1932, and September 13, 1930. The specimen taken on July 11 was an adult male in worn, although still complete, summer plumage.

Recurvirostra americana Gmelin. Avocet.

The remains of an avocet, apparently dead not longer than a week, were found at Indian Springs on September 12, 1930.

Zenaidura macroura marginella (Woodhouse). Western Mourning Dove.

Mourning doves were found to be permanent residents at Indian Springs (July, August, September, October, and February). Merriam (Fisher, 1893) found them at Mountain Spring and Upper Cottonwood Spring on April 30, 1891, so that records from the Lower Sonoran Zone extended through the year.

In midsummer and fall, mourning doves are of sparse though general distribution in the mountains up to 8700 feet altitude, principally in the yellow pine parks; but whether these birds breed to such elevations or whether they are simply up-mountain migrants is not known. Jaeger (1927) noted them in June in "scrub forest and among pinyons," but he gives no altitudes. An occasional individual was noted in Lee Cañon in July, 1932, but we saw none in August until the 22nd, when an obviously immature bird came to our camp at 8700 feet. From that date forward, several were seen daily in the locality. They were fairly common in Lee Cañon on September 14, 1930, and common at 8500 feet in the Sheep Mountains from the 16th to the 19th of that month. We saw none above the 4000-foot level in October, 1931, although doves were then fairly common in the lower country.

Tyto alba pratincola (Bonaparte). Barn Owl.

One of the guests at Indian Springs killed, and sent to me in the flesh, a barn owl. It was received on October 19, 1932, and was probably killed about the 15th. None of us personally encountered the barn owl anywhere in the region and it seems likely that the one mentioned above was a migrant.

Otus asio, subspecies. Screech Owl.

On various evenings durings the early part of July, 1932, a screech owl was heard trilling in the cottonwood grove which shaded the guest cabins at Indian Springs. This bird was the subject of search by ourselves and various guests whenever it was heard, but no one succeeded in seeing it other than for brief moments. To what subspecies the screech owls of the Lower Sonoran Zone in this region might belong it is impossible at this time even to guess.

Bubo virginianus, subspecies. Great Horned Owl.

Horned owls were often heard calling on the desert, in the piñon belt, and in the mountains up to at least 9000 feet; but to what subspecies they belonged is not known. A specimen taken on the Muddy River at St. Thomas on August 1, 1929, is *pallescens*; but St. Thomas is distinctly a locality of lower Colorado River affinities

and it does not necessarily follow that the Charleston horned owls would be *pallescens* also.

Nyctea nyctea (Linnaeus). Snowy Owl.

A male snowy owl, evidently adult, was shot at Indian Springs by a local trapper on or about December 1, 1929, and sent to us in the flesh by Miss Gertrude Snyder, then a resident of that place. It was received in good condition and is now number 31263 of the Dickey collection. Other than that the bird was shot near the end of a week of very cold weather, nothing is known as to the circumstances of the capture.

Speotyto cunicularia hypugaea (Bonaparte). Western Burrowing Owl.

At dusk on the evening of February 6, 1931, a burrowing owl was seen in the road near Indian Springs. Since we found no trace of the species at any other season, we assume this bird to have been a vagrant.

Asio wilsonianus (Lesson). Long-eared Owl.

Long-eared owls were detected only as fall migrants in the mesquite thickets at Indian Springs. On October 22, 1931, a visitor shot one bird from a "flock" which he found in and about the mesquite-shaded, deserted house. We found three at the same spot on the 25th and collected one. These two specimens, together with one collected at Coyote Springs, Lincoln County, are extremely pale and exhibit what is probably the maximum amount of white to be found in this species.

Cryptoglaux acadica acadica (Gmelin). Saw-whet Owl.

On the morning of June 18, 1928, Burt took an adult male saw-whet owl from a meat-baited steel trap set for carnivores in a patch of yellow pines and aspens at 8000 feet in Kyle Cañon. At about 9 p.m. the same day, a fully grown juvenile female was heard calling from a yellow pine about a mile from the spot where the adult had been trapped, and was finally located with the aid of an electric torch. It is possible that the small owl recorded by Jaeger (1927) as "*Glaucidium gnoma* subsp." really belonged to the present species, since it was seen (June 17, 1926) at the same place where Burt took his two specimens.

The adult taken possesses broad and very extensive white streaking on the forehead and crown, indeed it surpasses in this respect any other saw-whet owl examined to date. In addition, both the adult and the juvenile are more slaty (less brownish) dorsally than is normal for the subspecies *acadica*. Whether these birds represent an undescribed race, or are merely pale individuals, must be determined in the light of further material.

Phalaenoptilus nuttallii nuttallii (Audubon). Nuttall Poor-will.

In the region covered in this report the Nuttall poor-will was typically a bird of the yellow-pine zone, a manner of distribution at marked variance to the usual Upper Sonoran restriction. Jaeger (1927) records a single bird in the pines at 9000 feet in June, 1926. We heard the characteristic call notes in Lee Cañon all during July and August, 1932, at altitudes from 8000 to 9000 feet, but in no great quantity, and we estimated that not more than three males were within earshot of our camp at 8700 feet. Burt heard several poor-wills in the pines in the Hidden Forest in the Sheep Mountains in July, 1929, and he collected a specimen there on the 9th of that month.

In early July, 1932, Dawson and the writer spent three nights at Cold Creek, an Upper Sonoran locality apparently perfectly suited to the needs of poor-wills; but we found no birds, nor did we hear so much as a single call note. In the same place we took a fully grown juvenile on August 29, 1932, but concluded that it had come down from the higher mountains following a cold, rainy day and night of the week

before. In other words we believed that poor-wills had followed the same downward shift noticed in the cases of various other species at the first hint of cold weather.

I am unable to distinguish the two specimens collected from examples of *nuttallii* from eastern Arizona, though from the geographical position of the Charlestons one might expect them to show the characters ascribed by Oberholser (1932) to his recently named race, *P. n. nyctophilus*.

Chordeiles minor hesperis Grinnell. Pacific Nighthawk.

Pacific nighthawks were found in the breeding season only on the sage-juniper mesa (6000 to 7000 feet) at Cold Creek. There, on July 10 and 20, 1932, about a dozen individuals were seen each evening as they worked back and forth over the mesa, usually in the vicinity of the small stream. No nests were found, although a female which obviously had recently laid was taken on the 20th.

On August 23, 1932, a flock of five Pacific nighthawks appeared at dusk over our camp in Lee Cañon. This was the only occasion when the species was encountered in the higher mountains, and the flock may well have been evidence of a migratory movement, for we found only one individual at Cold Creek on August 30.

On September 11, 1930, two nighthawks, obviously differing from one another in color, were seen flying in uncertain fashion over the desert at Indian Springs. The same pair was seen on the 12th and again on the 13th, at which time the darker colored one was collected. It proved to be a juvenile *hesperis* with traces of sheathing still persisting at the bases of the wing quills, and it was so emaciated that it could fly only with difficulty. Its flying companion again appeared on the 14th, when it was collected and found to be a juvenile Texas nighthawk in much the same state of starvation. In the case of the young *hesperis* the doubly exceptional circumstance of late date and Lower Sonoran occurrence was probably the result of a bird hatched so late in the season that it had not sufficient time to reach the maturity necessary for the southward migration.

Chordeiles acutipennis texensis Lawrence. Texas Nighthawk.

Every evening in the months of July, August, and September that we were at Indian Springs numerous Texas nighthawks were seen over the fields and reservoir and, in lesser numbers, over the adjacent desert. They were common on the evening of September 14, 1930, but none was seen on October 10, 1931, nor on any seasonally subsequent dates. Not a single Texas nighthawk was seen at any time above the 3500-foot level, though one would expect at least occasional birds up to the limit of the Lower Sonoran desert growth.

Chaetura vauxi (Townsend). Vaux Swift.

Vaux swifts, probably transients, were seen in small flocks over Lee Cañon (8700 feet) on August 12, 13, and 27, 1932. These birds appeared in the late afternoons and, in company with violet-green swallows, remained in the locality until after sundown. Sheldon, on June 10, 1930, took a specimen of this swift at Pahrump Ranch, a few miles west of the Charlestons. However, none was found in the mountains other than as migrants, and the Pahrump individual, in spite of the late date, was probably a late migrant also.

Aëronautes saxatalis saxatalis (Woodhouse). White-throated Swift.

White-throated swifts were found to be fairly numerous in the Charlestons in July, August, and up to September 26, chiefly at the higher altitudes. They were observed most commonly at from 8000 to 9000 feet in Lee Cañon where towering cliffs overlook the yellow pine parkland, and in a similar environment in Kyle Cañon.

In the Sheep Mountains, white-throated swifts were not uncommon above the Hidden Forest from September 16 to 19.

It is probable that swifts leave the mountains when the first weather cold enough to affect their food supply arrives. We found none anywhere in the region in early October, 1931.

Calypte costae (Bourcier). Costa Hummingbird.

During July and August, 1932, the Costa hummingbird was found to be common in the yellow-pine belt in the Charlestons. A certain number were noted at Cold Creek in July and again at the end of August, but at this lower level they were by no means so common as in the pine belt.

Jaeger (1927) lists *"Calypte anna"* as present in the lower pine belt and chaparral in June, 1926, but makes no mention of *costae*. We found no trace of Anna hummingbird anywhere in the region and it seems probable that Jaeger's *"anna"* record really pertains to the present species.

In Lee Cañon in July and August both sexes were present in apparently equal numbers. No nests were found, though males were seen in courting flight up until mid-July. It is probable that the June birds seen by Jaeger and the early July birds seen by ourselves were breeding; but positive evidence, other than the courting of males, is lacking. In the latter half of July a decided increase in the number of Costa hummingbirds was noticeable, and by August 27 when we left the locality they were almost abundant at from 8000 to 9000 feet. These additions to the earlier number we considered to be vertical migrants from the Upper Sonoran, although part may have been migrants in transit. In September, 1930, we found the species still present in the mountains (up to 8500 feet) on the 14th, but none was observed there on the 26th.

In the Sheep Mountains these hummingbirds were fairly common from September 16 to 19, 1930, in the yellow pine belt up to 8500 feet. The last date is the latest we have for the species in this region.

Selasphorus platycercus platycercus (Swainson). Broad-tailed Hummingbird.

Broad-tailed hummingbirds were very common in summer between the 7500- and 9500-foot levels; we were seldom out of earshot of the metallic buzzing of one or more males. Within the 2000-foot zone of distribution these hummers were found in every type of habitat from the mahogany thickets on south exposures to the silver fir and limber-pine woods on the opposite slopes. They were perhaps most numerous in yellow-pine parks and aspen thickets. Not one individual was noted below 7500 feet, although extensive thickets of mountain mahogany, a tree much frequented above that altitude, may be found as low as 6000 feet.

Young-of-the-year begin to make their appearance about the end of July, and the period of greatest abundance (in 1932) was the middle of August. A sharp drop in numbers was apparent between August 15 and 20, and there was progressive rarity until August 27 when the species was noted as "still present but rare." On this date camp was moved to a lower locality, so that the actual date of departure for the species is not known. However, we found none present in the Charlestons on September 14, 1930, or in the Sheep Mountains on the 16th.

Specimens were taken in Lee Cañon (13) and at Macfarland Spring (1). These differ from a series from Colorado, Arizona, Sonora, and the Mexican Plateau (the last from the Biological Survey collection) in averaging definitely more bluish (less brassy) green above, and the females and young are whiter below. In the Charleston females and young, the median underparts are nearly purely white, with the brownish

cinnamon wash confined to the sides and flanks. However, a young male from the White Mountains of California appears to be identical with Mexican birds of similar age; a female from the Santa Rita Mountains of Arizona is like the Charleston birds ventrally and like Mexican birds dorsally; and, finally, one of the Charleston females is, while bluish green dorsally, fully as brown below as any Mexican or Rocky Mountain female examined. It is probable that when further details of distribution are known, a third race of the broad-tailed hummingbird will be defined.

Selasphorus rufus (Gmelin). Rufous Hummingbird.

The first migratory rufous hummingbird to be noted was taken at Macfarland Spring (8000 feet) on July 20, 1932, and from that date forward we noted several birds daily in Lee Cañon. In September, 1930, the species was still present in Lee Cañon (7500 to 9000 feet) on the 14th, but none was seen in Kyle Cañon on the 26th. In the Sheep Mountains, in 1930, we saw a dozen or more individuals daily between September 16 and 19.

Megaceryle alcyon caurina (Grinnell). Western Belted Kingfisher.

Two migratory belted kingfishers, one of which was collected, were seen at Indian Springs on September 12, 1930. Jaeger (1927) saw a kingfisher at Charleston Park (Kyle Cañon) on June 21, 1926, but in spite of the date he considered the bird to be a transient in the locality.

Colaptes cafer collaris Vigors. Red-shafted Flicker.

Red-shafted flickers were noted by us as common fall migrants in the Charleston region and in the Sheep Mountains. The date of arrival seemed to be after the middle of September; for although we found none in the Charlestons on September 14, 1930, two were collected in the Hidden Forest on the 17th and 18th, respectively, and on the 19th several were seen there. On the 26th we saw several in Kyle Cañon in the Charlestons. In 1931 we arrived in the Charlestons on October 6 and at that time found flickers generally distributed in the pine belt and in lesser numbers in the (lower) piñon and also in the (higher) aspen and fir belts. On the 11th, and again on the 21st, they were noted as "common" in the cottonwoods at Indian Springs, and on October 22 they were still common in Lee Cañon, up to 8000 feet. We did not find flickers anywhere in the region in November, 1932, or in February, 1931.

No nest holes were found, nor was a single flicker seen in July and August, 1932. Jaeger (1927) saw a pair of flickers in an aspen grove in the Charlestons, but it is not known whether the date was in April or in June. I have no explanation to offer as to why flickers apparently avoid the mountains of southern Nevada during the breeding season.

Two flickers were seen at a range of less than twenty feet in Lee Cañon in early October, 1931, which had every appearance of being pure-blooded *auratus*; but neither was collected, and there is a possibility that they were variations of the *cafer-auratus* mixtures so frequently encountered where the ranges of the two species meet. The male taken in the Hidden Forest on September 17, 1930, showed slight but definite traces of *auratus* blood.

Balanosphyra formicivora bairdi (Ridgway). California Woodpecker.

A single specimen of the California woodpecker was collected in the Hidden Forest (Sheep Mountains) on September 18, 1930. We saw no others at any time, either in the Sheep Mountains or the Charlestons, but near our camp in the Hidden Forest was a big yellow pine, the bark of which was dotted with numerous characteristic drillings. None of these holes contained acorns, however, and we found no oaks in the Sheep Mountains.

In 1932, one of the objects of special search in the Charlestons was this woodpecker, but we found not a trace of its presence though conditions appear to be much more suitable than in the Sheep Range. In the Charlestons are more or less extensive patches of Gambel oaks (*Quercus gambeli*), scarcely larger than scrub but nevertheless a source of acorn supply. This is particularly true on a logged-off area, the site of an old sawmill at about 8000 feet near Macfarland Spring, where scrubby Gambel oaks cover a large part of the cut-over area, and isolated yellow pines, both dead and living, offer storage facilities for acorns. Were there any California woodpeckers in the Charlestons it would seem that they must be found in the area described, but we found not so much as a drilling there, nor for that matter anywhere else in the mountains.

Were it not for the evidence of the drillings in the Sheep Mountains it would be safe enough to consider the bird taken there as a purely casual vagrant, as perhaps it was. But at some time in the not far distant past other individuals have been there. I am puzzled, also, by the avoidance of the Charlestons, close to, or over which, casuals from the west must pass (and where a successful colony might be started) in order to reach the less suitable Sheep Mountains.

The specimen collected does not appear to differ from examples of *bairdi* from southern California.

Asyndesmus lewis (Gray). Lewis Woodpecker.

The Lewis woodpecker was detected only as a rare fall migrant through the Charleston region. On September 13, 1930, a single bird was collected in an apple orchard at Indian Springs, and on October 9, 1931, two were seen flying over Lee Cañon at an altitude of 8000 feet.

Sphyrapicus varius nuchalis Baird. Red-naped Sapsucker.

Red-naped sapsuckers are probably at times fairly common as migrants, for their drillings were abundantly evident in the apple orchards and cottonwoods at Indian Springs, and residents there stated that sometimes in the fall they were common. We failed to detect any in September, 1930, and the first arrival of record was seen on October 7, 1931, in the pines at 7500 feet altitude in Lee Cañon. On the 11th of that month two were seen in an apple orchard and one (collected) in the cottonwoods at Indian Springs.

Nelson (Fisher, 1893) took a red-naped sapsucker in the piñon belt on the west slope of the mountains on February 12, 1891, a circumstance which indicates that a certain number may pass the winter in the locality.

Sphyrapicus thyroideus nataliae (Malherbe). Natalie Sapsucker.

We found the Rocky Mountain race of Williamson sapsucker to be a rare summer and fall species in the Charlestons, and to be present in fall in the Hidden Forest. It is probably resident in both ranges. A male and female were collected at 8500 feet in the yellow pines in the Hidden Forest on September 17, 1930, these being the only individuals of this species to be found there.

On October 7, 1931, two females were seen in the lowest part of the yellow-pine belt (7500 feet) in Lee Cañon; and what was probably one of these same birds was again seen there on the 8th. A juvenile male, evidently out of the nest for a week at most, was collected in a dense stand of silver firs at 9000 feet in Lee Cañon, on July 15, 1932, and an adult male was seen in a mixed growth of silver fir, yellow pine, piñon, and juniper at 9000 feet on the south exposure of the cañon, on August 24. All told only six individuals, two in the Sheep Mountains and four in the Charlestons, were seen during the total period of field work, a sufficiently small number to warrant

classing this woodpecker as a rare bird. Search in the higher mountains (above 9000 feet), where one would suppose these birds would be found more commonly, failed to disclose any at all.

The three specimens collected are all unmistakably of the small-billed Rocky Mountain race.

Dryobates villosus leucothorectis Oberholser. White-breasted Woodpecker.

White-breasted woodpeckers are common residents of the higher zones in the Charlestons. They were found to be common in the Sheep Mountains in September, 1930, and presumably are resident there also. The surroundings most favored were limber pine, silver fir, aspen, and yellow pine; in fact the distribution seemed to be pretty general in large timber from 7500 to 10,000 feet. Our own observations extended from early July to the end of November, and were also made in early February, but at no time did we find these woodpeckers below the lower edge of the yellow-pine belt. Jaeger (1927) found them common at from 8000 to 9000 feet in June, 1926, and noted an occupied nest about 40 feet from the ground in a dead fir stub.

Fourteen specimens were collected, three in the Sheep Mountains and eleven in the Charlestons. They appear to be typical of the southern Rocky Mountain race; not one can be said to be an intermediate toward *hyloscopus* of the coast, or toward *orius* of the mountains north and northwest. The only departure from the normal is one male, collected on October 7, 1931, which barely escapes being large enough to be *monticola*. The date of collection suggests that it might be a migrant or winter visitant.

Dryobates scalaris cactophilus Oberholser. Cactus Woodpecker.

Cactus woodpeckers were noted at infrequent intervals all through the Lower Sonoran joshua-tree belt from July to November, and also in February. These dates, together with the evidence of nest holes in the joshua trees show the species to be resident. Extremes of altitude at which cactus woodpeckers were seen were 3500 and 6500 feet, altitudes which closely correspond with the upper and lower limits of the *Yucca brevifolia* belt.

The single specimen, collected at 5000 feet in the joshua trees on the alluvial fan below the mouth of Lee Cañon, on July 17, 1932, is typical of *cactophilus*.

Tyrannus verticalis Say. Arkansas Kingbird.

The only locality in which the Arkansas kingbird was found was Indian Springs, where it was a common summer visitant. In July, 1932, at least six pairs were present in the orchards, cottonwoods, and mesquites, and most if not all of them were breeding. One specimen was collected on July 11. In September, 1930, several birds were seen daily between the 11th and 15th. In 1931, the departure was some time prior to October 10, for not a single kingbird was seen by us on that or subsequent dates.

Myiarchus cinerascens cinerascens (Lawrence). Ash-throated Flycatcher.

Two pairs of ash-throated flycatchers were breeding in crevices in old board and sod cabins at Indian Springs in July, 1932. Because the birds were frequently seen to carry food it was supposed that there were young in both nests at this time. A single specimen was collected on the 9th.

From August 12 to 27, 1932, one or more ash-throated flycatchers were seen daily about the spring at our camp in Lee Cañon at 8500 feet altitude. It is more likely that these birds had come into the mountains in a post-breeding, vertical migration rather than as migrants in transit, for what we took to be the same individuals were present day after day. In 1930, ash-throated flycatchers had departed prior to September 11.

Sayornis nigricans semiatra (Vigors). Northern Black Phoebe.

Black phoebes were noted on but two occasions. A single bird was seen at Indian Springs on September 11, 1930, and on August 15, 1932, one appeared at the spring (8700 feet) in Lee Cañon. This latter bird was in evidence daily until the 27th, our last day in the locality, and may have been an up-mountain migrant from some adjacent lowland breeding place.

Sayornis saya saya (Bonaparte). Say Phoebe.

The Say phoebe was noted but once, on July 8, 1932, when a worn-plumaged, post-breeding adult was taken in an apple orchard at Indian Springs and three young of the year were seen near-by. This should, one would suppose, be a common species about the low cliffs and rock piles of the lower foothills, but if it occurs there neither Jaeger nor ourselves encountered it.

Empidonax traillii brewsteri Oberholser. Traill Flycatcher.

The willows and apple orchards at Indian Springs evidently were attractive to the Traill flycatcher, for three pairs were found nesting there in July, 1932. One pair was engaged in feeding at least two young on the wing in a patch of willows beside the reservoir on July 8; another was feeding a young Nevada cowbird in an apple orchard on the same date; and the third pair had a nest with two apparently fresh eggs in an apple orchard on July 11.

Empidonax hammondii (Xantus). Hammond Flycatcher.

The Hammond flycatcher appeared in fall migration on August 13, 1932, on which date a specimen was collected at the spring in Lee Cañon. One or more were seen in the locality daily (another specimen collected on the 21st) until we broke camp on the 27th. In the Sheep Mountains, in 1930, we collected a Hammond flycatcher in a silver fir grove at 8500 feet on September 19. This was the only individual seen there, and it represents our latest fall date for the region. Both of the Charleston specimens are in an intermediate plumage as regards color, while that from the Sheep Mountains is the extreme of the yellow-green type.

In addition to the above, another small flycatcher was collected which is at present undeterminable, either as to seasonal or systematic status. It was collected in a mahogany thicket near the spring in Lee Cañon on July 13, 1932, a date which would seem far too early for a migrant. This bird was an adult male with testes reduced almost to winter size. It resembles *hammondii* in the tiny bill and in wing length (70 mm.), and also through the fact that it is in the midst of the annual molt (*hammondii* molts before departure, while *wrightii* normally leaves in worn summer plumage and molts enroute to, or after it has reached, its winter quarters); but the wing formula is that of *wrightii*, and the color is the gray extreme of a series of over 70 *hammondii* from the western United States.

To summarize, this specimen may be an extraordinarily early migrant *hammondii* of decidedly abnormal characters; but there is the possibility that an undescribed flycatcher occurs in the Charlestons in summer. In the latter event it must be extremely rare, for I made effort, especially after the acquisition of this bird, to collect at sight every small flycatcher which was not instantly identifiable.

Empidonax wrightii Baird. Wright Flycatcher.

The Wright flycatcher was an uncommon summer visitant to the higher mountains and a more numerous fall migrant throughout the region. Jaeger (1927) lists an *Empidonax* as "often noted" in the pine and fir forest near Cathedral Rock (7500 feet) in June, 1926, which probably was this species. Sheldon took a breeding male in

the yellow pines at 8500 feet in Clark Cañon on the west slope of the range on June 23, 1929. Dawson and I collected a breeding male in a mixed mahogany and fir growth at Macfarland Spring (8000 feet) on July 10, 1932, another in a similar association in Lee Cañon (8700 feet) on the 13th, and a mated pair in limber pine and fir woods, at 9000 feet, in the same cañon on the 16th. Five juveniles were collected in yellow pines, firs, or limber pines in Lee Cañon between August 15 and 25, at altitudes varying from 8500 to 9500 feet, and we noted others up to 10,000 feet in the bristlecone pines. Four young-of-the-year collected at Cold Creek on August 29 and 30, 1932, were certainly transients at that particular spot, although they probably were locally raised birds which had come down from the higher mountains as a result of unseasonably cold weather the previous week. Two specimens taken at Indian Springs on September 13, 1930, and in the Hidden Forest on September 19, were probably migrants, for the species appeared to be rather common at both places on these dates.

The summer distribution of the Wright flycatcher in the Charlestons thus closely coincides in altitude with that of the yellow pine, though it extends a few hundred feet higher. Within the altitudes of 7500 and 9500 feet it does not appear to be particularly "choosy" about habitat.

Comparison of the Charleston series of *wrightii* with ample material from other parts of the range of the species shows that the local birds average a little grayer. However, every specimen may be matched in this respect with selected individuals from other areas.

Empidonax griseus Brewster. Gray Flycatcher.

A single specimen of the gray flycatcher was collected by Sheldon on the sage-juniper mesa near Cold Creek on June 2, 1932, under circumstances that indicated that it was either breeding or about to do so. This specimen was originally tagged as taken at Indian Springs but (*fide* Sheldon) this was in error. In July, 1932, we saw several single flycatchers at Cold Creek which we were sure were *griseus,* but we failed to collect any. Four were seen on the 10th and six on the 20th.

Empidonax difficilis difficilis Baird. Western Flycatcher.

The first migrant western flycatcher of the season was collected at the spring (8700 feet) in Lee Cañon on August 13, 1932. From that date forward, from one to five were usually in evidence there, and on the 20th a definite flight was noticed, with a dozen or more birds seen an hour at the spring. Others were seen from time to time until we left the locality on the 27th. The latest date we have is September 12, 1930, when a specimen was collected at Indian Springs.

This is one of the several species for which there is ample suitable territory, but which for some unknown reason does not occur in the Charlestons in summer. The absence of water over the greater part of the mountains may possibly be the answer, although in my experience while western flycatchers prefer the immediate vicinity of running water they do not require it. For that matter the flow from Macfarland Spring and other seepages at the northern end of the range create seemingly suitable conditions at many places over a considerable area.

Myiochanes richardsonii richardsonii (Swainson). Western Wood Pewee.

Careful search failed to reveal a single western wood pewee in the summer; there is no evidence that it is to be found in these mountains other than as a migrant. The case is parallel with that of the olive-sided flycatcher and some other birds in that absence cannot be laid to a lack of suitable environment.

The earliest migrant of record was collected in the yellow pines in Lee Cañon on August 15, 1932; four more were seen in the same locality on the 16th, and another

(collected) on the 25th. At Cold Creek four migrating birds appeared on August 30, two of which were collected. The latest seasonal record is that of a bird seen in the cottonwoods at Indian Springs on September 11, 1930.

Nuttallornis borealis borealis (Swainson). Olive-sided Flycatcher.

A late migrant olive-sided flycatcher was found dead by Burt at Indian Springs on June 9, 1929. In the fall migration the first arrival to be detected was heard calling, and was later seen at the tip of a tall dead pine, at 8700 feet in Lee Cañon on August 12, 1932. Five more, two of which were collected, were found in the same locality on the 15th; and thereafter one or two were seen daily until the 23rd. A single bird was collected in the mesquites at Indian Springs on September 13, 1930.

The environment provided in the higher zones appears to offer every inducement to summer occupancy by olive-sided flycatchers, but neither Jaeger nor ourselves found them there.

Otocoris alpestris ammophila Oberholser. Mohave Horned Lark.

On July 10, 1932, several pairs of horned larks were found on an area of mesa at Cold Creek and two males and two females were collected. All of the horned larks seemed to have nests or young about, but we could not find either. On the 20th at this same place a group of five horned larks, which was made up of two adults and three young in juvenal plumage, flew past us, but none was collected. The area where these birds were found was an old field of perhaps 40 acres which had been abandoned and was then covered with a thin growth of grass and weeds.

Oberholser (1902) lists *Otocoris alpestris leucolaema* as breeding at several points immediately north and west of the Charlestons. The four specimens collected in the present study seem to be identical with specimens of *ammophila* from the Mohave Desert of California, and they are accordingly so classified.

Tachycineta thalassina lepida Mearns. Violet-green Swallow.

The violet-green swallow was a common summer visitant in the Charleston Mountains, most abundant in the yellow-pine belt. Numerous nesting pairs occupied old woodpecker holes in dead stubs near our Lee Cañon camp in early July, 1932 (specimens taken July 13), and during early August young-of-the-year greatly augmented the previous population. On July 19, 20 and 21 we saw many violet-green swallows at Cold Creek. These birds worked back and forth over the mesa in the vicinity of the stream. They appeared about sundown and stayed until dusk, when they disappeared and were not seen again until the following evening. Supposedly they came down from the higher mountains to feed, for there were no nesting sites closer than two miles from Cold Creek.

The species remained common in the mountains until we left the higher levels on August 27, though the numbers fluctuated considerably after the middle of the month. We believed this variation to be due to vertical shiftings and not to regular migration; for it was noticeable that during warm, sunny days violet-green swallows were common at high altitudes, but with the advent of a cold or cloudy day scarcely a swallow would be seen there. At Indian Springs they were noted daily in fair numbers over the fields and reservoir from September 11 to 15, 1930. A one-day excursion to 9000 feet in Lee Cañon on the 14th showed that swallows were still present, though not common, at that altitude. When we reached the mountains on October 5, 1931, the last swallows had left the locality, and we found none at Indian Springs on the 10th.

Stelgidopteryx ruficollis serripennis (Audubon). Rough-winged Swallow.

Rough-winged swallows were migrating commonly at Indian Springs from Sep-

tember 11 to 15, 1930. A bird of the year, still in juvenal plumage, was collected there on the 13th.

Hirundo erythrogaster Boddaert. Barn Swallow.

An abundant migrant at Indian Springs from September 11 to 15, 1930. No specimens were collected.

Petrochelidon albifrons hypopolia Oberholser. Northern Cliff Swallow.

Cliff swallows were noted as migrating in small numbers at Indian Springs on September 13, 1930, and one specimen was collected. Whether more than one subspecies was represented is unknown.

The specimen collected is a female in juvenal plumage. It differs from California (coast slope) specimens of *albifrons* of similar age in being considerably larger (wing 113 mm.); the rump is pale pinkish buff instead of cinnamon buff or brownish cinnamon, and the underparts are whiter, with a minimum of brownish tinge on the sides.

In this connection it is to be remarked that a series of 13 adult and one juvenile from Mammoth and Mono Lake, Mono County, California, are of this same large size (wing 109-115) and the juvenile shows the same color characters as does the Indian Springs specimen. Adults have the rumps only very slightly paler than *albifrons*, but have paler underparts and are, as above stated, larger. A series (11) from Truckee, California, has the large size of *hypopolia* and the coloration of *albifrons*; in other words they are intermediate, as one would suspect to be the case on geographic grounds. Oberholser (1932) has recently named the cliff swallow of eastern Oregon as a new subspecies, *aprophata*. Should that form be recognized, the Nevada and eastern California birds would be known under that name instead of *hypopolia*; but I do not believe it practical to acknowledge more than one large, light-colored race from the Great Basin and northwestern interior.

Cyanocitta stelleri percontatrix van Rossem. Southern Nevada Jay.

This indigenous race of Steller jay, confined to the isolated Charleston and Sheep mountains, was found to be a rare resident of the Charlestons between 7500 and 9000 feet, extremes of altitude which correspond with the distribution of yellow pines, or, to be dogmatic, the Transition Zone. The 10 specimens collected in the Charlestons were taken in the following surroundings: juniper, 1; silver fir, 2; yellow pine, 7. Of the dozen or more individuals seen, but not collected, the majority were in yellow pines, two in silver firs, and one in a mahogany thicket surrounded by a mixed growth of yellow pines and silver firs. Jaeger (1927) found these jays only in piñons and yellow pines in lower Kyle Cañon during April, 1924, and early July, 1926. Our own investigations showed them to be present in Kyle Cañon, Lee Cañon, at Macfarland Spring, and at several intervening points; so there is no reason to suppose that distribution is not continuous throughout the yellow-pine belt. Specimens were collected in August, September, October, and February. Other individuals were seen in April (Jaeger), July, and November.

For some reason these jays were very wild and, at the first hint of pursuit, would hide or leave the locality entirely. Single birds were certainly the rule at most times, and only once did we see as many as four together. These were probably a family party (August); for two which were collected proved to be an adult male and a juvenal female.

In the Sheep Mountains only one jay was seen other than the single specimen collected. Both were in yellow pines at 8500 feet altitude.

The 11 specimens which are now available show the characters originally (van Ros-

sem, 1931) ascribed to this jay to be constant, and in addition other slight but definite color characters are made apparent by the larger series. The nearest comparison is, as formerly stated, with the crested jays of the southern Rocky Mountains, but the southern Nevada race has a more slaty (less brownish) dorsum and neck; the upper chest is more blackish (less bluish); the underparts are slightly darker and more violaceous blue, and the rump is duller and darker (less greenish) blue. These comparisons are with recently collected (1932) examples from the Chiricahua and Santa Rita mountains of Arizona. Old specimens of this species become markedly browner by post-mortem color change.

Aphelocoma californica woodhouseii (Baird). Woodhouse Jay.

The Woodhouse jay was a common, generally distributed resident of the piñon-juniper mahogany association from 6000 feet upwards, but there were seasonal shifts which took it well beyond the characteristic Upper Sonoran environment. Following the breeding season there seems to be a general dispersal through the mountain forests, a dispersal which tended to attain higher altitudes as the summer waned. In early July, 1932, we found this jay most numerous in the piñons and junipers at from 6000 to 7500 feet, and occasional pairs up to the extreme limit of the mahogany and piñon growth at 9500 feet, an altitude at which Jaeger (1927) also found them in June, 1926.

In late July and in August we found several individuals in limber pine, bristle-cone pine and yellow pine areas up to 10,000 feet; on more than one occasion they were associated with crested jays. On September 14, 1930, they were found in the yellow pines in Lee Cañon up to 8500 feet, at several points in the Upper Sonoran, and in the mesquites in the Lower Sonoran Zone at Indian Springs. In October, 1931, and in early February, 1931, the bird's range was from Indian Springs up to about 6500 feet. The period of widest dispersal, zonally, appeared to be mid-September, a time when the earliest birds reach the lower country and when the weather is not yet cold enough to drive them out of the higher mountains.

Fisher (1893) records this jay from the Charlestons but gives no specific data. In the Sheep Mountains in 1930 we found the Woodhouse jay to be rather sparsely, though evenly, distributed from the 6000-foot lower edge of the piñon belt up to 9000 feet in the yellow pines, from September 16 to 19.

Pica pica hudsonia (Sabine). American Magpie.

Mr. Ira Macfarland, owner of Indian Springs, told me that in severe winters small flocks of magpies frequently came to that place and might remain for as long as several days at a time.

Corvus corax sinuatus Wagler. American Raven.

At Indian Springs we saw occasional ravens about the ranch and adjacent rocky hills in July, August, September, October, and February, and assumed them to be resident. At no time did we see any in the mountains, nor even in the Upper Sonoran Zone; in fact about 4000 feet seemed to be the upward limit.

Corvus brachyrhynchos hesperis Ridgway. Western Crow.

On February 7, 1931, the desiccated remains of a crow were found under a mesquite tree at Indian Springs. I am certain the carcass was not there in September of the preceding fall, so that the bird must have been killed during the five-month interval. The date might be approximately the same as that of the only other record for the region, a bird seen by Suffel and myself flying over the fields on October 11, 1931.

Cyanocephalus cyanocephalus (Wied). Piñon Jay.

The piñon jay was a common fall and winter visitor to the piñon-juniper belt, and in the fall was also noted in the yellow pines up to 8700 feet.

The earliest arrivals were seen at Cold Creek, when two single birds were found on the piñon-juniper mesa at 6500 feet, on August 29, 1932. On September 14, 1930, we encountered numerous small flocks, totalling several hundred birds, all the way from 5000 feet in the tree yuccas up to 8700 feet in the yellow pines in Lee Cañon. Small flocks were scattered over much the same area in early October (6 to 10), 1931, though at this time none was observed above the 7000-foot level. In early February (3 to 6), 1931, a flock of ten or twelve piñon jays was observed daily in the piñons at 6000 feet at the mouth of Kyle Cañon, and on the 7th several small flocks were seen at about 5000 feet in the tree yuccas. Fisher (1893) records that Palmer saw a piñon jay in the tree yuccas on the west slope of the range in February, 1891.

In the Sheep Mountains, from September 16 to 19, 1930, we found piñon jays in small flocks all the way from 6000 to 8500 feet. They were partial to the piñon-juniper stands but were also seen in stands of yellow pine and silver fir.

Nucifraga columbiana (Wilson). Clark Nutcracker.

Nutcrackers are fairly common and are permanently resident in the Charlestons, for we found them from July to November, and also in February. Jaeger (1927) lists them as "very common" in all Transition and Boreal forests in June, 1926, and (1929) as nesting in the firs in March, 1928. Fisher (1893) states that nutcrackers were "common" on the west slope of the range in February, 1891.

In common with practically all of the (normally) Hudsonian birds which inhabit the Charlestons, nutcrackers are equally, if not more, common in the Transition than they are at higher levels. Although we found them present up to 11,000 feet in July and August, 1932, there seemed to be more between 8500 and 9500 feet than at any other altitudes. A nest, determined by a few body feathers to have belonged to a nutcracker, which had probably been used the previous spring, was found near our camp in Lee Cañon at 8700 feet. The site was a silver fir and the nest was tucked into a thick mat of living twigs twelve feet from the ground and four feet out from the trunk.

In the Sheep Mountains we found nutcrackers, in much the same numbers as in the Charlestons, in coniferous woods from 8000 feet upward, in mid-September. Presumably the species is resident there also.

Parus gambeli inyoensis (Grinnell). Inyo Chickadee.

In point of numbers the Inyo chickadee is probably the commonest species to be found in the Transition and higher zones in the Charleston Mountains; certainly it is by far the most common permanent resident. We observed it at every point visited above the 7500-foot level; Jaeger (1927) considered it to be the most frequently encountered bird in the mountains in April, 1925, and Fisher (1893) on the authority of Palmer recorded it as "common" on the west side of the range in February, 1891.

When one enters the mountains the Inyo chickadee is more than likely to be the first bird species to be encountered after one reaches an altitude of 7500 feet; from this level up to timberline one is seldom out of earshot of the plaintive call notes. The center of abundance is between 8000 and 9500 feet, and although there is a natural preference shown for coniferous timber they may also be found in mahogany and other Upper Sonoran growths. In fact we considered the chickadee to be an excellent example of a species whose summer range was influenced almost as much by altitude as by plant zones.

Family parties were in evidence by the first weeks in July in 1932. By mid-August, small flocks of mixed species began to be noticed—flocks with chickadees as nuclei, with attendant nuthatches, kinglets and an occasional creeper. Later in the fall various migrating warblers often attached themselves to such an assemblage.

Although this species is probably resident as high as 9000 feet, at which altitude we found it common in February, 1931, there is a downward shift from the highest levels in fall and winter. August 25 and 26, 1932, were days of cold rain by day and light frost at night. By the 27th there was a noticeable increase of chickadees about our camp at 8700 feet, and a walk to the 10,300-foot level showed them to be uncommon above 9500 feet. In early October, 1931, and in November, 1932, chickadees were fairly common in the piñon-juniper belt down to 6500 feet, an altitude a full thousand feet below the lowest summer range. The only occasion when the species was noted below 6500 feet was on September 12, 1930, when a chickadee was heard, unmistakably, in the cottonwoods at Indian Springs. It was heard repeatedly by Burt and myself, but a strong breeze made it impossible to locate it in the moving foliage.

In the Sheep Mountains chickadees, from September 15 to 19, 1932, were fully as common as in the Charlestons and undoubtedly are resident there.

A series of 16 specimens collected in the Charleston and Sheep mountains averages slightly more ashy above and has the head markings more prominent than a series of topotypical *inyoensis* from the White Mountains of California. These differences are tangible in series but are scarcely perceptible in individuals, save as they are selected. For the present it seems best to regard the southern Nevada birds as the extreme manifestation of the race *inyoensis,* although a larger series than is at present available from the White Mountains might show the advisability of recognizing the Nevada birds by a different name.

Parus inornatus ridgwayi Richmond. Gray Titmouse.

In view of the great areas of piñon and juniper growth, we had expected to find the gray titmouse common in the Charlestons, but we encountered it only in November, 1932, at Cold Creek. One specimen was collected on the 24th and another bird was seen on the 25th. Jaeger (1927) also found it to be rare, for he records but one individual as seen in Charleston Park in Kyle Cañon in June, 1926. However, Fisher (1893) records the gray titmouse as "common" in the junipers in the Charlestons in March, 1891, presumably on the west side of the range. Because of the March, June, and November records it would seem that the species is resident, though in the experiences of Jaeger and ourselves a very rare one.

At first I thought that the absence of oaks, other than as scrub or dwarf trees, might be the answer; but this can scarcely be the case, for the species is common in the equally oakless Virgin Mountains of southeastern Nevada and in the piñons and junipers of the Clark Mountains in extreme eastern San Bernardino County, California.

Psaltriparus minimus cecaumenorum Thayer and Bangs. Sonora Lead-colored Bush-tit.

On July 14, 1932, a small flock of bush-tits, probably a family party, was seen in a mahogany thicket on the south slope of Lee Cañon at a 9000-foot altitude. A similar assemblage, possibly the same one, was noted in the same place on August 24. At Cold Creek a flock of about a dozen birds was encountered in a mahogany thicket on August 30, 1932, and on October 7, 1931, two small flocks were found in a mixed juniper and mahogany area at 7500 and 8000 feet. These were all encountered casually, for no special effort was made to secure more than the two which were thought necessary for identification. The species is probably fairly common in the mountain mahoganies from 6000 to 9000 feet.

The two specimens collected in the Charlestons, together with a single bird collected in the Virgin Mountains on September 24, 1930, and five taken in the Providence Mountains of southeastern California in the spring of 1935, are not referable to the

subspecies *plumbeus*. Compared with eastern Arizona *plumbeus* they are decidedly paler and more ashy gray and lack the olive dorsal tones. After careful comparison I am unable to distinguish the southern Nevada and Providence Mountains bush-tits from the type series of *Psaltriparus minimus cecaumenorum*, a race described by Thayer and Bangs (1906) from central Sonora. This determination is discussed in detail in another paper (van Rossem, 1936, p. 85).

Sitta carolinensis nelsoni Mearns. Rocky Mountain Nuthatch.

The number of white-breasted nuthatches observed during the fall months was so much greater than in the summer that it was not surprising to find that the increase was in great part due to an influx of migrants from other regions.

Three specimens collected in the Charlestons, August 19 and 25, 1932, and September 14, 1930, as well as four taken in the Hidden Forest on September 16, 17, and 18, 1930, are best referable to *nelsoni*. They differ from the resident race, *tenuissima*, in shorter and thicker bill, slightly darker dorsal coloration, and darker posterior underparts. They are apparently just like Idaho specimens of *nelsoni*; that is, they are not so dark below as *nelsoni* from southern Arizona, but are otherwise similar. It seems likely that *nelsoni* will be found to be generally distributed in the mountains of southern Nevada in the fall, for we also took a specimen at Cedar Basin in the Virgin Mountains on September 24, 1930.

Sitta carolinensis aculeata Cassin. Slender-billed Nuthatch.

A single specimen of the slender-billed nuthatch was collected in the cottonwoods at Indian Springs on September 11, 1930. This individual is, of course, a vagrant far from its normal range. However, there are known instances of its occurrence on the Mohave Desert in California outside the breeding season, and the Indian Springs record is not so extraordinary as it might seem at first glance.

Sitta carolinensis tenuissima Grinnell. Inyo Nuthatch.

The resident form of the white-breasted nuthatch was found in every type of coniferous timber above 8000 feet. Until the middle of August the birds ranged up to 10,500 feet in the bristle-cone and limber-pine forests, but after the first cold weather the higher altitudes were almost deserted. On August 19, I saw but one nuthatch above 9500 feet and on the 21st none above 9200 feet, although on both dates they were common, chiefly in yellow pines, between 8000 and 9000. Jaeger (1927) records this nuthatch, under the name of "*Sitta carolinensis* subsp.", as one of the commonest June birds in the woods, the locality being probably Kyle Cañon. Our own localities were Kyle Cañon, Lee Cañon, and Macfarland Spring.

This nuthatch, as a species, was common in the Hidden Forest in the Sheep Mountains. Five specimens taken there between September 16 and 19, 1930, proved to be *nelsoni* in four cases and *tenuissima* in one. The latter is probably the resident race in the Sheep Mountains.

Thirteen specimens of the Inyo nuthatch were collected, one in the Sheep and 12 in the Charleston Mountains. These birds are all very similar to *tenuissima* from the White Mountains of California. They average darker dorsally, though not to a significant degree.

Sitta canadensis canadensis Linnaeus. Red-breasted Nuthatch.

Our only record of the red-breasted nuthatch is that of two individuals seen (unmistakably) at a spring at 7500 feet in Lee Cañon on October 8, 1931. These were most probably transients, for no trace of this species was found during the breeding season.

Sitta pygmaea canescens van Rossem. Nevada Pigmy Nuthatch.

The local distribution of pigmy nuthatches seemed to be coextensive with that of of the yellow pines, where they were resident. The highest altitude at which they were found was 9300 feet and the lowest 7000 feet. Between these extremes their abundance varied in accordance with the abundance of yellow pines, though on a few occasions they were noted on dead fir or limber pine stubs. We found the species continuously from July to November, and in February. Jaeger found them in June, 1926, and Nelson and Palmer found them to be common in the bristle-cone pines on the west side of the range in February, 1891.

The pigmy nuthatch and hairy woodpecker are probably the most strictly resident birds in the mountains and seem to be little affected by inclement weather. On February 4, 1931, Burt and I watched a flock of pigmy nuthatches busily engaged about a dead stub at 7800 feet, at a time when a heavy snow was falling and the temperature was well below the freezing point.

Pigmy nuthatches were found to be equally common in the Sheep Mountains in September, 1930, and it is probable that they are resident there.

Fourteen specimens of the race *canescens* are now available for examination. The characters are less outstanding than are those of the other three known endemic subspecies, but are, I believe, sufficiently well marked for recognition by name. The nearest relative is *Sitta pygmaea melanotis,* which *canescens* resembles in size and prominent black auricular streak, but from which it differs in paler and more ashy coloration, particularly on the head and hind-neck.

Certhia familiaris leucosticta van Rossem. Nevada Creeper.

Creepers were found throughout the yellow-pine belt, although they were seen occasionally on the trunks of firs, limber- and bristle-cone pines, and aspens. The highest altitude at which we found them was 9000 feet, and the lowest 7300, with, as above stated, a decided preference for yellow pines.

In the Charlestons, creepers were collected only in Lee and Kyle cañons. Jaeger (1927) noted them in June, 1926, in the bristle-cone pines while our own dates extend from July to October, with the notation of a creeper heard, but not seen, in Kyle Cañon on February 5. Presumably the species is a permanent resident both in the Charleston and Sheep ranges, at which latter place we found it in September, 1930.

A juvenile, only recently from the nest, was collected on July 12, 1932, at 8700 feet, in Lee Cañon. It was in the company of both parents on the trunk of a large, partly dead yellow pine. Since the young bird was unable to fly more than a few feet it was doubtless hatched in the immediate vicinity, not improbably in the same tree in which it was found. Another juvenile, just commencing the fall molt, was taken in the same grove of pines on August 14. Adults in which the annual molt was nearly completed were taken in Lee Cañon on August 20, 23, and 26.

Fourteen specimens were collected, two in the Sheep Mountains and 12 in the Charlestons. Possibly as many more were seen, but not collected, and our observations show it to be a rather uncommon bird.

At all ages and in all plumages this creeper is distinct from any other American race of the species, and is the best characterized of the four subspecies of birds peculiar to Charleston and Sheep mountains. In absence of brown tones it resembles *albescens* of southern Arizona and northern Mexico, but it possesses the palest and grayest dorsal coloration and the whitest underparts of the known races.

Cinclus mexicanus unicolor Bonaparte. Dipper.

Jaeger's record (1927) of a breeding pair of dippers near the Williams Ranch on

Trout Creek on the west side of the mountains is the only one for the range. At the time the nest was found, June 20, 1926, the nest was thought to contain young. Burt informs me that the nearest site suitable for dippers is some distance above the Williams Ranch and in the yellow-pine zone at about 7000 feet.

Troglodytes domesticus parkmanii Audubon. Western House Wren.

House wrens were found to be uncommon in summer in the higher mountains, in fact only three pairs were found between 8200 and 9000 feet in Lee Cañon in the summer of 1932. All of these pairs had young on the wing by mid-July, and there was good evidence that one pair had brought off two broods. The three pairs which came under observation were, respectively, in currant bushes beneath yellow pines, in a mixed yellow-pine and mahogany growth, and in a group of fallen dead trees in the limber-pine forest.

A sudden increase in the number of house wrens was evident in late August, an increase which we first noticed on August 20 and which we attributed to the arrival of the first of the fall migrants. Thick currant clumps in the yellow-pine belt seemed to be the situation most favored. On our arrival at Cold Creek on August 29, 1932, we found house wrens not uncommon in willow thickets and other shrubbery along the stream. These birds were probably migrants, for no house wrens were found there in July. One specimen which was collected in a weed patch near the spring in the Hidden Forest in the Sheep Mountains, on September 16, 1930, is our latest for the region. We failed to find house wrens in Lee Cañon on October 6, 1931, or at Indian Springs on the 11th of that month.

Some decided departures from the normal are to be seen in the specimens taken before the influx of migrants. The July adults are in such worn plumage that little can be stated concerning them. They do not appear to differ, however, from equally worn *parkmanii* from other parts of the western United States. A young male, partly in juvenal, partly in post-juvenal, plumage, is bright rusty red and shows a marked reduction of the usual dark barring both above and on the sides. Dorsally this specimen is between "ferruginous" and "hazel" of Ridgway, 1912. A perceptible approach to the same condition is seen in three juveniles, the first two of which were collected in the same currant clump as the red bird and which possibly represent a second brood from the same parents. The third was collected about a mile from the others, and at least one of the parents was normal in coloration. Aside from the red bird, the three juveniles are not at all like juveniles of *parkmanii* from California and other western states. It is evident that the house wrens breeding in the Charleston Mountains need further study and that a series of breeding adults should be collected in early summer before abrasion has obscured such color characters as they might show.

Thryomanes bewickii eremophilus Oberholser. Desert Wren.

A family of desert wrens, consisting of the parents and several fully grown juveniles, was seen in and about an abandoned cabin at Indian Springs on July 8 and 9, 1932. One specimen was collected on the 9th.

Heleodytes brunneicapillus couesi (Sharpe). Northern Cactus Wren.

We saw one or more cactus wrens in the thorny scrub of the alluvial fans below Kyle and Lee cañons and at the base of the Sheep Mountains every time we had occasion to cross those areas. They were noted from July to November and in February, and are undoubtedly resident. Occasional nests were seen in some of the larger cholla patches.

Cactus wrens could by no means by called common anywhere on the deserts about the bases of the Charleston and Sheep mountains. There is hardly enough cactus or

other protective cover to provide a typical environment, and also this region is close to the northern limit of the range of the species. The species is common up to 4000 feet in the Virgin Mountains, a short distance southeastward; but in the Virgins cactus and other ground cover is infinitely more abundant.

Catherpes mexicanus conspersus Ridgway. Cañon Wren.

Cañon wrens were found to be sparingly but regularly distributed over the entire region wherever cliffs or large rock piles provided suitable surroundings. Their penetrating whistles were heard frequently in the rocky hills back of Indian Springs and in mountain cliffs to as high as 9000 feet. Birds were seen or heard every month we were in the field, but in February, 1931, we noted none above 6000 feet. Two specimens were collected, one at a small shed in an apple orchard at Indian Springs on September 13, 1930, and one on a rocky ridge in the yellow pines in the Sheep Mountains, on September 19, 1930.

Salpinctes obsoletus obsoletus (Say). Rock Wren.

Rock wrens were decidedly more numerous than cañon wrens and were encountered almost everywhere save in deep forest. We noted them from the Lower Sonoran hills at Indian Springs up to 11,000 feet in the summer and fall months and up to 6500 feet in February. Jaeger (1927) records rock wrens as fairly common in rocky places in the piñon forests, near Charleston resort, and in the lower part of Kyle Cañon, in June, 1926; in the last-named place he considered it to be the commonest species present. This is an area of steep-banked cañons and gullies cut into deep semi-cemented conglomerate, an ideal location for rock wrens. In this same place we found it to be common in February, 1931.

While the preference naturally was for open, rocky ground, we occasionally found this species in less typical situations such as talus covered with a thick growth of mahogany and rocky outcrops in relatively open forest. One (apparently breeding) specimen was taken in a small, steep-walled gully at Cold Creek on July 10, 1932.

Toxostoma lecontei lecontei Lawrence. Leconte Thrasher.

Seven fully grown juvenile Leconte thrashers were collected in the mesquites at Indian Springs on July 8 and 10, 1932. In one of the small, infrequent patches of cholla cactus on the immediately adjacent desert, a felt-lined, characteristic nest of this species was found on October 11, 1931. At this time an intensive search of the vicinity failed to produce any evidence of Leconte thrasher, nor did we see any at any time other than those found at Indian Springs.

This species is known to occur in the Pahrump Valley west of the Charlestons in February and March, and also in the Vegas Valley in May (Fisher, 1893); an occasional wintering in the immediate vicinity of the Charlestons is not improbable.

Toxostoma dorsale dorsale Henry. Crissal Thrasher.

The only record of the crissal thrasher for the Charlestons is that by Nelson (Fisher, 1893) who found a nest containing three eggs, and collected one of the parents, at Cottonwood Spring, on March 8, 1891.

Oreoscoptes montanus (Townsend). Sage Thrasher.

An adult male sage thrasher, evidently breeding at the time, was collected on the sage-juniper mesa at Cold Creek on July 12, 1932. Several other sage thrashers were seen at that time, and also on July 20.

In the fall months we noted sage thrashers as not uncommon on the alluvial fans in the foothills of the Charlestons, the dates extending from September 14 to November 25. In February, 1931, a few were seen singly on the desert near Indian Springs and up to 5000 feet in the yucca belt below Lee Cañon.

Turdus migratorius propinquus Ridgway. Western Robin.

Western robins were found to be rare in summer in the Transition Zone in the Charlestons, to be abundant everywhere in the fall migration, and to be rather uncommon in midwinter below 6000 feet. Because of the characters shown by certain robins wintering in the Colorado River delta in northwestern Sonora, I had looked forward with interest to the systematic study of Charleston breeding birds. Only five specimens were collected, and momentary sight was obtained of another individual. The five which were collected appear not to differ in the least from examples in comparable stages from the mountains of southern California and the Sierra Nevada.

In Lee Cañon, in 1932, an adult male and a half-grown juvenile were collected on July 14 in a growth of seedling yellow pines at the edge of a dry meadow at 8500 feet. An adult female was taken in the identical place on August 24; possibly she was the mate of the male taken previously. There was no water within three-quarters of a mile of this spot; it seems strange that at the two springs in Lee Cañon we saw no robins during the breeding season other than a single adult which came to the upper spring (8700 feet) on August 1, but was not seen thereafter.

On July 19, 1932, a nest containing three eggs in which incubation had started was found in a large mountain mahogany surrounded by pines and firs at Macfarland Spring. It was discovered when the female flushed as the result of a nearby gunshot. At no time was the male seen, although we camped overnight at the spot in the hope that he would appear. A young male, still partly in the spotted juvenal plumage, was taken in a willow clump at a seepage in the yellow-pine zone above Cold Creek on August 30, 1932. Jaeger (1927) records the nesting of two pairs of robins in the yellow pines in Kyle Cañon in June, 1926.

The earliest migrants were noted in Lee Cañon on September 14, 1930, when small flocks were found drifting restlessly through the pines and firs at from 7500 to 9000 feet. In early October, 1931, they were not only abundant up to 9000 feet in Lee Cañon, but all over the surrounding desert. The greatest concentration seen at this time was in the juniper belt, where they were feeding on the berries in company with flickers, solitaires, and bluebirds. A few days of cold weather, with snow in the mountains above 8500 feet, brought a large flight to the region; and on the 22nd fully a thousand robins were seen in the 16 miles between the base of the mountains and 8000 feet in Lee Cañon. As in the earlier part of the month, the greatest numbers were seen in the juniper belt. On November 24 and 25, 1932, a few robins were noted in the piñons and junipers at Cold Creek, and others at Indian Springs, but it was obvious that the large flights of the fall months had not, in 1931 at least, been other than transient in the region. Fisher (1893) records robins as "rather common from the valley up to the piñons on the west side of the Charleston Mountains," in February, 1891. We saw only a few in the yucca belt below Kyle Cañon in February (6 to 9), 1931.

Hylocichla guttata polionota Grinnell. Great Basin Hermit Thrush.

Hermit thrushes proved to be common summer visitants between 7000 and 9000 feet. Between 9000 and 10,000 feet they were present also, but in decidedly fewer numbers. They were observed in aspen and mountain mahogany thickets perhaps more commonly than elsewhere, but were generally distributed in other associations such as willow thickets (at Macfarland Spring), silver fir, yellow pine, bristle-cone pine and limber pine. The bristle-cone forest, though, was not favored where it was too open. Old nests believed to have belonged to hermit thrushes were found in mahoganies, willows, scrub oaks, firs, and small limber pines. It was readily apparent that the local distribution of hermit thrushes was governed largely by other conditions than plant zones.

Birds in juvenal plumage were collected from July 19 to August 22, the last date being that for a three-fourths grown individual which must have been hatched at a date far later than normal; for post-juveniles in complete fall plumage were taken as early as August 13.

After the middle of August hermit thrushes decreased steadily in numbers. In fact adults seemed to leave before the inception of the annual molt. An adult taken on August 22, about half way through this molt, was the only molting adult which came to notice. This date is the latest one we have for adults, and the circumstance may be exceptional. When we left Lee Cañon on August 28, hermit thrushes were decidedly rare. Two were noted in the firs above Cold Creek on August 30. No hermit thrushes were found in Lee Cañon on September 14, 1930, but one was collected in the Hidden Forest in the Sheep Mountains on September 19. This was a bird of the year which had been injured in one wing, a circumstance which undoubtedly explains the late date.

There are appreciable color differences between the series of 25 specimens collected in the Charlestons and a series of 20 from the White Mountains of California. The Charleston birds are darker, grayer, have darker and browner flanks, and larger breast spotting. Two, however, appear to duplicate White Mountain examples. Two color extremes have been noted in certain other races of this species (Oberholser, 1932) and the same condition probably exists in the case of *polionota*. If this be true the gray extreme is certainly dominant in the Charlestons and the rufescent extreme in the White Mountains.

Sialia mexicana occidentalis Townsend. Western Bluebird.

Although Jaeger (1927) found the western bluebird a fairly common species in yellow pine and aspen forests up to 11,200 feet in June, 1926, we found it to be decidedly uncommon in Lee Cañon in July and August, 1932. A breeding pair was found in the yellow pines at 8500 feet in mid-July, at which time they were accompanied by four fully grown young on the wing. The two adults and one of the young were collected on July 12 and 15. Burt took an adult male at 8200 feet in Lee Cañon on July 1, 1929. On August 19, 1932, I found a family consisting of two adults and four young still in spotted plumage in an open bristle-cone pine forest at 10,000 feet, and on this occasion one of the young was collected.

In the fall, bluebirds became more common, an increase which probably resulted from an influx of migrants. At this season the distribution became general, although most of the birds were seen from 5000 feet in the yucca belt up to 8000 feet in the mountains. On October 24, 1932, a small flock of western bluebirds was seen on the sage-juniper mesa at Cold Creek, a locality where we also saw not more than a dozen individuals November 25. In February, 1931, three small flocks were seen in the yuccas below Kyle Cañon at about 5000 feet. Fisher (1893) records a specimen as taken by Nelson in the Charlestons on February 13, 1891.

The analogies provided by other species had led us to anticipate that the Rocky Mountain subspecies, *bairdi*, would be the one to be found breeding in the Charlestons. However, the breeding adults, and, in particular, the young, show that such is not the case. The summer specimens, and also a male taken October 7, 1932, are decidedly closer to *occidentalis* but, like the bluebirds of the southern Sierra Nevada and the White Mountains, are not typical of any race.

Sialia currucoides (Bechstein). Mountain Bluebird.

Mountain bluebirds were noted as common migrants and winter visitants in the Lower and Upper Sonoran zones, over which they seemed to be generally distributed. The earliest arrival noted was a male on the desert near Indian Springs on September

11, 1930. On the 14th, a flock of seven was seen in the junipers at 7500 feet in Lee Cañon, and from that date the species was fairly common all over the desert and into the foothills up to 7000 feet. Fisher (1893) records mountain bluebirds "among the cedars on the Charleston Mountains in March," the locality being most probably on the west slope.

Myadestes townsendi (Audubon). Townsend Solitaire.

The Townsend solitaire was a rather uncommon summer visitant in the Charlestons; it was more numerous in fall and winter. A worn, post-breeding adult was taken in Lee Cañon at 8700 feet on August 13, 1932, and a spotted juvenile, just able to fly, was seen at the same spot on August 16. Later it was seen in the company of the remaining adult. The characteristic song of the solitaire was heard on several occasions in July and August, often enough to indicate the presence of several pairs between 8000 and 10,000 feet in Lee Cañon. Jaeger (1927) frequently heard the song of this species in the pines in June, 1926.

In the fall, solitaires, probably in large part migrants, were found in Lee and Kyle cañons, at Macfarland Spring, Cold Creek, and in the tree-yucca belt as low as 5500 feet. Even at this season they were singing, and in the Sheep Mountains (September 16 to 19) we were seldom out of sound of one or more singing males. We noted solitaires commonly as late as October 24, and in November and February individuals were observed in smaller numbers in the piñon-juniper belt. Fisher (1893) records this species as "not uncommon among the cedars in the Charleston Mountains in March."

Polioptila caerulea amoenissima Grinnell. Western Gnatcatcher.

The recording of the western gnatcatcher as a summer visitant in the Charleston region rests chiefly on the statement of Jaeger (1927) that in June, 1926, he found it uncommon in mountain mahogany at 9000 feet and that it became increasingly common at lower altitudes. Our own observations resulted in but one summer record, that of a juvenile taken on the juniper-piñon mesa at Cold Creek on July 10, 1932. Two individuals seen in the mesquites at Indian Springs on September 13, 1930, were probably migrants.

Corthylio calendula calendula (Linnaeus). Eastern Ruby-crowned Kinglet.

Ruby-crowned Kinglets were found to be breeding in small numbers in the Charlestons in the summer of 1932. They were present during July from 8000 feet up to at least 10,000 feet and were seen or heard in yellow pines, silver firs, limber pines, and bristle-cone pines, with decided emphasis on the last three. Jaeger (1927) records them as frequently heard and occasionally seen in the fir forest at the base of Cathedral Rock in Kyle Cañon in June, 1926. On July 15, 1932, three bob-tailed juveniles were taken from a flock of seven birds in a bristle-cone pine forest at 9800 feet in Lee Cañon. On the 16th, four adults were taken in firs and limber pines at 9000 feet, and the same day a brood of several young, evidently only recently out of the nest, was watched as they were being fed by the parents in a mixed grove of firs and yellow pines at 8000 feet.

When we returned to our camp in Lee Cañon on August 12 after a few days absence it was found that kinglets had become decidedly more numerous at altitudes below 9000 feet than previously had been the case, and that they were then not uncommon in the mahogany thickets, an association from which they had formerly been absent. These were probably local birds, for specimens taken on the 12th, 13th, and 23rd were molting from juvenal to post-juvenal plumage. On August 26, it was found that kinglets had virtually abandoned the higher altitudes (above 9000 feet) and were commoner than ever before in the yellow pines and mahogany. However, they had not descended to the piñon-juniper level at Cold Creek on the 29th, 30th, and 31st, a

locality in which we found them to be fairly common on November 24. Numerous individuals were seen in the mesquites at Indian Springs from September 10 to 15, 1930, and others in early February, 1931; but whether these were local birds or visitors from farther north is, of course, unknown.

In the Sheep Mountains kinglets were found in the pine and fir woods in the Hidden Forest from September 16 to 19, 1930.

Eleven specimens were collected, 10 in Lee Cañon between July 15 and August 23, and one at Cold Creek on November 24. In assigning all these to the subspecies *calendula* I have not taken into consideration the four mid-summer adults, the plumage of which is so abraded that color characters are lost. The three juveniles collected on July 15 are decidedly greener above and slightly greener on the posterior underparts than four juveniles of similar age from Eldorado County, California, which latter may be assumed to be *cineraceus*. The three young birds molting from juvenal to post-juvenile plumage are greener than *cineraceus* but lighter than *calendula* from the eastern United States. The single fully plumaged winter bird is obviously referable to *calendula*.

Anthus spinoletta rubescens (Tunstall). American Pipit.

We found the pipit to be a common, generally distributed migrant in October, 1931. On the 7th of that month a flock of seven was found in a dry, dusty meadow at 8200 feet in Lee Cañon; and on the 11th, and again on the 21st, the species was present in considerable numbers on cultivated ground at Indian Springs.

Bombycilla cedrorum Vieillot. Cedar Waxwing.

Cedar waxwings were found as fall migrants in the mistletoe-bearing mesquites at Indian Springs. On September 13, 1930, a flock of perhaps 30 individuals was noted; and on October 11, 1931, two single birds were seen there.

Phainopepla nitens lepida Van Tyne. Phainopepla.

On July 19, 1932, a male phainopepla in parti-colored (one-year-old) plumage was collected in a piñon-juniper stand at Cold Creek. This individual was not breeding and we considered it to be a vagrant. Two adult males were seen in mistletoe-covered mesquites at Indian Springs on September 13, 1930. Fisher (1893) records the phainopepla as noted by Merriam at Mountain Spring on April 13, 1891.

We failed to find any evidence that the region is inhabited by breeding phainopeplas, or even that the species occurs in any numbers during migration; the few records are most probably those of vagrants.

Lanius ludovicianus sonoriensis Miller. Desert Shrike.

At no time of the year were shrikes common in the vicinity of the Charlestons; the few that we saw were noted as solitary individuals scattered at rare intervals in the Lower Sonoran Zone. The species was practically confined to the joshua-tree belt, though on one occasion two were seen in the mesquites at Indian Springs.

Our field work in the region resulted in seeing fewer than twenty shrikes, and these were probably resident, for there was no noticeable seasonal fluctuation in numbers. Individuals were seen at Indian Springs, between Indian Springs and Cold Creek, on the alluvial fans below Kyle and Lee cañons, and in the yucca forest (5000 feet) on the west base of the Sheep Mountains. Dates extended from early July to late November, and early February. Merriam (Fisher, 1893) found shrikes, probably of this subspecies, at Mountain Spring on April 30, 1891.

Four specimens were collected: two fully grown juveniles at Indian Springs on July 9, 1932, one juvenile, in molt, below Lee Cañon on October 10, 1931, and an adult male in the latter locality on the same date. These are all good examples of the subspecies *sonoriensis*.

Vireo solitarius cassinii Xantus. Cassin Vireo.

Cassin vireo was noted as a common late-August migrant through the Upper Sonoran and Transition zones, but was observed at no other time.

At our 1932 camp at 8700 feet in Lee Cañon the first arrival to be noted was collected on August 16 in a mountain-mahogany thicket at the spring, a focusing point for fall migrants since it was the only surface water in the vicinity. One or more Cassin vireos were seen at this spot from the 17th to the 23rd. On the 24th a marked flight was apparent, and until the 28th the species steadily increased in numbers. On the 28th a shift of location to Cold Creek in the Upper Sonoran zone showed this vireo to be even more common there than in the Transition, and at least a score were seen daily on the 29th, 30th, and 31st. Extremes of altitude noted were 6200 and 9000 feet. We found no vireos of this species in September, 1930, or in October, 1931.

The complete absence of *Vireo solitarius* during the breeding season was a continual source of surprise. We searched intensively in all types of woodland, some of which would appear to be ideally suitable, but without success; we were finally forced to the conclusion that the species does not breed in these mountains.

Vireo gilvus swainsonii Baird. Western Warbling Vireo.

This is the only species of vireo to be found breeding in the Charlestons. At this season it was seemingly confined to aspen thickets at from 8500 to 9000 feet and apparently was present in limited numbers.

On July 14, 1932, a male in breeding condition was collected in a small clump of aspens growing at the edge of a silver-fir wood at 8800 feet in Lee Cañon. On the 15th, a male and a female were taken in a similar situation at 9000 feet, and on the 16th a nest containing four half-grown young was found in a small isolated patch of aspens only a few hundred yards from the spot where the pair had been collected the previous day. Two of the young and the male parent were prepared as specimens. A warbling vireo was heard singing in what was probably the lowest patch of aspens, in point of altitude, in Lee Cañon, on the 17th. This was at about 8500 feet in a mixed fir, yellow pine, and aspen stand. Careful search failed to reveal more than the four pairs of warbling vireos in Lee Cañon. Jaeger (1927) found a pair nesting in an aspen grove in Kyle Cañon in June, 1926.

The first hint of a migratory movement to be noticed was on August 25, when an adult female, commencing the annual molt, was taken in mountain mahogany at 8700 feet. Two individuals, a male and a female of the year in complete post-juvenal plumage, were taken in willows and mountain mahogany above Cold Creek on August 30 and 31. Whether these were local birds which had shifted downward preparatory to departure or were transients, there is no means of knowing. On September 12, 1930, we found warbling vireos very common in the mesquites at Indian Springs; in fact they were entered in the field notes of the day as "swarming." This was undoubtedly a real migratory wave and not a shift in local population.

The five summer adults collected are grayer (less greenish) dorsally and paler ventrally than the average of *swainsonii* in seasonally comparable plumage from the Sierra Nevada, Idaho, and southern California. There was originally the temptation to apply to them the name *leucopolia,* for they present just the characters to which that name has recently (Oberholser, 1932) been given. However, selected specimens from the Sierra Nevada, and particularly from the mountains of southern California, appear to be indistinguishable from the Charleston birds. The same tendencies are apparent in the two post-juveniles from Cold Creek.

Vermivora celata celata (Say). Orange-crowned Warbler.

A female of the year was taken at Indian Springs on October 23, 1931. Although a trifle small (wing 56 mm.) it has the dull coloration and grayish cheeks and throat of the typical race. While it is likely that both *celata,* and the following subspecies, *orestera,* occur as transients in larger numbers than the taking of a single specimen of each might indicate, there is not the slightest doubt that the dominant migratory race of this species to occur in the region is *lutescens.*

Vermivora celata orestera Oberholser. Rocky Mountain Orange-crowned Warbler.

One specimen, a male of the year in fresh fall plumage, was collected at Indian Springs on October 11, 1931. It is assigned to the subspecies *orestera* because of its darker and duller coloration as compared with *lutescens* and because of its slightly larger size.

Vermivora celata lutescens (Ridgway). Lutescent Warbler.

The earliest migrating lutescent warblers were seen on August 16, 1932, when two individuals, one of which was collected, were seen in a mixed growth of mahogany and sapling yellow pines at 8700 feet in Lee Cañon. On the 17th, several more were noted, and after that date they became increasingly numerous. They were seen chiefly in low growth, and they particularly favored dense patches of sapling yellow pines, bracken, and wild-currant clumps. Numbers were seen at from 6000 to 7500 feet at Cold Creek the last three days of August, 1932. In September, 1930, up to the 15th, they were found commonly in willows, cottonwoods, mesquites, and rank weed growth at Indian Springs. Three specimens were collected, two in Lee Cañon on August 16 and 17, and one at Indian Springs on September 13.

Vermivora virginiae (Baird). Virginia Warbler.

Virginia warbler, the only member of the genus known to breed in the mountains of southern Nevada, was found as a common summer visitant in 1932. The distribution appeared to be limited to the so-called Upper Sonoran associations of mahogany and Gambel oaks, and therefore the species is considered characteristic of that zone, although the extremes of altitude at which it was found were 6300 and 9000 feet. Because of the relative scarcity of oaks, by far the greater number were found in mahogany which here grows as low, dense forest, instead of in the more familiar shrub form in which it is usually known.

On July 10, 1932, a nearly full-grown juvenile was taken in an isolated patch of scrubby Gambel oaks which grew near the stream at Cold Creek. The same day, a worn-plumaged adult female was taken in a mountain mahogany thicket at Macfarland Spring. This latter bird was accompanied by another adult, probably its mate, and actions of the two birds were such as to presuppose a nest. On July 13, two birds-of-the-year in nearly complete post-juvenal plumage were taken in a forest of mountain mahogany near the spring (8700 feet) in Lee Cañon; from this circumstance it would appear that two broods are raised in a season. Eight more young-of-the-year were collected at the spring on various dates up to August 27. An adult male in fresh fall plumage was taken at 7500 feet in a willow clump above Cold Creek on August 30, the latest date which we have for the species. No Virginia warblers were found on September 14, 1930, in the Charlestons, or between the 16th and 19th in the Sheep Mountains; it is assumed that the species normally leaves the region about the end of August.

Thirteen specimens were collected at Cold Creek, Macfarland Spring, and in Lee Cañon. Careful comparison with an adequate series from southern New Mexico fails to disclose any differences between specimens from the two areas, save that two or

three selected specimens from the Charlestons are a little grayer and paler than the grayest of the New Mexico birds. These differences are believed to be individual in nature.

Dendroica aestiva morcomi Coale. Rocky Mountain Yellow Warbler.

A pair of yellow warblers was discovered in a cottonwood grove at Indian Springs on July 9, 1932, and the female was collected. This individual is in very worn plumage, but is best referable to *morcomi*. Fisher (1893) records that Merriam found the yellow warbler at Cottonwood Springs on April 30, 1891. No specimens were collected and the subspecies, therefore, is in doubt.

Dendroica auduboni auduboni (Townsend). Audubon Warbler.

The relative abundance of *auduboni* and *memorabilis* during the fall migrations is unknown. Presumably most of the individuals seen in large numbers in the lowlands and up to 8500 feet in the mountains from mid-September to the latter part of October were *auduboni*, but data are lacking. An adult male taken at 7500 feet in Lee Cañon on October 8, 1931, is certainly of this subspecies; for, though fully adult, it has a wing measurement of only 75 mm.

Dendroica auduboni memorabilis Oberholser. Rocky Mountain Audubon Warbler.

Four adult males, two adult females, and two juveniles only recently out of the nest, were collected in Lee Cañon between July 12 and 17, 1932. Altitudes varied from 8000 to 9000 feet, and the birds were collected in yellow pines, silver firs, and limber pines. Other individuals were seen in bristle-cone pines up to 10,000 feet during the first part of July; it is assumed that they were breeding at that time. Several males other than those collected were noted during July in yellow pines and silver firs; it was evident that, although the vertical range was from 7500 to 10,000 feet, distribution during the breeding season was chiefly below 9000 feet and that yellow pines and silver firs were the favored trees. Jaeger (1927) found Audubon warblers, probably of this subspecies, in yellow pines and mountain mahogany in June, 1926, but no altitudes are recorded. We found none in mountain mahogany until early in August, when the species was generally dispersed through the mountains. Two birds of the year, molting from juvenal to post-juvenal plumage, were collected in mountain mahogany on August 12 and 18.

Numerous Audubon warblers were seen in Lee Cañon on September 14, 1930, but no specimens were collected at that time. They were numerous in the Sheep Mountains between September 16 and 19, 1930. The only specimen taken there is referable to *memorabilis*, for although a bird-of-the-year it is brightly colored and of relatively large size. The species was common in Lee Cañon and over the lower desert in October, 1931, but at that time the only specimen collected was *auduboni*. We noted none in November, 1932, nor any in February, 1931, anywhere in the region.

The six summer adults differ from typical *auduboni* of the Puget Sound region and western Oregon in their distinctly larger size and brighter color. The wings of the males range from 78 to 81 millimeters in length; those of the females from 74 to 76 millimeters. The black on the pectoral region of the males is more solid and extends farther down on the sides, and the flanks are more heavily streaked with black. They are apparently most like *memorabilis* of the Rocky Mountain region, but differ in possessing an abnormal amount of semi-concealed white in the interscapular region. A larger series might result in the detection of other possibly significant differences.

Dendroica nigrescens (Townsend). Black-throated Gray Warbler.

A male of the year in complete, new, post-puvenal plumage was taken in a patch of oak scrub at Cold Creek on July 19, 1932. The species was not noted again until two individuals appeared in company with some migratory lutescent warblers at the 8700-foot spring in Lee Cañon on August 16. One apparently adult male was seen in mountain mahogany at 9000 feet on August 25, and a single (adult?) male was seen in yellow pines in the Hidden Forest in the Sheep Mountains on September 18, 1930.

Although July 19 would appear to be a very early date for this species to be migrating, there is no evidence to show that the individual taken on that date was other than a transient. The black-throated gray warbler is a species we had anticipated as breeding in the Charlestons and for which we made careful search without success. Jaeger (1927) did not find it in these mountains in June, 1926.

Dendroica townsendi (Townsend). Townsend Warbler.

The Townsend warbler was noted only as an uncommon fall migrant, the dates and localities being as follows: One, evidently an adult male, was seen in mountain mahogany at 8700 feet in Lee Cañon on August 15, 1932; a male of the year was collected in the mesquites at Indian Springs on September 13, 1930; and another young male was taken in a piñon-juniper area at the mouth of Lee Cañon on October 22, 1931.

Oporornis tolmiei (Townsend). Macgillivray Warbler.

The earliest migrating Macgillivray warbler was seen in a tangle of blackberry vines and pine saplings at 8700 feet in Lee Cañon on August 20, 1932. On the 22nd one was collected and another seen in mountain mahogany at the spring. On the 23rd, a definite wave occurred, and many birds were seen not only about the spring but in low growth generally. Wild currant clumps were frequent retreats. The species was common as long as we were in Lee Cañon (until the 28th), and we found it to be equally common in willows and other growth along the stream at Cold Creek from the 28th to the 31st. From September 11 to 15, 1930, Macgillivray warblers were noted as common in weed patches and vine tangles at Indian Springs, but none was found in the mountains on the 14th of that month, nor at Indian Springs on October 10, 1931.

Geothlypis trichas occidentalis Brewster. Western Yellow-throat.

Yellow-throats were present in considerable numbers at Indian Springs from September 11 to 15, 1930, and a single individual was seen there on October 11, 1931. Two specimens collected on September 11 and 12, were of the subspecies *occidentalis*

When we visited Indian Springs in early July, 1932, the yellow-throat was one of the several species whose presence we had anticipated as a matter of course, but a thorough combing of territory suitable for breeding pairs failed to disclose a single individual. There is also suitable yellow-throat cover in considerable quantity at Cold Creek, but that locality proved as barren as had Indian Springs. James Stevenson tells me that he found the species migrating in abundance at Indian Springs in early May, 1932. Why none stopped to breed there is an exceedingly interesting problem. Both Indian Springs and Cold Creek are permanent streams with, at Indian Springs in particular, ample territory for any number of breeding pairs.

Icteria virens auricollis (Lichtenstein). Long-tailed Chat.

From September 11 to 15, 1930, we found chats migrating in abundance at Indian Springs. The only other record for the species is that of a specimen collected in a willow tangle at Cold Creek on August 30, 1932. No trace was found of the chat in the breeding season.

Wilsonia pusilla pileolata (Pallas). Northern Pileolated Warbler.

The earliest arrival to be noted was collected at the spring in Lee Cañon on August 13, 1932. Pileolated warblers were noted in ever increasing abundance after that date until we left the locality on the 28th. Whether all were of the same subspecies as the single bird collected is doubtful. Fisher (1893) records that Merriam found pileolated warblers at Mountain Spring and Cottonwood Spring on April 30, 1891, but of what subspecies is unknown, since no specimen was collected.

Passer domesticus domesticus (Linnaeus). English Sparrow.

The English sparrow was a common resident about habitations at Indian Springs. It was observed from July to November, and also in February.

Sturnella neglecta Audubon. Western Meadowlark.

During the breeding season we found meadowlarks only on cultivated ground at Indian Springs. In July, 1932, at least three pairs were present, but these proved to be so wild that only a single adult was collected, on the 10th. On the 11th a half-grown juvenile, unable to fly but capable of making good speed on foot, was found in an abandoned corn field. The adult has the same peculiar bill structure which has been noted (van Rossem, 1931) in winter-taken specimens from the Colorado River delta in northwestern Sonora. The upper mandible is elongated (culmen 37.5 mm.) into a flat, flexible tip which projects for several millimeters beyond the lower.

In the fall, meadowlarks were often found on the deserts about Indian Springs and in the tree-yucca belt up to the limit of the Lower Sonoran Zone. In one instance they were noted in a clearing in the piñon-juniper area at the mouth of Kyle Cañon at 6500 feet. Fall dates are from September 11 to October 26; and it is probable that most of the meadowlarks seen at that season were transients, for none was seen in November, 1932, or in February, 1931.

Xanthocephalus xanthocephalus (Bonaparte). Yellow-headed Blackbird.

A few male yellow-headed blackbirds were seen at Indian Springs on October 10 and 25, 1931, usually in company with Brewer blackbirds in an old milo-maize field. James Stevenson collected a yearling male on the desert near Indian Springs on May 11, 1932.

Agelaius phoeniceus nevadensis Grinnell. Nevada Red-wing.

We found Nevada red-winged blackbirds in considerable numbers about old fields and pastures at Indian Springs on October 10 and again on October 21, 1931, but noted none in November, 1932, or in February, 1931. Six specimens were collected, all of which are good representatives of *nevadensis*. As in the cases of *Geothlypis* and *Melospiza* there is permanent territory of considerable dimensions which is unoccupied in the breeding season. This was certainly true of the summer of 1932, and so far as the negative evidence of an absence of old nests may be taken, was also true in 1930 and 1931.

Icterus parisorum Bonaparte. Scott Oriole.

The Scott oriole is a fairly common summer visitant to the piñon-juniper belt and also of the tree-yucca belt down to about 4500 feet. Fisher (1893) records a specimen as taken by Merriam at Mountain Spring at the south end of the range on April 30, 1891; Jaeger (1927) reports it as "plentiful in the piñon-mountain-mahogany association" and present in lesser numbers in the tree-yucca belt in June, 1926. We found it distributed rather sparingly but regularly in the higher parts of the yucca belt and in the piñons and junipers at Cold Creek in July, 1932, and noted one individual in

mountain mahogany in Lee Cañon at 9000 feet on August 25, 1932. No specimens were collected.

Icterus bullockii bullockii (Swainson). Bullock Oriole.

In early July, 1932, the Bullock oriole was found to be breeding in the cottonwoods at Indian Springs; at that time at least five pairs were present. Two pairs were nesting in the willows at Cold Creek on July 10. By the actions of the parents we judged that all the nests found contained young, although no direct investigation was made. A male in juvenal plumage was taken in mountain mahogany at 8700 feet in Lee Cañon on August 25, 1932. This individual was probably a late summer wanderer from lower levels.

Euphagus cyanocephalus cyanocephalus (Wagler). Brewer Blackbird.

The Brewer blackbird was noted only as a fall migrant, chiefly about Indian Springs. About a dozen individuals were seen there on September 13, 1930, which for the most part were found about corrals and other ranch buildings. On September 26, a small flock was seen feeding in a newly plowed field near the mouth of Kyle Cañon. Small numbers were noted at Indian Springs on October 10 and 21, 1931.

Three specimens were collected. These are slightly larger than *minusculus* of the Pacific slope of California (the wings of the two males measuring 130 and 132 millimeters, respectively), and the reflections are greenish rather than bluish in tone.

Molothrus ater artemisiae Grinnell. Nevada Cowbird.

Although cowbirds were not uncommon about Indian Springs in early July, 1932, they usually kept so close to cattle or to occupied buildings that it was not feasible to collect any adult specimen. They had every appearance, though, of large size, and insofar as *artemisiae* can be distinguished in life from the much smaller *obscurus*, the Indian Springs cowbirds were of the former race. On July 8 a juvenal female just out of the nest and fostered by a pair of Traill flycatchers was collected in an apple orchard. This bird is far too young to be of value for subspecific determination. A fully grown juvenal female taken in the piñon-juniper area at Cold Creek on August 29, 1932, is definitely *artemisiae*. Because of this indecisive date it may have been either locally bred or a transient.

Piranga ludoviciana (Wilson). Western Tanager.

We found western tanagers to be fairly common all through the yellow-pine zone during July and the first half of August, 1932; and about our 8700-foot camp in Lee Cañon we saw adults and young daily. A family of young recently from the nest was seen in the yellow pines at 8000 feet on July 12. Jaeger (1927) found western tanagers of "infrequent occurrence" in mountain mahogany in June, 1926.

The first evidence of migration was noted about mid-August, when there was an obvious decrease in the number of tanagers about our camp, and by the 28th of the month the species was so rare that perhaps not more than one a day would be seen at the spring. There seemed to be a gap in time between the departure of the summer visitants and the arrival of extra-territorial migrants, for on September 11 and 15 we found small flocks migrating commonly at Indian Springs and on the 14th numbers were observed up to 8500 feet in Lee Cañon. The latest date we have is October 7, 1931, at which time a single bird was taken at the lower (8200 feet) spring in Lee Cañon.

In the Sheep Mountains tanagers were migrating commonly through the yellow-pine zone from September 16 to 19, 1930. To judge from the feathers scattered in the vicinity of the spring in the Hidden Forest this species was the most frequently selected victim of the several sharp-shinned hawks which made the spring their hunting ground.

Hedymeles melanocephalus melanocephalus (Swainson). Rocky Mountain Grosbeak.

Although Jaeger (1927) reported the black-headed grosbeak as "very abundant" in mountain mahogany thickets in June, 1926, the species by no means came within such classification in the summer of 1932. In fact we secured only 10 specimens in our field work in southern Nevada. At Cold Creek we found a fair number in willows and scrub oaks and on July 19 and 20 collected two adult males, an adult female, and four full-grown juveniles. Two more juveniles were collected in the same locality on August 29 and 30. In addition to the specimens collected we saw an adult male in a mountain mahogany thicket at Macfarland Spring on July 12, and another at the spring in Lee Cañon on August 16. A migrant was seen in the cottonwoods at Indian Springs on September 11, 1930.

In the Sheep Mountains we saw, and collected, only one black-headed grosbeak, an immature female on September 20, 1930.

Most of the black-headed grosbeaks from the Great Basin are not typical of either race, and the Charleston Mountain birds are no exception. The series is definitely closer in measurements to the larger, Rocky Mountain *melanocephalus*, than to *maculatus* of the Pacific coast.

Passerina amoena (Say). Lazuli Bunting.

In the tangle of willows, wild rose clumps, and blackberry vines along the stream at Cold Creek, two pairs of lazuli buntings were found to be breeding in July, 1932. An adult male, two adult females, and three juveniles on the wing were collected there on the 19th and 20th. Cold Creek, a typical Upper Sonoran Zone locality, of sage, junipers, and piñons, with a riparian tangle along the small stream, was the only place where the lazuli bunting was found in the region.

Hesperiphona vespertina californica Grinnell. Western Evening Grosbeak.

In the fall of 1931, evening grosbeaks invaded southern Nevada in large numbers. On our arrival at the lower spring (8000 feet) in Lee Cañon on October 7, several flocks, the largest of which contained fully 50 birds, were found in yellow pines and firs growing on the cañon floor at that point. Subsequent investigation, on the 8th, 9th, and 10th, showed roving flocks to be generally distributed throughout coniferous timber up to 9500 feet at least. Later in the month, on the 22nd and 23rd, we found evening grosbeaks present in Lee Cañon in about the same numbers as previously. On October 24 they were very common at Macfarland Spring, and during a two-hour wait at this spot at least 200 evening grosbeaks came to a tall dead pine which overhung the spring. Every few minutes a number would descend to drink and then return to the flock. Although there were as many as fifty birds in the tree, not more than eight were seen on the ground at one time.

It seems likely that evening grosbeaks were generally distributed over southern Nevada in October, 1931; for a flock of five was seen in the cottonwoods at Indian Springs (specimen collected) on October 21, and a trio were seen at St. Thomas on the 19th.

The nine specimens collected belong to the subspecies *californica* which was originally described by Grinnell (1917) and later considered to be indistinguishable from the northwestern *brooksi* by Grinnell, Dixon, and Linsdale (1930). However, I believe that *californica* is an easily recognizable race. Age for age and season for season, males of *californica* are paler, and also yellower on the underparts posterior to the chest. Females of *californica* are grayer (less brownish) in color than *brooksi*. The above comparisons are based on more than adequate material in point of age, sex and season.

Carpodacus cassinii Baird. Cassin Purple Finch.

Although never abundant, the Cassin purple finch was a common, at times locally very common, resident of the coniferous forests, and it is surprising that Jaeger (1927) noted but one bird in June, 1926.

In early July, 1932, we found these birds regularly distributed from 8000 feet upwards. They seemed to be relatively about as common in the yellow-pine levels as in the higher limber and bristle-cone pines at this season. A downward movement was noticed about the middle of August, when the birds became much more numerous about our 8700-foot camp and had virtually left, even at this early date, the levels above the yellow-pine zone. By the 19th of August small flocks were noticed for the first time (that is, assemblages larger than family parties), and this flocking tendency became increasingly evident toward the last of the month when we left the locality. However, none had reached the piñon-juniper levels by the end of August, for we found none in such a situation at Cold Creek during the last three days in August. Essentially the same conditions prevailed in September, 1930; for on the 14th and 26th of that month we found Cassin purple finches common in the yellow-pine belt but none below.

In October, 1931, another seasonal shift was evident, for on the 10th we saw very few birds above 8000 feet, but found them common in the piñons and junipers between 6500 and 7500 feet. On the 24th a flock of about a dozen was found in a patch of scrubby Gambel oaks at Cold Creek (6200 feet); and on this date birds were seen at frequent intervals up through the piñon belt to the firs, yellow pines, and mountain mahogany at Macfarland Spring, at which point (8000 feet) they were very common.

We noted Cassin purple finches in fair numbers in the piñons in November, 1932, and in February, 1931; but at no time did we detect the species below 6000 feet. Briefly, the summer range lies above 8000 feet and the winter range between 6000 and 8000 feet. The early departure from the higher levels indicates that food rather than cold weather might have been the impelling cause.

In the Hidden Forest in the Sheep Mountains we found this species to be fairly common in the yellow pines and silver firs from September 16 to 19, 1930. Presumably it is resident there. Eighteen specimens collected in the Charlestons appear not to differ in the least from examples from other parts of the western United States.

Carpodacus mexicanus frontalis (Say). Northern House Finch.

Linnets were found to be common residents of the Lower Sonoran Zone, with year-round concentration, of course, in the immediate vicinity of cultivated lands and ranch houses. In the breeding season few were noticed on the open desert, but occasional individuals or pairs were seen in the tree-yucca belt. The only occasion when a linnet was noticed above 6000 feet was when a red-plumaged male came to the upper spring (8700 feet) in Lee Cañon on August 25, 1932. Our specific locality records are Indian Springs, Cold Creek, and alluvial fans below Lee and Kyle cañons, and Lee Cañon. Jaeger (1927) found several feeding in an apple orchard at the Williams Ranch at the mouth of Clark Cañon on the west side of the range, and Merriam (Fisher, 1893) noted the species at Mountain Spring (5500 feet) at the south end of the range and at Upper Cottonwood Springs at the foot of the east side, on April 30, 1891.

The series of 17 specimens collected offers several points of more than casual interest. Perhaps the most outstanding feature is that all of the young, first-winter males, seven in number, possess the streaked, female type of plumage such as is worn during the first year of the so-called purple finches, *Carpodacus purpureus* and *Carpodacus cassinii*. A similar male is at hand from Mono Lake, California, a circumstance that indicates that this condition may be general over at least the southern part of the Great Basin. So far as I have been able to determine, males on the coastal slope of

California invariably molt from the juvenal plumage directly into the coloration of maturity, though the intensity of the color may be not so pronounced as in older individuals. Harold Michener, who is perhaps better informed on the plumage sequences of southern California linnets than is any other living person, informs me that he has never encountered a condition such as is shown by the linnets of southern Nevada, an observation which is supplemented by nearly a hundred California specimens whose sex and ages were personally determined.

In addition to the streaked first-year plumage of the young males, the adult males show a marked restriction and diminution of color, the streaking of both sexes is relatively narrow and pale, and the bills are slightly smaller in all dimensions. It is unlikely that the linnets of the southern part of the Great Basin, or more probably of a much larger territory, can be included systematically with those from the Pacific Coast, but I would emphasize that the material used in future studies on the problem must have the age and sex of individual specimens accurately determined at the time of collection.

Spinus pinus pinus (Wilson). Northern Pine Siskin.

Pine siskins were fairly common in July, 1932, throughout coniferous timber from 8000 to 10,500 feet. They were seen in yellow pine, silver fir, aspen, limber pine, and bristle-cone pine stands. Below 9000 feet they were most often noted in yellow pines, above that altitude in bristle-cone pines. Jaeger (1927) noted siskins as "infrequent" in aspens and firs at from 9000 to 10,000 feet, in June, 1926.

About the middle of August the siskins, in company with several other species, were noted in increasing numbers about our 8700-foot camp in Lee Cañon and they soon became one of the commonest visitors to the spring. On August 19 it was observed that siskins were commencing to gather into flocks and that they were becoming restless. A climb to 10,500 feet on August 21 failed to disclose any siskins above 9200 feet, although they were common below 9000 and remained so until we left the cañon on the 28th. The species was common up to 8500 feet on September 14, 1930.

In October, 1931, we found numbers of siskins in a field of dead sunflowers at Indian Springs on the 21st; half a dozen were seen in a patch of willows at Cold Creek on the 24th, and the same day we found them to be common at Macfarland Spring at an altitude of 8000 feet. In early February (6 to 8), 1931, they were "abundant" in the cottonwoods, willows, and weed fields at Indian Springs, frequently in company with green-backed goldfinches; but at this midwinter season we found none in the mountains.

Thus as a species the siskin is resident, with a summer distribution in the Transition and Hudsonian zones, a fall distribution from the Transition down to the Lower Sonoran, and in midwinter it was found only in the Lower Sonoran. It is, of course, unknown whether or not the same individuals remain in the region throughout the year.

Ten specimens, including two juveniles, were collected. The two adult males have wing measurements of 72 and 73 mm., respectively, and the four females range from 68 to 71 mm. While none is as dark as the darkest eastern and northwestern individuals, the series as a whole is very similar to specimens from southern California and Arizona.

Spinus psaltria hesperophilus (Oberholser). Green-backed Goldfinch.

Green-backed goldfinches were uncommon in summer at Indian Springs, although we saw a few there in early July, 1932, and assumed them to be breeding. In the fall and winter it was noted that they were common in weed fields, orchards, and mesquites in that locality, the dates being September 11, October 21, and February 6 to 8. Fisher (1893) reports this goldfinch as seen by Merriam at Upper Cottonwood Spring on April 30, 1891.

In the Sheep Mountains we found several small flocks of goldfinches frequenting weed patches at an altitude of 8500 feet in the Hidden Forest on September 16, 1930. This being the case, it is probable that they also occur in late summer and early fall at similar altitudes in the Charlestons.

Loxia curvirostra, subspecies? Crossbill.

On October 22, 1931, a flock of about 20 crossbills was found in the yellow pines at the edge of a dry meadow at 8500 feet in Lee Cañon. Two of these, evidently a mated pair, were shot on the ground under a tree in which several other members of the flock were feeding, and a third individual (see under *stricklandi*) was shot from the tree a moment later. Intensive search on this and other dates was unproductive of further specimens; indeed the only crossbills seen were a single red male flying over the yellow pines in Lee Cañon at 8700 feet on August 18, 1932, and a trio seen to leave a cluster of yellow pines at 9000 feet in the same locality on August 24.

The female of the pair collected is typical of the pale, ashy race with medium-sized bill, which will be formally described by Griscom in his forthcoming review. The male is neither so pale nor so rosy as a male of the same race from Mount Pinos, California, but evidently belongs in the same category. Dissection showed some enlargement of the reproductive organs of both specimens, the testes of the male being 5 mm. in length, and the largest ovum in the female being about half a millimeter in diameter. Both birds were in fresh, unabraded, fall plumage, so that external evidences of incubation were necessarily lacking. However, the oviduct of the female indicated a waxing, not a waning, of breeding activity.

Loxia curvirostra stricklandi Ridgway. Mexican Crossbill.

The third of the trio of crossbills taken on October 22, 1931, is an unmistakable *stricklandi* and, like the male of the presumably mated pair, showed considerable sexual activity. Such a circumstance naturally leads to speculation as to which race breeds in the Charlestons, whether both do so, or whether all of the few birds observed were simply vagrants which would soon have left for other regions. Had any of the four crossbills seen in August, 1932, been collected, the identity of the resident race would probably have been learned.

Measurements of the single adult male *stricklandi* collected are: wing, 100 mm.; tail, 60 mm.; exposed culmen, 21 mm.; depth of bill at base, 12.4 mm.

Oberholseria chlorura (Audubon). Green-tailed Towhee.

The green-tailed towhee was found to be a fairly common summer visitant between 6000 and 9000 feet. In early July, 1932, a time when second sets of eggs were being laid and when it may be assumed that pairs were still in their permanent summer locations, we found them in sage-juniper, mahogany, wild currant, snowberry, and wild rose clumps; in fact the distribution was general in all types of thick cover between the altitudes given above. Such being the case, it seems rather arbitrary to list the species as characterizing any particular zone. However, green-tailed towhees were definitely less numerous in the Upper Sonoran plant belts below 7500 feet than they were in cañon floor thickets in the yellow pines, and they are accordingly listed as Transition.

Jaeger (1927) found these birds common between 8000 and 9000 feet in June, 1926, and noted three nests in rose bushes and snowberry thickets. We found them at Cold Creek and Macfarland Spring (nests with four eggs each noted at 6500 and 8000 feet on July 10) at various times in July, 1932; in Lee Cañon during July and August, 1932; in Lee Cañon on September 14, 1930; and in Kyle Cañon on September 26, 1930. We found none anywhere in the region in early October, 1931.

In the Sheep Mountains we noted green-tailed towhees as common in the Hidden Forest between the 16th and 19th of September, 1930. In the Virgin Mountains we found them to be very common on the 24th and supposed them to be migrating through that locality.

Three specimens were collected, one at Macfarland Spring and two in Lee Cañon. These I am unable to distinguish in any way from eastern Arizona specimens, which may be assumed to represent typical *chlorura,* or from specimens from the Sierra Nevada and southern California. Oberholser (1932) has recently separated far western examples under the name of *Oberholseria chlorura zapolia,* but I confess to being unable to distinguish any variation in this species other than that which appears to be attributable to age and season.

Pipilo maculatus montanus Swarth. Spurred Towhee.

Spurred towhees were found to be generally distributed in mountain mahogany, sage, juniper, piñon, and stream shrubbery of the Upper Sonoran Zone. They were perhaps most numerous in the last named environment and least common in pure sagebrush areas. In the matter of altitude, spurred towhees ranged from 6000 to 9000 feet, but they consistently followed Upper Sonoran; we did not note them as occurring in currant patches or other Transition plant belts. This subspecies is evidently resident, for it was detected from July to November and in February. Jaeger (1927) found it common in mountain mahogany thickets in June, 1926.

At Cold Creek, on July 10, 1932, a nest containing four fledglings nearly ready to leave was found in a rose thicket surrounded by knee-deep water. The nest was 18 inches above the water and supported by a mass of stems. Another nest with three fresh eggs was found in a rose thicket in the same locality on July 20. Like the first nest it was off the ground, in this instance over two feet. In this locality we found young on the wing on both of the above dates, a circumstance which indicated that two broods were raised in the season.

Burt found this towhee in the Sheep Mountains in July, 1929, and collected an adult male on the 22nd. We found it common there in September, 1930, and took a single specimen on the 16th. In the Virgins it was even more common than in the other ranges in September, 1930, and October, 1931.

Fifteen specimens were collected in the Charleston (12), Sheep (2), and Virgin mountains (1). These are all easily referable to the southern Rocky Mountain subspecies, *montanus*, in size and color. In measurements five males, three of them in abraded plumage, show wing lengths of from 85 to 90 mm., and tail lengths of from 103 to 109 mm. Five females measure from 83 to 86 mm. in wing length, and from 102 to 107 mm. in tail length.

Pipilo maculatus curtatus Grinnell. Nevada Towhee.

One specimen of the Nevada towhee, well known to be a migratory race, was taken in the Hidden Forest in the Sheep Mountains (8500 feet) on September 16, 1930. Contributory evidence that this subspecies may be regularly looked for in southern Nevada is provided by a specimen taken at St. Thomas on September 22, 1930.

Passerculus sandwichensis, subspecies. Western Savannah Sparrow.

Savannah sparrows were extremely common in pastures, plowed ground, and weed fields at Indian Springs from September 11 to 15, 1930, and on October 11, 1931. Two specimens collected on September 13 and October 11, respectively, were the western Savannah sparrow, that is, *"alaudinus"* of the A. O. U. Check-list. But the name *alaudinus*, as I have recently (1933) shown, is not applicable to this subspecies.

Passerculus sandwichensis nevadensis Grinnell. Nevada Savannah Sparrow.

A single Savannah sparrow collected at Indian Springs on February 7, 1931, belongs to the breeding race of the Great Basin. At this date very few birds of this species were seen and these were all in a weed-grown field at the edge of a line of mesquites.

At Cold Creek (6200 feet) there is a fairly extensive area of boggy meadow which would seem to offer an ideal breeding ground for Savannah sparrows. This area was carefully searched in July, 1932, but with negative results, and it seems unlikely that this species breeds in the region.

Pooecetes gramineus confinis Baird. Western Vesper Sparrow.

Vesper sparrows were seen only in the fall, and the few individuals noted were probably migrants through the region. At Indian Springs one bird was seen in an old weed-grown field on September 11, 1930. On the 16th, occasional vesper sparrows were seen at the lower edge of the juniper belt (6000 feet) in the cañon leading to the Hidden Forest in the Sheep Mountains.

Chondestes grammacus strigatus Swainson. Western Lark Sparrow.

Our only record for the western lark sparrow is that of a bird seen at the upper spring (8700 feet) in Lee Cañon on August 17, 1932. This individual was almost certainly a migrant, for it was seen on but the one occasion. Lark sparrows were seen by Merriam (Fisher, 1893), probably as migrants, at Mountain Spring and Upper Cottonwood Spring on April 30, 1891. Although there is abundant territory apparently suitable for lark sparrows, we saw not a single bird during the breeding season. It is common enough in similar territory west and immediately north of the Charlestons.

Amphispiza bilineata deserticola Ridgway. Desert Sparrow.

Desert sparrows were by no means common in the Charleston region in summer, although we saw occasional individuals and pairs in the tree-yucca and the lower parts of the sage-juniper belts between Indian Springs and Cold Creek on July 10 and 21, 1932, and collected a juvenile in greasewood at Indian Springs on July 9.

In the fall months the species was more common, probably on account of the presence of migrants. At Indian Springs it appeared to be fairly common on the desert between September 11 and 15. We also noted it at frequent intervals on the alluvial fans below Lee Cañon on the 14th, and below Kyle Cañon on the 26th.

A few birds were seen along the northwest base of the Sheep Mountains on September 16 and again on September 20, 1930. In the Virgin Mountains, on September 24 and 25, 1930, we found desert sparrows very common everywhere up to 4500 feet. Perhaps the general and abundant growth of cactus in the Virgins is the explanation of their presence there in numbers infinitely greater than in the Charleston and Sheep mountains, localities where cactus is none too common anywhere.

We found no trace of this species on October 6 and subsequent dates in 1931, or in November, 1932, or in February, 1931.

Amphispiza belli nevadensis (Ridgway). Northern Sage Sparrow.

The northern sage sparrow was found to be rather rare during July, 1932, on the sage-juniper mesa between Cold Creek and Macfarland Spring. Not more than half a dozen individuals were seen there on each occasion during the month (10, 20, and 21) when we crossed this mesa, and these were all so wild that no specimen was taken. A fully grown juvenile, most probably a straggler from the mesa above, was collected at Indian Springs on July 9.

There is apparently a gap in time between the departure of the sage sparrows

which summer in the region and the arrival of the winter population. None was seen anywhere, even in the most suitable-appearing localities, in August or September. However, when we arrived in southern Nevada on October 6, 1931, we found sage sparrows common and generally distributed in singles, pairs, and small flocks, over the Lower Sonoran deserts. The most favored surroundings were among tree-yuccas and greasewood. In November, 1931, and February, 1932, sage sparrows were fully as common as during October, in fact during the fall and winter months this was the most frequently seen bird on the desert.

Amphispiza belli canescens Grinnell. California Sage Sparrow.

A single sage sparrow seen on the mesa at Cold Creek on August 30, 1932, was collected and found to belong to this subspecies.

Junco hyemalis hyemalis (Linnaeus). Slate-colored Junco.

On February 4, 1931, an adult male slate-colored junco was collected from a flock of juncos feeding outside our cabin at 6000 feet at the mouth of Kyle Cañon. At this time the ground above the 6000-foot level was covered with snow and we saw no juncos above the altitude mentioned, although they were common about our camp and at lower elevations. During the fall and winter, every flock of juncos encountered was inspected as closely as circumstances would permit, but we detected only the single *hyemalis* recorded above.

Junco hyemalis connectens Coues. Cassiar Junco.

Seven juncos, all intermediate in characters between the *hyemalis* and *oreganus* groups, were collected between October 21 and February 7. These individuals were taken at various altitudes from 3200 to 8500 feet, and in situations such as mesquite, tree yucca, juniper, mountain mahogany, and currant clumps in yellow-pine parkland. In every case they were with flocks of two or more other subspecies of juncos.

Three of the above specimens are males and four are females. One of the males is very similar to the typical "Cassiar" type, with gray back (lightly tipped with brown in fresh plumage), black head and convex pectoral area. The other two males are about intermediate between *hyemalis* and *shufeldti* in their present, fresh-plumaged state, but the dorsal plumage is gray subbasally, and with wear they would have become essentially gray-backed birds. The four females are placed here because of the more leaden dorsum, more dusky (less pinkish) sides, and slightly longer wing when compared with *shufeldti*.

It is at present a moot point whether *connectens* is or is not a stable, recognizable race connecting *hyemalis* with the *oreganus* group. I use the name as indicative of the probable area from which the seven Charleston specimens came.

Junco oreganus shufeldti Coale. Shufeldt Junco.

The Shufeldt junco, so far as could be estimated by visual means, was by far the commonest member of the genus wintering in the Charleston region.

Our earliest fall date for the arrival of *shufeldti* is October 7, on which date we found it in considerable numbers in Lee Cañon up to an altitude of at least 8500 feet. It was very common at Indian Springs on the 10th, and numerous individuals and small flocks were noted not only about weed patches and shrubbery but also on the open desert. We saw a great many juncos as high as 7500 feet, above Cold Creek, on November 24 and 25, 1931, and they were equally common up to 6000 feet in February, 1931. Bailey (Fisher, 1893) took a specimen of *shufeldti* in the Charlestons on March 7, 1891, and Nelson found juncos, the majority of which were probably of this subspecies, in February and March on the west side of the range.

During our own work in the field, 10 specimens of *Shufeldti* were collected, the localities being Lee Cañon, Kyle Cañon, and Indian Springs, and the dates ranging from October 7 to February 7.

Junco oreganus thurberi Anthony. Thurber Junco.

Four juncos, collected at from 7500 to 8000 feet in Lee Cañon on October 7 and 22, 1931, are referable to the race which breeds in the Sierra Nevada and the mountains of southern California. It is quite probable that *thurberi* also will be found in the lowlands, but its detection among the flocks of *shufeldti* is pretty much a matter of chance.

Junco oreganus caniceps (Woodhouse). Gray-headed Junco.

A single specimen of the gray-headed junco was collected at the lower spring in Lee Cañon on October 9, 1931. This individual was an immature male in first winter plumage, as shown by the brownish-edged tertials and ungranulated areas on the skull. It differs from the grayest examples of the resident *mutabilis* of similar age and sex in slightly larger size (wing, 83 mm.; tail, 71 mm.), concave line of demarcation between chest and underparts, and in having the sides concolor with the chest.

Junco oreganus mutabilis van Rossem. Nevada Junco.

The resident junco was a moderately common bird in the yellow pines, silver firs, aspens, limber pines, and bristle-cone pines. However, its distribution within these areas was to a great extent governed by the relative abundance of wild currant (*Ribes cereum*) clumps, which are the chief shrubbery to be found in cañon bottoms from 8000 feet up to 9500 feet or, more rarely, up to 10,000. Far more juncos, both in summer and fall, were found between 8500 and 9000 feet than above or below those altitudes. It is in this narrow vertical range that the greatest mingling of vegetation representative of the Transition, Canadian, and Hudsonian zones occurs, where open, yellow-pine parkland alternates with clumps of fir, aspens, and limber pines, and where the relatively broad cañon floors are most plentifully sprinkled with clumps of currant and wild rose.

In July and August, 1932, juncos were found from 8000 to 10,000 feet in Lee Cañon, at this time usually in family groups consisting of the two parents and three or four streaked young. After August 15 a downward shift was noted, for the birds then became uncommon above 9000 feet and correspondingly more numerous below that altitude. A distinct tendency to gather into flocks was also observed at this time, a tendency which increased toward the end of the month. In September, 1930, we found these juncos only in flocks among the currant bushes. Very few were observed in October, 1931, although specimens were taken at 7500 and 8500 feet on the 7th and again on the 22nd. These October individuals were with good-sized flocks of other juncos, and their detection was thereby rendered more difficult than in the early fall when they were the only form present. None was found in the mountains in February, 1931. Whether the failure to find any was because of a departure from the region or whether they were lost in the flocks of winter visitants I do not know. It seems probable that they are resident, for we found none in the lowlands either in fall or winter.

Burt found Nevada juncos breeding at Sawmill Spring in Clark Cañon on the west side of the range on June 23 and 25, 1929. Jaeger (1927) saw a flock (probably in Kyle Cañon) in June, 1926.

In the Hidden Forest in the Sheep Mountains breeding pairs were found by Burt in July, 1929, but we found not a single individual there in mid-September, 1930. This absence we attributed to sharp-shinned hawks, several of which had hunting stands at the spring.

Spizella passerina arizonae Coues. Western Chipping Sparrow.

Chipping sparrows were noted in July, 1932, as common in the Upper Sonoran and Transition zones of the Charlestons, in fact the distribution seemed to be continuous from the lower edge of the piñon-juniper belt up through the mahogany and yellow pines to about 9000 feet. However, the yellow-pine zone was certainly the metropolis. Jaeger (1927) notes that the chipping sparrow, in June, 1926, was very common in the pines, firs, and aspens on the south and west walls of Kyle Cañon and seldom straggled into the chaparral [that is, the Upper Sonoran] on the north walls.

After the middle of August, chipping sparrows began to gather into small flocks and toward the end of that month they were often found in company with juncos. In September, 1930, we found them to be common and generally distributed from Indian Springs up to at least 9000 feet in Lee Cañon. On the 26th we found them up to 8000 feet in Kyle Cañon. This last date is the latest we have for the species; for none was found in the mountains on October 7, 1931, nor did we observe any at Indian Springs on October 10.

In September, 1930, we noted that chipping sparrows were extremely common from the 16th to the 19th in the yellow pines of the Hidden Forest in the Sheep Mountains. The abundance of the species throughout the region after the first of September suggests that many, perhaps the majority, of individuals present at that time were transients.

Spizella breweri breweri Cassin. Brewer Sparrow.

On the sage-juniper mesa between Cold Creek and Macfarland Spring we found Brewer sparrows common, and apparently breeding, in July, 1932. On the 10th and 20th of that month many individuals were seen between 6000 and 8000 feet, in all instances in a sage-juniper area. A juvenile was collected on the 10th. Brewer sparrows were still adhering closely to the Upper Sonoran Zone in late August (29 to 31), 1932.

During the fall and winter there was a complete absence of the species above 6500 feet. In September, 1930, a few birds were seen in the lower parts of the sage belt, while below 6000 feet they were common in the tree-yucca belt and were abundant in weed fields, pastures, mesquites, and on the desert at Indian Springs. Probably the majority of the birds seen in September (dates from 10th to 26th) were migrants; for in October, 1931, and in early February, 1931, we found limited numbers in the yucca belt and but few more at Indian Springs.

Merriam (Fisher, 1893) noted Brewer sparrows at Mountain Spring on April 30, 1891.

Spizella atrogularis evura Coues. Desert Black-chinned Sparrow.

A single black-chinned sparrow was collected by Sheldon on Trout Creek above the Williams Ranch, on the west side of the range, on June 15, 1929. We failed to find this species on the east side in 1932, though there is ample territory there which appears suitable. My experience with this sparrow is that it is extremely local, even in areas where it may be classed as common. One may find an assemblage of several pairs breeding in a very limited locality, with surrounding territory apparently exactly similar in every respect unoccupied.

Zonotrichia gambelii gambelii (Nuttall). Gambel Sparrow.

In 1932, no Gambel sparrows were observed up to the time we left the region on August 31. On our arrival at Indian Springs on September 10, 1930, they were already tiresomely common, so much so that in places they interfered with the detection of other, more desirable, brush-haunting species. On the 14th they were noted on the open desert in small numbers, and in abundance in the tree-yucca, juniper-sage, and

higher habitats up to at least 9000 feet in Lee Cañon. During visits in seasonally subsequent months (October, November, and early February) we found this sparrow common, though in lesser numbers than during the high tide of migration in mid-September, up to about 6000 feet or the upper limit of the Lower Sonoran Zone.

Nelson (Fisher, 1893) found Gambel sparrows "abundant" among the junipers on the west side of the Charlestons in March, 1891, as did Merriam at Mountain Spring at the south end of the range on April 30.

In the Sheep Mountains, from September 16 to 19, 1930, the species was common up to 8500 feet in shrubbery in the yellow-pine belt.

Melospiza lincolnii lincolnii (Audubon). Lincoln Sparrow.

The Lincoln sparrow (as a species) was noted as a fairly common fall migrant. Two individuals were seen in grass and mesquites at Indian Springs on September 13, 1930, one of which was collected. At least two (one collected), and probably others, were seen at the spring at 8500 feet in the Hidden Forest on September 17, 1930; two were seen in a weed patch at Indian Springs on October 11, 1931, and on the 21st the species was noted as "fairly common" at the same place.

Melospiza lincolnii alticola Miller and McCabe. Western Lincoln Sparrow.

A Lincoln sparrow taken at 8200 feet in Lee Cañon on October 7, 1931, belongs to this newly named subspecies. On the basis of only three specimens it is not possible to conjecture as to which race is the more common migrant in this region.

Melospiza melodia fallax (Baird). Mountain Song Sparrow.

Song sparrows were found in the Charleston region as common fall transients and, more rarely, as winter visitants. The time of arrival is apparently early in October, for when we left the region on September 26, 1930, song sparrows had as yet not appeared, but when we arrived at Indian Springs on October 10, 1931, they were present in fair numbers.

Indian Springs and Cold Creek were the only localities in which song sparrows were noted. At Indian Springs they were found in weed fields, grass and mesquite, swampy locations near the reservoir, and growth along irrigation ditches. At Cold Creek, on October 11, 1931, about half a dozen individuals were seen in the (then) leafless thickets of wild roses growing in and near the stream. In midwinter but one song sparrow was noted. A specimen was collected at Indian Springs on February 7, 1931.

Nine specimens collected are all referable to *fallax,* although an occasional bird looks as though it might have come from a region of intergradation between *fallax* and *merrilli.* One would expect the Modoc-Sierra race, *fisherella,* to occur in this region as a migrant or winter visitant, but if it did, we failed to take any specimens.

Melospiza melodia merrilli Brewster. Merrill Song Sparrow.

Two song sparrows, collected at Indian Springs on October 11, 1931, and at Cold Creek on October 24, 1931, are apparently typical of the subspecies *merrilli.*

The absence of song sparrows from Indian Springs and Cold Creek during the breeding season was a matter which occasioned considerable surprise, for there is suitable, permanent territory in which we had every expectation of finding them.

LITERATURE CITED

Burt, W. H.
1934. The mammals of southern Nevada. Trans. San Diego Soc. Nat. Hist., vol. 7, pp. 375-428, map.

Fisher, A. K.
1893. Report on the ornithology of the Death Valley expedition of 1891, comprising notes on the birds observed in southern California, southern Nevada, and parts of Arizona and Utah. North Amer. Fauna No. 7, pp. 7-158.

Grinnell, J.
1908. The biota of the San Bernardino Mountains. Univ. Calif. Publ. Zool., vol. 10, pp. 1-170, pls. 1-24.
1917. The subspecies of *Hesperiphona vespertina*. Condor, vol. 19, pp. 17-22, 1 fig.
1928. A distributional summation of the ornithology of Lower California. Univ. Calif. Publ. Zool., vol. 32, pp. 1-300, 24 figs.

Grinnell, J., and Hall, H. M.
1919. Life-zone indicators in California. Proc. Calif. Acad. Sci., ser. 4, vol. 9, pp. 37-67.

Grinnell, J., Dixon, J., and Linsdale, J. M.
1930. Vertebrate natural history of a section through the Lassen Peak region. Univ. Calif. Publ. Zool., vol. 35, pp. v+594, 181 figs.

Grinnell, J., and Swarth, H. S.
1913. An account of the birds and mammals of the San Jacinto area of southern California with remarks upon the behavior of geographic races on the margins of their habitats. Univ. Calif. Publ. Zool., vol. 10, pp. 197-406, pls. 6-10, 3 figs.

Jaeger, E. C.
1926. A preliminary report on the flora of the Charleston Mountains of Nevada. Occas. Papers Riverside Junior Coll., vol. 1, pp. 1-15, 1 pl.
1927. Birds of the Charleston Mountains of Nevada. Occas. Papers Riverside Junior Coll., vol. 2, pp. 1-8.
1929. Denizens of the mountains (Springfield, Ill., Thomas), pp. xiii+168, 27 pls., many figs.

Longwell, C. R.
1926. Structural studies in southern Nevada and western Arizona. Bull. Geol. Soc. Amer., vol. 37, pp. 551-584, 4 pls.

Oberholser, H. C.
1902. A review of the larks of the genus Otocoris. Proc. U. S. Nat. Mus., vol. 24, pp. 801-883, pls. 43-45, maps 1-4.
1932. Descriptions of new birds from Oregon, chiefly from the Warner Valley region. Sci. Publ. Cleveland Mus. Nat. Hist., vol. 4, pp. 1-12.

Pickwell, G.
1930. The sex of the incubating killdeer. Auk, vol. 47, pp. 499-506.

Thayer, J. E., and Bangs, O.
1906. Breeding birds of the Sierra de Antonez, north central Sonora. Proc. Biol. Soc. Wash., vol. 19, pp. 17-22.

Van Rossem, A. J.
1931*a*. Report on a collection of land birds from Sonora, Mexico. Trans. San Diego Soc. Nat. Hist., vol. 6, pp. 237-304.
1931*b*. Description of new birds from the mountains of southern Nevada. Trans. San Diego Soc. Nat. Hist., vol. 6, pp. 325-332.
1933. The types of three birds described from California. Trans. San Diego Soc. Nat Hist., vol. 7, pp. 1-2.
1936. The bush-tit of the southern Great Basin. Auk, vol. 53, pp. 85-86.

Transmitted October 13, 1935.

INDEX

COOPER CLUB PUBLICATIONS

THE CONDOR

Vol. 1 (1899) "Bulletin of the Cooper Ornithological Club" - - - - - - - - (*Out of print*)

Vols. II and III (1900-1901) The Condor - - - - - - - - - - - - (*Out of print*)

Vols. IV to VII (1902-1905) The Condor, complete, each volume - - - - - - - - $10.00

Vols. VIII to XII (1906-1910) The Condor, complete, each volume - - - - - - - - $3.00

Vol. XIII (1911) The Condor, complete - $6.00

Vols. XIV to XXV (1912-1923) The Condor, complete, each volume - - - - - - - - $2.00

Vol. XXVI (1924) The Condor, complete - $3.00

Vol. XXVII (1925) The Condor, complete - $7.00

Vols. XXVIII to XXIX (1926-1927) The Condor, complete, each volume - - - - - - - $3.00

Vol. XXX (1928) The Condor, complete - - $5.00

Vols. XXXI to XXXVIII (1929-1936) The Condor, complete, each volume - - - - - - $3.00

PACIFIC COAST AVIFAUNA

No. 1, 1900 Birds of the Kotzebue Sound Region, Alaska; 80 pp., 1 map - - - - - - $1.00
By J. GRINNELL

No. 2, 1901 Land Birds of Santa Cruz County, California; 22 pp. - - - - - (*Out of print*)
By R. C. McGREGOR

No. 3, 1902 Check-list of California Birds; 100 pp., 2 maps - - - - - - - - - (*Out of print*)
By J. GRINNELL

No. 4, 1904 Birds of the Huachuca Mountains, Arizona; 75 pp. - - - - - - - - - (*Out of print*)
By H. S. SWARTH

No. 5, 1909 A Bibliography of California Ornithology; 166 pp. - - - - - - - - - $2.00
By J. GRINNELL

No. 6, 1909 Index to the Bulletin of the Cooper Ornithological Club, vol. 1 (1899), and its continuation, The Condor, vols. II to X (1900-1908) 48 pp. - - - - - - - - - - $4.00
By HENRY B. KAEDING

No. 7, 1912 Birds of the Pacific Slope of Southern California; 122 pp. - - - - - - $1.00
By G. WILLETT

No. 8, 1912 A Systematic List of the Birds of California; 23 pp. - - - - - - - - $ .50
By J. GRINNELL

No. 9, 1913 The Birds of the Fresno District; 114 pp. - - - - - - - - - - $1.00
By J. G. TYLER

No. 10, 1914 Distributional List of the Birds of Arizona; 133 pp., 1 map - - - - - - $1.00
By H. S. SWARTH

Supplement to Pacific Coast Avifauna No. 10. The author, Anders H. Anderson, has brought this State List up to date. Reprint from **The Condor**, XXXVI, No. 2, March, 1934, pp. 78-83 - $ .30

No. 11, 1915 A Distributional List of the Birds of California; 217 pp., 3 maps - - - - $2.00
By J. GRINNELL

No. 12, 1916 Birds of the Southern California Coast Islands; 127 pp., 1 map - - - - $1.00
By A. B. HOWELL

No. 13, 1919 Second Ten Year Index to The Condor, volumes XI-XX, (1909-1918); 92 pp. - $2.00
By J. R. PEMBERTON

No. 14, 1921 The Birds of Montana; 194 pp., 35 illustrations - - - - - - - - $4.00
By ARETAS A. SAUNDERS

No. 15, 1923 Birds Recorded from the Santa Rita Mountains in Southern Arizona; 60 pp., 4 illustrations - - - - - - - - - $1.00
By FLORENCE MERRIAM BAILEY

No. 16, 1924 Bibliography of California Ornithology; 2nd Installment; 191 pp. - - - - - $4.00
By J. GRINNELL

No. 17, 1925 A Distributional List of the Birds of British Columbia; 158 pp., colored frontispiece and map, 26 line maps, 12 ills. - - - $3.00
By ALLAN BROOKS and HARRY S. SWARTH

No. 18, 1927 Directory to the Bird-life of the San Francisco Bay Region; 160 pp., one map, colored frontispiece - - - - - - - - - - $3.00
By JOSEPH GRINNELL and MARGARET W. WYTHE

No. 19, 1929 Birds of the Portland Area, Oregon; 54 pp., 21 illustrations - - - - - - $1.00
By STANLEY G. JEWETT and IRA N. GABRIELSON

No. 20, 1931 Third Ten Year Index to The Condor, volumes XXI-XXX, (1919-1928); 152 pp. $4.00
By GEORGE WILLETT

No. 21, 1933 Revised List of the Birds of Southwestern California; 204 pp. - - - - - $4.00
By GEORGE WILLETT

No. 22, 1934 Birds of Nunivak Island, Alaska; 64 pp. - - - - - - - - - - $2.00
By H. S. SWARTH

No. 23, 1936 The Birds of Nevada; 145 pp., 1 map - - - - - - - - - - - - $4.00
By JEAN M. LINSDALE

MISCELLANEOUS PUBLICATIONS

Biographies

H. W. Henshaw: 56 pp., 3 pls. (from CONDOR, 1919-1920) - - - - - - - - - - $1.00

Robert Ridgway: 118 pp., 50 ills. with a complete bibliography of his writings (from CONDOR, 1928) - - - - - - - - - - - - - $1.00

Bird Art Catalogues

Catalogue of an exhibition of paintings by American Bird Artists, First Annual Meeting, Los Angeles Museum, April, 1926; 24 pp. - - -$1.00

Catalogue of the work of Major Allan Brooks held in connection with the third annual meeting of the Cooper Ornithological Club May 4-6, 1928, under the auspices of the San Diego Society of Natural History, Fine Arts Gallery, Balboa Park, San Diego, Calif., 10 pp. - - - - - $ .50

An exhibition of scientific drawings by John Livzey Ridgway, shown by the Los Angeles Museum, on the occasion of the Fifth Annual Meeting of the Cooper Ornithological Club - - - - - $ .50

Other Publications

The Story of the Farallones, 1897; 36 pp., 28 ills. - - - - - - - - - - - - - $ .20
By C. BARLOW

Report of the Birds of Santa Barbara Islands. Pub. No. 1, Pasadena Acad. Sci., August, 1897; 26 pp. - - - - - - - - - - - - $1.00
By J. GRINNELL

Birds of the Pacific Slope of Los Angeles County. Pub. No. 2, Pasadena Acad. Sci., March, 1898; 52 pp. - - - - - - - - - $ .50
By J. GRINNELL

FOR SALE BY

W. LEE CHAMBERS, Business Manager

2068 ESCARPA DRIVE, EAGLE ROCK,

LOS ANGELES, CALIFORNIA